

**Rock Cut Slopes
Portsmouth Bypass
Project SCI-823-0.00
Phase 3 – Stage I
Scioto County, Ohio**

VOLUME 1 OF 2

November 16, 2007



Report of:

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PID 77366

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Prepared by:



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OF
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**REPORT
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PHASE 3 – STAGE I
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1.0 INTRODUCTION

This report presents the methodologies and findings of the cut slope design performed by DLZ Ohio, Inc. (DLZ) for the Phase 3 portion of the SCI-823-0.00 Portsmouth Bypass project located in Scioto County, Ohio. The Phase 3 portion of the project will begin at Station 0+00 and ends at Station 353+00. The proposed alignment will extend in a north/northwesterly direction for approximately 6.7 miles from existing US 52 north to a point approximately 0.5 mile north of Blake Hollow Road and 0.25 mile west of US 235. The proposed alignment is illustrated on the general location map in Appendix A.

Based on the site plans included in Appendix A, rock cut slope design was required in certain areas of the proposed alignment between Station 40+00 and Station 352+00. In considering the rock cut slopes, the areas requiring rock cut design were divided into eleven cut sections, namely, Rock Cuts #1 through #11. Rock cuts will also be located on two ramp alignments. These are State Route 140 and US Route 52. Rock cut design for Rock Cuts #11(north half) through #32 are presented in separate reports for project Phases 1 and 3. The areas requiring rock cut slope design and their corresponding station ranges are shown in the following table. The stationing for the rock cuts are approximate and are based on roadway alignment and elevation information available at the time of this report.

| Rock Cut | Station Range |
|----------------------|----------------------------------|
| US 52 Ramps A&B 1 | 40+50 – 54+00 & 54+00 – 61+25 |
| 2 | 77+00 – 106+25 |
| 3 | 138+75 – 173+25 |
| 4 | 177+75 – 207+25 |
| 5 | 212+25 – 228+00 |
| 6 | 257+75 – 268+25 |

| Rock Cut | Station Range |
|-----------------|----------------------|
| 7 | 269+75 – 290+25 |
| 8 | 305+75 – 317+25 |
| 9 | 322+75 – 328+25 |
| 10 | 329+25 – 343+75 |
| 11 | 347+25 – 351+50 |
| SR 140 Ramp A | 77+00 – 105+50 |
| SR 140 Ramp B | 60+92 – 77+95 |

A subsurface exploration program was conducted for the proposed alignment. The purpose of the subsurface exploration was to: 1) determine the subsurface conditions to the depths of the borings, 2) evaluate the engineering characteristics of the subsurface materials, and 3) provide information to assist in designing the cut slopes, roadway embankments and pavements.

This report pertains to the rock cut slope design only. The findings of the roadway embankment and pavement evaluation are presented in separate documents. Note that information specific to soil cut slopes is also present in their respective roadway embankment reports.

The geotechnical engineer has planned and supervised the performance of the geotechnical engineering services, has considered the findings, and has prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are made as to the professional advice included in this report.

2.0 PHYSICAL SETTING

The project is located in the Shawnee-Mississippian Plateau of the unglaciated portion of the Appalachian Plateau Physiographic Region. This area is not highly developed and contains limited secondary roadways. The area is characterized by rough, steep, broken, and severely dissected topography. The natural slopes are generally very steep, rising abruptly from the valley bottoms. The maximum topographic relief along project centerline is on the order of 275 feet and occurs between a high point at approximate Station 523+70 (approximate elevation 890 feet) and a low point near Station 353+80 (approximate elevation 615 feet). The maximum vertical relief along the proposed finished grade is approximately 130 feet, with the highest point at approximate Station 352+00 (elevation 645 feet) and the lowest point near Station 519+30 (elevation 775 feet).

3.0 GEOLOGICAL CONSIDERATIONS

3.1 Site Geology

The lithology of the project area is primarily composed of Pennsylvanian and Upper Mississippian age rocks including shale, siltstone, and sandstone.

The Pennsylvanian age rocks in the project area are in the Pottsville Group and mapped as the Pennsylvanian Breathitt Formation according to the bedrock geology maps prepared by the Ohio Department of Natural Resources' Division of Geologic Survey (ODNR-DGS). The Breathitt Formation is found as thin bands generally following the topographic contours of the higher ridgelines. Due to the regional dips, this rock formation generally exists above elevations between 760 and 850 feet in the project area. The Breathitt Formation consists of conglomerate, coal, shale, thin limestone, sandstone, and ironstone. Generally, shale and sandstone are the dominant lithologies with occasional thin, bony coal beds or blossoms.

The predominant marker beds found with the Breathitt Formation are the Harrison Ore, located immediately above the Mississippian age Maxville Limestone, the Sciotoville Clay, the Sharon Ore, and the Anthony Coal. Of these members, the Harrison Ore is the only marker bed that is relatively continuous within the project area.

The Upper Mississippian age rocks from the Waverly Series, Logan, and Cuyahoga Formations generally exist below the Pennsylvanian age Breathitt Formation. However, the Maxville Limestone, overlying the Logan Formation, marks the contact with the Breathitt Formation. The Maxville Limestone consists of isolated, discontinuous pockets of limestone. The discontinuous nature is due to an erosional unconformity at the upper

surface. Where the Maxville Limestone is absent, the Logan Formation marks the upper contact with the Breathitt Formation.

The Logan Formation varies in thickness in part due to the erosional unconformity at its upper boundary and consists primarily of gray to brown fine-grained sandstone, siltstone, and sandy shale. However, the Logan Formation is characterized by the dominance of sandstone. Three members of the Logan are identified within the project area, namely, the Byer Sandstone, the Allensville Conglomerate, and the Vinton Sandstone. Occasional iron bearing zones, identified as ironstones and ferric bands, are present within the Logan Formation, but are usually thin, isolated, and nodular. Generally, the Vinton member is a fine-grained sandstone which can be finely interbedded with sandy shale and often contains zones of fossils and ironstone concretions. The Byer member is generally a fine-grained sandstone which can be finely interbedded with sandy shale or massive sandstone. The Allensville member is a fine-grained sandstone which can be finely interbedded with sandy shale with small pebbles beds (1 to 2 inches) throughout. This member is not easily distinguishable from the Byer member and is often missing within the sequence.

The Logan Formation is the dominant rock stratum found within the project area with the exception of the Pennsylvanian Breathitt Formation capping the higher ridgelines in some areas.

Soils found within the study corridor can be divided into three groups; residual and colluvial soils derived from weathering of underlying rock and downslope transport; lacustrine and outwash deposits of glacial origin; and recent alluvial deposits. The residual and colluvial soils are found along the ridge tops and hillsides; glacial soils are typically found within the major stream valley and their tributaries; and recent alluvial deposits are found along and within stream channels and valleys.

Within the project area, residual and colluvial soils are generally thin to moderately deep, covering moderate to very steep slopes. Residual and colluvial soils on the hillsides are prone to landslides.

The two types of glacial soils encountered within the study corridor are lacustrine deposits and glacial outwash deposits. The lacustrine soils are commonly known as the 'Minford Silts' or the Minford Complex. The Minford Complex soils are generally found between elevations 650 and 780 feet. The thickness of the Minford Complex soils varies considerably throughout the project area, partially due to the nature of original deposition and geological changes since the time of formation. When present, these materials usually lie on or near bedrock. The Minford Complex soils have no regular succession. Typically sands and sandy silts are found near the bedrock and fine laminated silts and clays are found at the higher levels of the sequence. Occasionally, the Minford Complex contains sandstone cobbles and boulders or chert and quartz pebbles in the lower parts of the sequence. These cobbles, boulders and pebbles within the sequence are believed to be of local origin. The glacial deposits are late Wisconsinan in age and consist of sand

and gravel deposits with small isolated peat deposits. Generally, these deposits are saturated at shallow depths with high recharge rates.

Alluvial soils, to some extent, are found along all of the creeks and rivers within the project area. Generally alluvial deposits range from silty clay to coarse sand. Where bedrock is shallow, alluvial deposits may contain coarse sand, gravel, and cobbles.

3.2 Landslide Susceptibility

The dominant rock type along the proposed alignment is sandstone of the Mississippian aged Logan Formation. Siltstone and shale are commonly found interbedded with the sandstone. These siltstones and shales generally weather to clay with low shear strength over time. The steeper slopes are prone to gradual movement known as soil creep. The low shear strength of the residual and colluvial soils combined with the steep topography makes some of the hillsides within the proposed limits of construction prone to shallow surficial landslides and soil creep. Generally these conditions are easily corrected by removal of the unstable slope materials. No deep-seated landslides were observed along the proposed Phase 3 alignment.

In the steep terrain of Scioto County, soil creep is common. Areas of slope instability were first identified using survey data and aerial photography and then verified during the fieldwork. Three areas showed indications of significant instability near or within the limits of construction. Most slope instability appeared to be relatively shallow soil creep contained within the overburden. In most cases, these areas of slope instability were less than 10 feet deep even though drilling in several of these landslide areas indicated significantly deeper overburden. These areas of slope instability are shown on the field notes and proposed centerline in Appendix A of the *Report of Geology and Field Reconnaissance for Project SCI-823-6.81, Phase 3-Stage 1, dated November 16, 2007*. The following is a summary of those findings.

Station 136+25 to Station 137+50

This area includes the northern shore of the Little Scioto River to the edge of SR 335. Pavement cracking along the shoulder of SR 335 and displaced trees, which appeared to be indicative of recent movement, were observed. Slope movement in this area appeared to be the result of soil saturation and rapid drawdown during flood events.

Station 138+50 to Station 146+50

Mapping and field work revealed signs of a past, possibly massive landslide in this area. The slopes in this hollow are generally 1H: 1V or steeper. The terrain was hummocky and a perennial stream had eroded the lower portions of the slopes in the hollow. Bedrock was exposed in the lower portions of the hollow towards the Little Scioto River.

Station 319+75 to Station 323+75

This appeared to be a shallow landslide that might have occurred as a result of logging activities. There was a wet area at the toe of the slope and several logging roads had been cut into the slope at varying elevations.

3.3 Mining Activities

Scioto County has been mined extensively for a variety of materials including sand and gravel, sandstone, clay, and coal. However, neither large sand and gravel operations nor large clay pits were reported within the project area.

Strip and drift mining for coal are common within the Pennsylvanian rocks along the far eastern portions of the county in Bloom, Vernon, and Green Townships outside of the project area. Coal seams do not appear in significant enough thickness or quality within the study corridor to have warranted extensive mining. Small-scale local coal mining operations are suspected to have occurred historically within the Pennsylvanian Breathitt Formation found in the project area.

Quarries are found throughout Scioto County for mining dimension blocks of sandstone and limestone for aggregate or flux. However, the sandstones of the Mississippian Logan Formation, the dominant rock in the study corridor, are unsuitable for dimension stone. Consequently, quarries for sandstone or limestone were not reported or observed within the project area.

Iron deposits are found throughout the region and were reported to have been locally mined within Scioto County. The extent of ore mining within the project area is unknown, but estimated to be very small.

3.4 Seismic Considerations

Compared to seismically active areas of the United States (California or Alaska), Ohio has relatively few earthquakes. The most frequent and damaging earthquakes in the state of Ohio originated from the City of Anna, Shelby County, in the vicinity of western Ohio. During the last 100 years this area has experienced more than 30 earthquakes with the decade of the 1930's being the most active period. Among these 30 earthquakes, only 23 events were recorded, including the most severe shock ever recorded in Ohio. This severe earthquake, occurred on March 9, 1937, had a reported intensity of VIII on the modified Mercalli scale (5.4 on the Richter scale) and was felt over an area of 150,000 square miles. Considerable damage to windows and walls and extensive cracking of masonry occurred in several large buildings in Anna and nearby communities.

Earthquakes were also reported in northeastern, southeastern, and other western portions of Ohio. One earthquake, measured between 4.0 and 4.9 on the Richter scale, reportedly centered near Portsmouth, Ohio in 1901. Lesser magnitude quakes have been recorded in southern Ohio, outside of Scioto County. These earthquakes were of minor intensity (<3.9 magnitude), causing little or no damage.

This project is located in excess of 200 miles away from the City of Anna and any of the above-mentioned areas of historical earthquakes. It is estimated that the levels of seismic acceleration from any of the previous earthquake locations would be small and that the effect of seismic loadings, if any, due to the potential earthquakes from these areas can be considered minimal on the design of rock cut slope design.

3.5 Existing Cut Slope Features in the Region

Existing rock cut slopes are present along the CSX Railroad line, existing roadways, and in isolated locations of the project area. The field observations of the rock cut slopes within the project area are presented in the following paragraphs.

A large cut exists in the northwestern portion of the proposed Portsmouth Bypass corridor on Fairground Road behind M&J Welding, a moderately-sized industrial facility. The base of the cut is at an approximate elevation of 620 feet. The property behind and adjacent to the M&J Welding main building appears to be in the preliminary stages of development for an industrial park. The approximately lower two-thirds of the hillside behind the building is composed of the Portsmouth Shale member of the Cuyahoga Formation while the remaining one-third is composed of sandstone of the Logan Formation. The cut directly behind the building appears to be entirely within the Portsmouth Shale at approximately 1.5H:1V to 2H:1V slope. It is uncertain whether the cut was made for original construction of the building or to mitigate a landslide that might have developed after the building was constructed since the cut appears to be recent. The shale exposed in the cut showed evidence of moderate erosion and softening and appeared to be weathering quickly to clay. Road construction leading to a residence on the ridge top had exposed shale in the ditches that had become soft and plastic upon exposure. A prominent cut in the sandstone of the Logan Formation is present along the residential driveway at an approximate elevation of 820 feet. The sandstone exposed in this location was cut nearly vertical. Two prominent joint sets were observed in the rock cut, both nearly vertical with one trending approximately east-west and the other trending approximately north-south. The cut appeared to be performing well; however, it is suspected that the cut might have been recently constructed.

Large road cuts are present east and west of State Route 140, near the intersection of US 52. The cut to the west of State Route 140 is heavily vegetated with little rock exposure while the cut located east of State Route 140 is a sparsely vegetated slope consisting of mixed material ranging from shale to sandstone in thin to medium beds at an approximate roadway elevation of 560 feet. The rock strata in this cut belong to the Mississippian aged Logan Formation. The cut is approximately 1,500 feet long and 150 feet high, with a slope of approximately 1H:1V. A 20-foot wide horizontal bench was cut approximately 100 feet above SCI-CR503 and US 52 (Service Road Y on 1961 SCI-52-25.62 plans) and the other 20-foot wide horizontal bench at the base of the cut. At the time of the field observation, the slope appeared to be performing well with minor amounts of rock fall at the base. However, the bench at the base of the cut appeared to have been recently cleaned.

A large rock cut is also present along State Route 335 between Swauger Valley Road and the CSXT Rail Bridge over the Little Scioto River. The cut is on the north side of the road at an approximate roadway elevation of 660 feet. The exposed rock is a hard sandstone that is pitted and black in appearance overlying a medium hard siltstone layer which is just above the road elevation at the east end of the cut. The sandstone is jointed and is believed to be the Byer Member of the Logan Formation. The major joint set is trending east-west, parallel with the cut face. The cut appeared to be sloped at approximately 1/2H:1V. Overall, the cut appeared to be stable producing only occasional rockfall. At some locations the rock face appeared to slough off in large sheets probably due to freeze thaw action within the joints over time. At the intersection of Swauger Valley Road and State Route 335 the west face had been recently cut back with a high cut at an approximate roadway elevation of 530 feet. The cut appeared to be over 100 feet high consisting primarily of sandstone. A weak zone approximately 20 feet thick was evident about 40 feet above the base of the cut. The cut appeared to be approximately 1/2H:1V to 1/3H:1V with a bench approximately 40 to 50 feet wide at the base of the cut. Several large blocks of rock were present on the bench at the time of the field observation and were likely rock fall.

Along State Route 335, south of Wheelers Mill Road, a small cut was observed on the western side of the roadway around a bend at an approximate roadway elevation of 560 feet. This cut is a mixed slope of interbedded sandstone, siltstone and minor shale with a 1/2H:1V slope. The slope appeared to be performing poorly with large amounts of sloughed rock accumulating at the base of the cut.

Along State Route 139 between Minford and Clarktown, two rock cuts was observed along the north side of the roadway at an approximate roadway elevation of 640 feet. These rock cuts were at approximate mile markers 9.8 and 9.9 and were approximately 10 to 20 feet high with near vertical slopes in massive sandstone of the Logan Formation. The cuts appeared to be old with minimal or no recent maintenance. However, the cuts appeared to be performing well with very minimal rock fall along the base of the cuts.

4.0 FIELD EXPLORATION

DLZ personnel conducted an initial field reconnaissance and reviews of published data in February 2002. The results were compiled in a report titled *Phase I Subsurface Investigation, Portsmouth Bypass Transportation Study, Geotechnical Literature Review and Field Reconnaissance, SCI-823-0.00*, dated February 25, 2002.

A preliminary geotechnical investigation was performed by DLZ Ohio, Inc. as part of the Portsmouth Bypass Transportation Study. A total of twenty-one borings were drilled throughout the study corridor to develop preliminary geotechnical information to aid in the selection of feasible alternative alignments. A summary of the preliminary geotechnical investigation was presented in DLZ Ohio, Inc.'s report titled *Phase I-Stage II Subsurface Investigation, Portsmouth Bypass Transportation Study, Preliminary Boring Program, SCI-823-0.00*, dated June 21, 2002.

Using the information collected during the geotechnical overview and the Phase 1-Stage II subsurface investigation, and upon review of preliminary plans, profiles and cross-sections, DLZ prepared a boring plan for geotechnical exploration. Upon review and approval of the boring plan by ODOT Office of Geotechnical Engineering (OGE) personnel, DLZ personnel performed the subsurface exploration between April 28, 2004 and September 1, 2006. The subsurface exploration consisted of drilling 530 mainline roadway borings, R-15 through R-2676, using both truck-mounted and ATV-mounted, rotary-type drill rigs. Drilling efforts included auger borings, sample borings, and rock core borings. The borings were generally spaced 300 to 600 feet apart and were advanced to depths between 15 and 230 feet. The borings generally were drilled a minimum of 10 feet below the anticipated finished grade of the roadway.

5.0 DESIGN PROCEDURE FOR CUT SLOPE RECOMMENDATIONS

On January 13, 2006, ODOT issued the Geotechnical Bulletin GB-3 “Rock Cut Slope & Catchment Design” to provide guidance on the design of rock cut slopes, rockfall catchment, and rockfall controls. During the February 3, 2006 project meeting with ODOT, an alternate roadside ditch design was selected to be used. The alternate road side ditch design does not strictly adhere to the GB-3 requirements but reduces the width of proposed rock cuts and lessens the amount of property to be taken by the cut excavations than the standard designs would require. As a result, the design of rock cut slopes for the Phase 3 of the Portsmouth Bypass project slightly deviate from the GB-3.

Note that information specific to soil cuts are presented in their respective roadway embankment report.

In general, the approach to the design of cut slopes consisted of four phases. The details of each of the design phases are discussed in the following sections.

5.1 Existing Data Evaluation

The first phase involved evaluations of available geologic data, which included surface mapping, data and information gathered from USGS, ODNR, and other relevant resources, and field reconnaissance. A summary of the existing data evaluation is presented in Section 3 of the report.

5.2 Field Investigation and Laboratory Testing

The second phase involved subsurface exploration, which included soil and rock sampling and laboratory testing of selected samples. Geotechnical information including, but not limited to, soil strength, rock structure, rock hardness, degree of weathering, and rock fabric were developed by visual descriptions of soil and rock cores, and hand penetration tests of soil samples. Slake durability tests (ASTM D4644) and point load strength index tests (ASTM D5731) were also performed on selected rock cores. Note that a factor of 21 was applied to the point load test result of a rock core to determine the equivalent uniaxial compressive strength of the rock core. According to a study, titled

Using the Point Load Test to Determine the Uniaxial Compressive Strength of Coal Measure Rock, performed by Mr. John Rusnak of the Peabody Group for the National Institute for Occupational Safety and Health, the conversion factor of 21 worked well for a variety of rock types and geographic regions.

5.3 Slope Evaluation, Design, and Layout

The third phase was to determine the cut slope configuration based on the information gathered from the first two phases of the design procedure. In designing the rock cut slope configurations, significant consideration was given to the point load strength, rock quality designation (RQD) values, rock structure and hardness, degree of weathering, and slake durability test, if available.

Cut slope benches were provided according to the following guidelines:

1. Soil overburden benches: Slopes in the soil overburden zone (where the zone is over 10 feet thick) typically had a slope of 2H:1V. At the interface between soil overburden and bedrock, a 10-foot wide bench was provided. If the overburden zone was less than 10 feet thick or the natural slope was 1H:1V or steeper, rounding of the top of the cut to blend into the natural slope was considered.
2. Geotechnical benches: These benches, generally 10-foot wide, were placed at locations where a competent lithologic rock overlies an incompetent/weathered rock. The slope of these benches longitudinally followed the base of the competent rock with an outslope having positive drainage at a maximum grade of 10%, and a minimum grade of 3%. Note that geotechnical benching must be field adjusted during construction to follow any changes in bedding surface.
3. Construction benches: For slopes steeper than 1H:1V, 5-foot wide horizontal construction benches were placed at a maximum of 30-foot vertical intervals of a rock cut slope where no geotechnical benches were required.

Note that variations in the actual construction bench widths are expected. Bench widths may need to be modified to maintain a temporary working bench, accommodate relief in the existing sloping face and overburden thickness, and minimize the amount of water flow across the cut slope face.

5.4 Quantitative Analysis of Rock Cut Slopes

The fourth phase was to evaluate the failure potential of the cut slope configuration using the Colorado Rockfall Simulation Program (CSRP), Version 4.0. This program uses slope and rock geometry and material properties to calculate falling rock bounce height, velocity and travel distance. Results of the CSRP analyses were used to verify the appropriateness of the cut slope configuration break in slope angles, and catchment ditch geometry. Based on the CSRP analysis, barriers were recommended in some areas to provide the necessary rockfall mitigation measure. Given the existing site conditions and

the results of the preliminary CSR analysis, it appears that a minimum slope height of 80 feet is necessary for any falling rock to reach beyond the catchment ditch. Consequently, the CSR analysis was performed only for the cut slopes 80 feet or higher.

6.0 SUBSURFACE CONDITIONS

The following sections present the generalized subsurface conditions encountered by the borings. For more detailed information, refer to the Rock Cut Boring Location Plans in Appendix A and the Boring Logs presented in Appendix B. Laboratory test results including the slake durability indices and uniaxial compressive strengths are shown on the Boring Logs and also included in Appendix B.

The overburden encountered in the borings primarily consisted of varying thicknesses of cohesive soils including Sandy Silt (A-4a), Silt (A-4b), Silt and Clay (A-6a), Silty Clay (A-6b), and Clay (A-7-6). Occasionally, granular materials consisting of Coarse and Fine Sand (A-3a), Gravel with Sand (A-1-b) and Gravel with Sand and Silt (A-2-4), and Gravel with Sand, Silt and Clay (A-2-6) were also encountered.

Bedrock encountered in the borings correlates well with the available geologic references. The cores obtained consisted primarily of sandstone and occasionally shale, siltstone, clayshale and coal with varying degrees of weathering and different amounts of fracturing. During the rock coring operation, some water was lost into the voids in the rock. The final water levels in the borings varied widely at the completion of rock coring.

Based on the site plans provided, rock cut slope is only required in certain areas of the proposed alignment between Station 40+00 and Station 351+50. In considering the rock cut slopes, these areas were divided into eleven cut sections, namely Rock Cuts #1 through #11, as shown in the table in Section 1.0 of this report. In addition, rock cut slopes are also necessary along the US Route 52 Ramps A and B, Rock Cut SR 140 Ramp A and Cut SR 140 Ramp B.

The sections that follow present the generalized subsurface conditions encountered by the borings within the anticipated rock cut sections, which was used to construct the rock cut profiles for the sections. For detailed information, refer to the boring logs in Appendix B. The boring logs are separated by divider tabs according to the associated rock cut number.

6.1 Rock Cut US Route 52 Ramps A and B (Station 40+50 to Station 54+00) and Rock Cut #1 (Station 54+00 to Station 61+25)

The subsurface conditions generally consisted of less than 8 inches of topsoil underlain by soils including Silt (A-4b), Silt and Clay (A-6a), Sandy Silt (A-4a), Gravel and Stone Fragments with Sand and Silt (A-2-4), and Sandy Silt (A-4a) and Fine Sand (A-3). Silt (A-4b), Silt and Clay (A-6a) and Sandy Silt (A-4a) were the most common soil types encountered. Soil overburden thickness generally ranged from less than 1 foot to 19 feet.

Below the topsoil and soils, a layer of severely weathered argillaceous sandstone, between 1 and 5 feet thick, was encountered in most of the borings. Generally the

severely weathered rock was similar to the type of intact bedrock encountered immediately below it. The competent bedrock generally consisted of sandstone.

Bedrock was confirmed by coring in all borings. Bedrock primarily consisted of medium hard to hard, very fine to fine-grained sandstone. Sandstone containing varying amounts of siltstone and shale were also encountered. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

Wet conditions were encountered during the drilling of Boring R-2014; however, seepage was not observed in the overburden. Prior to coring, 8.1 feet of water was observed in the borehole. Groundwater and seepages were not encountered in any other boreholes drilled for these rock cuts prior to coring. Noted that the water levels at completion, recorded on the boring logs, included the water used for coring.

| Dominant Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|--|----------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 24 – 100 | 76-3,678 | 1,596– 77,238 | 1,621-13,958 | 4.1-99.8 |
| Sandstone and Shale with varying amounts of interbedding | 66-91 | 361-728 | 7,581-15,288 | 4,352-12,960 | 64.9-89.8 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

6.2 Rock Cut #2 (Station 77+00 to Station 106+25)

Generally, the near-surface conditions consisted of a veneer of topsoil overlying the soil. Topsoil thicknesses were typically less than 0.5 foot while the underlying soils ranged in thickness from 3.0 to 10 feet. Soils including Sandy Silt (A-4a), Silty Clay (A-6b), Silt and Clay (A-6a), Silt (A-4b), Fine to Coarse Sand (A-3a) and Gravel and Stone Fragments with Sand and Silt (A-2-4) were encountered.

Below the topsoil and soil overburden, a layer of severely weathered rock was encountered in most of the borings, ranging in thickness between 1.5 and 9.5 feet. The severely weathered rock, primarily consisted of weathered sandstone, weathered shale and siltstone were also encountered. The highly weathered bedrock generally was similar to the type of intact bedrock encountered immediately below it.

Bedrock was confirmed by coring in all borings. Bedrock primarily consisted of medium hard to hard, very fine to fine-grained sandstone. Occasionally, argillaceous laminations and finer grained zones were interspersed with the sandstone. Shale was also encountered in several borings. Additionally, several borings encountered some interbedded zones consisting of varying amounts of shale, siltstone and sandstone. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

Seepage was noted at depth of 1.0 foot in Borings R-34 and no appreciable amount of water was present in the borings prior to coring. Groundwater and seepage were not encountered in any other boreholes prior to coring drilled for this rock cut.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|---|--------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 8-100 | 43-2,042 | 903-42,882 | 2,629-13,945 | 39.4-99.0 |
| Sandstone, Siltstone and Shale with varying amounts of interbedding | 33-100 | 40-468 | 840-9,828 | 5,662-12,415 | 74.2-93.2 |
| Shale | 57-97 | 17-500 | 357-10,500 | 2332 | 11.7 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

6.3 Rock Cut #3 (Station 138+75 to Station 173+25)

The subsurface soil conditions consisted of thin topsoil layer, typically less than 8 inches, followed by up to 8 feet of soil or highly weathered bedrock. Sandy Silt (A-4a) was the most prevalent soil type identified. Silt and Clay (A-6a), Silty Clay (A-6b), Fine to Coarse Sand (A-3a) and Clay (A-7-6) were also noted. Soil thickness was generally less than ten feet with few exceptions. Boring R-72 has a soil thickness of 25 feet and Boring R-85 had a thickness of 14 feet.

The bedrock encountered by the borings was primarily very fine to fine-grained sandstone. A layer of severely weathered sandstone was mostly encountered in the upper 1 to 2 feet of the bedrock strata. However, severely weathered bedrock layers of up to 7.5 feet thick were occasionally encountered. Below the severely weathered layer, the sandstone was mostly medium hard to hard sandstone. Shales and mixtures of siltstone, shale, sandstone and coal were found in rock strata between elevation 805 and 850. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

Seepage was encountered in Borings R-81 and R-87 approximately one foot below ground surface and in Boring R-85 at a depth of 6 feet. None of the borings contained appreciable water amounts of water prior to coring. The other borings reviewed for this rock cut did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|--|--------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 0-100 | 16-1,758 | 336-36,918 | 7,492-14,941 | 83.5-98.3 |
| Sandstone with varying amounts of interbedding | 30-100 | 10-516 | 210-10,836 | 2,173-7,923 | 3.3-76.5 |
| Shale | 0-100 | 12-376 | 252-7,896 | 252-7,896 | 0-58.4 |
| Siltstone | 58-94 | 133-549 | 2,793-11,529 | 3,758 | 41.5-93.5 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

6.4 Rock Cut #4 (Station 177+75 to Station 207+25)

The subsurface conditions generally consisted of less than 0.5 foot of topsoil overlying the soil. Silt and Clay (A-6a), Sandy Silt (A-4a) and Silt (A-4b) were the most prominent soil types identified in the soil overburden. Soil thicknesses varied and generally ranged from 3 to 12 feet. However, soil thicknesses were up to 37.5 feet in some areas. Severely weathered sandstone was encountered in SPT samples collected in the bedrock. These severely weathered samples were similar to the underlying competent rock and were thin, typically less than 4 feet thick.

The bedrock encountered by the borings was primarily very fine to fine-grained sandstone. Below the highly weathered layer, the sandstone was mostly medium hard to hard. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone are summarized in the table below.

Most of the borings did not encounter any seepage prior to rock coring. However, seepage was encountered in Boring R-102 at depths of 8.5 and 35 feet, Boring R-103 at a depth of 2.5 feet and at depths of between 11.0 and 21.0, and Boring R-104 at depths of between 16.0 and 30.0 feet. Wet soils were noted in Boring R-140 between the depths of 18 and 20 feet. However, no measurable water levels were present in any of the borings drilled for this rock cut prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|------------|--------|----------------------------|--|---------------------------------------|------------|
| Sandstone | 0-100 | 127-2,225 | 2,667 – 46,725 | 3,201 – 12,131 | 97.5- 98.2 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

6.5 Rock Cut #5 (Station 212+25 to Station 228+00)

The subsurface conditions generally consisted of less than 4 inches of topsoil underlain by soils including Silty Clay (A-6b), Silt and Clay (A-6a) and Silt (A-4b). Overburden was generally less than 3.5 feet to as much as 8.5 feet thick.

Severely weathered sandstone and shale were mostly encountered in the upper 2 to 5 feet of the bedrock strata. The bedrock encountered by the borings was primarily very fine to fine-grained sandstone. However, shale, claystone, siltstone and coal were encountered between elevations 796 and 837. All borings were completed at least 10 feet into bedrock. Generally, the sandstone bedrock was mostly medium hard to hard. Shale, claystone, siltstone and coal bedrock were typically weaker and less durable than the sandstone. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|---|--------|----------------------------|--|---------------------------------------|----------|
| Sandstone | 30-100 | 25-553 | 525-11,613 | 1,918-11,696 | 4.9-97.6 |
| Varying amounts of Shale, Siltstone, Sandstone and Coal interbedded | 37-100 | 116-285 | 2,436-5,985 | NM | NM |
| Shale | 88-100 | 37-118 | 777-2,478 | 2,101 | 1.7-10.2 |
| Siltstone | 88-100 | 43-433 | 903-9,093 | 987-4,920 | 19.4-49 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

NM = not measured.

6.6 Rock Cut #6 (Station 257+75 to Station 268+25)

Topsoil was not encountered in any of the borings drilled for this rock cut area. The overburden was typically 3 to 13 feet thick. Silt and Clay (A-6a) and Sandy Silt (A-4a) were the majority of the soil types encountered although smaller amounts of Silty Clay (A-6b) and Clay (A-7-6) were also encountered.

A layer of severely weathered rock was encountered below the soils. This layer of severely weathered rock was only a few feet thick and rapidly gave way to the more competent rock below. The primary bedrock in the area was medium hard to hard sandstone. However, shale and mixes of shale, sandstone siltstone and coal were located between elevation 830 and 886. Very fine to fine grained sandstone was generally encountered at approximate elevation 830. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|---|--------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 0-100 | 21-778 | 411-16,338 | 2,324-11,150 | 67-93.6 |
| Varying amounts of Shale, Siltstone, Sandstone and Coal interbedded | 53-87 | 59-490 | 1,239-10,290 | NM | 3.1 |
| Shale | 22-94 | 25-296 | 525-6,216 | 703 | 11.4-45.2 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

NM = not measured.

6.7 Rock Cut #7 (Station 269+75 to Station 290+25)

Generally less than one foot of topsoil was encountered in this cut section area. Below the topsoil, the soils were between less than one foot and 24.5 feet thick. Soils were typically Silt and Clay (A-6a), Clay (A-7-6) and Sandy Silt (A-4a). Smaller amounts of Silty Clay (A-6b) were also encountered. Generally, finer grained clay soils were more prevalent where soils were thicker and silts were more prevalent where the overburden was thinner. Up to 9 feet of severely weathered bedrock was encountered below the soil layer.

With few exceptions, all borings encountered bedrock consisting of medium hard to hard sandstone below elevation 809. Soft shale, coal and siltstone were encountered in several borings above elevation 809. Interbedded sandstone and siltstone were also encountered sporadically across the stratigraphic column. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

Seepage was encountered in Borings R-150 and R-154 at depths of 5 feet and 9 feet, respectively. However, no appreciable amount of water was encountered in any of these borings prior to coring. The other borings reviewed for this cut did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|---|--------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 16-100 | 18-1,636 | 378-34,356 | 2,974-11,269 | 80.9-81.1 |
| Varying amounts of Shale, Siltstone, Sandstone and Coal interbedded | 67-100 | 26-395 | 756-8,295 | 2,270-9,960 | 1.4-18.7 |
| Shale | 27-100 | 28-369 | 588-7,749 | 699-5,348 | 14.6-64.2 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

NM = not measured.

6.8 Rock Cut #8 (Station 305+75 to Station 317+25)

Typical topsoil thicknesses were between 1 to 4 inches. Below the topsoil, borings encountered 5 to 21 feet of native soil. Sandy Silt (A-4a) was the most common soil encountered. Clay (A-7-6), Silt and Clay (A-6a) and Silt (A-4b) were also encountered but were about half common as Sandy Silt. (A-4b). Single occurrences of Silty Clay (A-6b) and Gravel and Stone Fragments with Sand and Silt (A-2-4) were encountered in the borings drilled for this rock cut. All of these soils appeared to be derived from the bedrock. Soil thicknesses varied widely across the rock cut area and ranged from 0 to 14.5 feet.

The severely weathered bedrock located beneath the soil was similar to the underlying rock. The severely weathered rock was typically less than 9 feet thick. Generally the principal bedrock type encountered in the area was sandstone. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

Seepage was not encountered in any of the borings. However, wet soil conditions were reported in two borings, R-177 and R-178, at depths of at 5 feet and 2.5 feet, respectively. No measurable water levels were present in any of the borings prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|------------|--------|----------------------------|--|---------------------------------------|--------|
| Sandstone | 51-100 | 189-2,071 | 3,969-43,491 | 5,323-8,478 | NM |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

6.9 Rock Cut #9 (Station 322+75 to Station 328+25)

Borings located between stations 322+75 and 328+25 report a little to no topsoil. The thicknesses of the soils were found to be a maximum of 15 feet. Silt and Clay (A-6a), Clay (A-7-6), and Silt (A-4b) are the primary soil types encountered in the borings. Below the soil was a layer of severely weathered rock. The thicknesses of the severely weathered rock ranged from approximately 0 to 5 feet.

The bedrock was typically medium hard to hard, very fine to fine grained sandstone with occasional zones containing varying amounts of argillaceous laminations. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|------------|--------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 14-100 | 19-1,633 | 399-34,293 | 4,621-8,880 | 89.2-97.6 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

NM = not measured.

6.10 Rock Cut #10 (Station 329+25 to Station 343+75)

Generally, less than 5 inches of topsoil was encountered in this rock cut area. Soil encountered by the boreholes mainly included Sandy Silt (A-4a) Silt and Clay (A-6a) and Clay (A-7-6). However, lesser amounts of Silty Clay (A-6b) and Gravel and Stone Fragments with Sand and Silt (A-2-4) were also encountered. The soil thicknesses were typically less than 6 feet. However, Boring R-199 encountered approximately 26 feet of soil. Severely weathered bedrock, approximately 0 to 15 feet thick, was encountered beneath the soils. The severely weathered bedrock consisted mostly of sandstone but siltstone and shale were also noted.

Bedrock generally consisted of medium hard to hard, very fine to fine sandstone or sandstone with varying amounts of shale interbedding or argillaceous laminations. Interbedded bedrock and shale typically appeared to be most prominent above elevation 760. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|---------------------------------|--------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 0-100 | 215-2,016 | 4,515-42,336 | 1,701-12,224 | 63.5-98.1 |
| Sandstone and Shale interbedded | 0-100 | 76-507 | 1,596-10,647 | NM | 18.6 |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

NM = not measured.

6.11 Rock Cut #11 (Station 347+25 to Station 351+50)

Rock Cut 11 is one of the shortest and shallowest cuts along the proposed Phase 3 alignment. It will be about 425 feet in length with a typical cut depth of less than 20 feet. Two borings drilled for this rock cut indicate that the area was covered with approximately 11.5 to 23 feet of soil. No topsoil was encountered in either boring. The soil types identified included Sandy Silt (A-4a), Clay (A-7-6) and Silt and Clay (A-6a). One sample of Silt (A-4b) was encountered in Boring R-206 between elevation 658.9 and

661.4. Below these soils, 8 to 10 feet of severely weathered sandstone and shale were encountered in these borings.

The two borings were cored ten feet into rock. The recovered samples consisted of moderately to highly weathered sandstone. Testing was not performed on the rock cores collected from these borings for point load strengths, uniaxial compressive strengths, and slake durability indices (SDI). Rock Quality Designation (RQD) values of the sandstone cores are summarized in the table below.

Wet soil conditions were reported at a depth of 21 feet in Boring R-206; however, this boring did not encounter any water seepage. Prior to coring, seepage and measurable water levels were not present in any of the borings drilled in this rock cut area.

| Rock Types | RQD, % | Point Load Strengths, psi | Equivalent Compressive Strengths, psi | Uniaxial Compressive Strengths, psi | SDI, % |
|------------|--------|---------------------------|---------------------------------------|-------------------------------------|--------|
| Sandstone | 78-91 | NM | NM | NM | NM |

NM = not measured.

6.12 Rock Cut SR 140 Ramp A (Station 77+00 to Station 105+50)

In general, the topsoil thicknesses found in the borehole locations were less than 6 inches. Silt (A-4b) and Sandy Silt (A-4a) were the most common soil types found overlying the bedrock. A small amount of Silt and Clay (A-6a) was also encountered. Soil thicknesses found in the borings were generally between 4 and 15 feet. However, boring B-1408 encountered a soil thickness of approximately 1.5 feet. Generally severely weathered bedrock underlying the soils was less than 3 feet thick. However, boring R-30 encountered a decomposed rock thickness of 8.5 feet.

The dominant rock type in this rock cut was sandstone. However, Boring R-30 encountered a layer of shale just below the severely weathered zone. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|------------|--------|----------------------------|--|---------------------------------------|-----------|
| Sandstone | 61-100 | 228-454 | 4,788-9,534 | 7,841-13,025 | 93.2-97.8 |
| Shale | 21 | 38 | 798 | NM | NM |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

NM = not measured.

6.13 Rock Cut SR 140 Ramp B (Station 60+92 to Station 77+95)

The borings encountered less than 6 inches of topsoil in this cut area. The overburden soils were generally thin, less than 15 feet thick. These soils were mostly Silt (A-4b) although smaller amounts of Silt and Clay (A-6a) and Sandy Silt (A-4a) were also encountered. Severely weathered sandstone was located below the soil layer. The severely weathered bedrock was generally less than 5 feet in thick.

With the exception of Boring R-30, which contained a layer of shale below the severely weathered zone, the competent bedrock encountered below the severely weathered zone was mostly fine to very fine grained sandstone. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

| Rock Types | RQD, % | Point Load Strengths*, psi | Equivalent Compressive Strengths*, psi | Uniaxial Compressive Strengths**, psi | SDI, % |
|------------|--------|----------------------------|--|---------------------------------------|--------|
| Sandstone | 44-100 | 106-601 | 2,226-12,621 | 8,887 | 91.5 |
| Shale | 21 | 38 | 798 | NM | NM |

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.

**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

NM = not measured.

7.0 ROCK EXCAVATION AND CUT SLOPE RECOMMENDATIONS

7.1 Rock Excavation Recommendations

The rippability of the bedrock is estimated to be fair to good for the upper 10 to 15 feet due to its weathered condition. Below the upper 10 to 15 feet of weathered material the rippability is estimated to be poor to fair and rock blasting will be required to achieve the roadway template. Blasting efforts should conform to Item 208 of the current CMS. All blasting operations should also be performed in accordance with applicable federal, state, and local laws and regulations.

7.2 Cut Slope Recommendations

Cut slope recommendations were based upon visual observations of the rock cores obtained, the presence and angles of joints and/or fractures within the cores, depths to bedrock, point load strengths, uniaxial compressive strengths, laboratory SDI, regional and local lithology, results of the field reconnaissance, and DLZ's past experiences. In general, DLZ reviewed the profile and cross-section views of the cuts to determine the likely positions/elevations for bench locations. Benches were typically placed at lithology breaks where a more durable rock overlies a weaker rock unit. Upon identifying the bench positions, the lift height between benches was evaluated and

additional benching used, if considered to be appropriate. The details of the cut slope design procedure are presented in Section 5.0 of this report.

In general, sandstone slope angles are recommended to be cut on 0.5H:1V slopes. Severely weathered sandstone should be cut on 1.5H:1V or flatter slopes. Shales, siltstones, clayshales, claystones, and siltshales were typically soft, severely to highly weathered and prone to rapid weathering once exposed and were typically recommended to be cut on 2H:1V slopes.

Specific recommended cut slope configurations are included in Appendix D of this report.

7.3 Groundwater Considerations

Generally, groundwater was not encountered in the unconsolidated materials or severely weathered bedrock along the project alignment except in a few locations. Seepage was generally encountered in thin zones less than 2 to 3 feet thick at the time of the investigation. As a result, significant yields of groundwater would not be anticipated in the overburden. The amount seepage in the bedrock could not be readily determined because water was added to core the bedrock. Final water levels reported in the borings reflect water added for coring and are not indicative of the actual groundwater levels. It should be noted that groundwater conditions can change with time, seasonal changes and precipitation. The reported findings represent only the conditions encountered at the time of drilling and may not be indicative of the long-term groundwater conditions. The contractor should be prepared to perform dewatering to maintain reasonably dry excavations and prepared to deal with unexpected seepage and precipitation entering any excavations. A summary of the groundwater findings is presented below.

Rock Cut US Route 52 Ramps A and B (Station 40+50 to Station 54+00) and Rock Cut #1 (Station 54+00 to Station 61+25)

Seepage was encountered in Boring R-23 at a depth of 20.7 feet (approximate elevation 751 at Station 58+17.3, 191.2' RT). At the completion of drilling, five feet of water was present in the borehole. Note that no water was added to the boring. Although the boring was located outside the rock cut and on a flank of a hillside away from the rock cut, there is a possibility that similar groundwater bearing strata could be encountered within the proposed rock cut. Seepage was not encountered in the soil strata in Boring R-2014 (Station 46+43.1, 25.4' LT) but 9.4 feet of water was present in the borehole prior to coring. This boring was located in the area that will have significant excavation. Any seepage zones within the soil will likely be completely removed prior to rock excavation. Depending on the field conditions during construction, special sloping and benching may be necessary to control and direct runoff during and after construction.

Rock Cut #2 (Station 77+00 to Station 106+25)

Seepage was noted at a depth of 1.0 foot in Boring R-34. However, no appreciable amount of water was present prior to coring. On the basis of the field observations, the low level of seepage is not anticipated to affect the ground conditions during construction.

Rock Cut #3 (Station 103+75 to Station 173+25)

Seepage was noted at a depth of 1.0 foot in Borings R-81 and R-87 and at a depth of 6 feet in Boring R-85. However, no appreciable amount of water was present prior to coring. On the basis of the field observations, the low level of seepage is not anticipated to affect the ground conditions during construction.

Rock Cut #4 (Station 177+75 to Station 207+25)

Wet conditions were encountered in a Clay (A-7-6), between the depths of 18.0 and 20.0 feet (elevation 589.8 and 892.3), in Boring R-104. Additionally, groundwater seepage was noted in Boring R-102 between depths of 8.5 and 35.0 feet and in Boring R-103 at a depth of 2.5 feet and between the depths of 11.0 and 21.0 feet. However, none of these borings had appreciable amount of water present prior to coring. On the basis of the field observations, the low level of seepage is not anticipated to affect the ground conditions during construction.

Rock Cut #5 (Station 212+25 to Station 228+00)

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Cut #6 (Station 257+75 to Station 268+25)

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Cut #7 (Station 269+75 to Station 290+25)

Seepage was encountered in Boring R-150 at a depth of 5 feet but no measurable water was present in the boring prior to coring. Seepage was also encountered in Boring R-2154 at a depth of 8 feet (286+03.1, 117.5' LT at elevation 778.9). This seepage zone was within the sandstone that will be cut. Seepage through joints or seams in this type of rock formation is not uncommon. Depending on the field conditions during construction, special sloping and benching may be necessary to control and direct runoff during and after construction.

Rock Cut #8 (Station 305+75 to Station 3170+25)

Seepage was noted at a depth of 2.5 feet in Boring R-178 and at a depth of 5 feet in Boring R-177. However, no appreciable amount of water was present prior to coring. On the basis of the field observations, the low level of seepage is not anticipated to affect the ground conditions during construction.

Rock Cut #9 (Station 322+75 to Station 328+25)

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Cut #10 (Station 329+25 to Station 343+75)

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Cut #11(Station 347+25 to Station 351+50)

Seepage was encountered in Boring R-206 at a depth of 21.0 feet. However, no appreciable amount of water was present prior to coring. On the basis of the field observations, this low level of seepage is not anticipated to affect the ground conditions during construction.

Rock Cut SR 140 Ramp A (Station 77+00 to Station 105+50)

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Cut SR 140 Ramp B (Station 60+92 to Station 77+95)

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

8.0 COLORADO ROCKFALL SIMULATION PROGRAM (CRSP) ANALYSES

The CRSP requires the input of a number of coefficients concerning the slope geometry, slope material properties, rock material properties and the assumption of rock geometry. In general, the ODOT Geotechnical Bulletin GB-3 “Rock Cut Slope & Catchment Design” was used as a guide for input data and catchment ditch configuration. Input data was also based on field observations and measurements of the existing rock cuts described in Section 3.5 of this report. The number of rocks simulated for the analyses was 500 and the shape of rock was assumed to be discoidal. Note that rounded rocks generally result in greater amounts of rock reaching the roadway since rounded rocks rolling gather a great deal more energy than angular blocks sliding. Based on the observations of the rock cores obtained, it is our opinion that the discoidal rocks can better describe the types of rocks encountered in the borings. The average rock size used in the analyses was a 1-foot tall and 1-foot diameter discoidal rock, while the maximum size used in the analyses was a 1.5-foot tall and 1.5-foot diameter discoidal rock. A summary of the input data for the CRSP analyses is presented in the following table.

Input Data for End of Construction Conditions

| Rock Type | Rock Thickness | Rock Diameter | Surface Roughness (S.R.) | Tangential Coefficient (Rt) | Normal Coefficient (Rn) | Rock Density |
|--------------------------------|-----------------------|----------------------|---------------------------------|------------------------------------|--------------------------------|---------------------|
| Hard Sandstone and Siltstone | 1.5 | 1.5 | 0.15 | 0.85 | 0.2 | 155 |
| Shale | 1.5 | 1.5 | 0.3 | 0.75 | 0.18 | 140 |
| Sandstone with Shale interbeds | 1.5 | 1.5 | 0.25 | 0.75 | 0.18 | 145 |
| Hard Sandstone and Siltstone | 1 | 1 | 0.12 | 0.85 | 0.2 | 155 |
| Shale | 1 | 1 | 0.15 | 0.75 | 0.18 | 140 |
| Sandstone with Shale interbeds | 1 | 1 | 0.14 | 0.75 | 0.18 | 145 |

Input Data for Long-term Conditions

| Rock Type | Rock Thickness | Rock Diameter | Surface Roughness (S.R.) | Tangential Coefficient (Rt) | Normal Coefficient (Rn) | Rock Density |
|--------------------------------|-----------------------|----------------------|---------------------------------|------------------------------------|--------------------------------|---------------------|
| Hard Sandstone and Siltstone | 1.5 | 1.5 | 0.3 | 0.8 | 0.18 | 155 |
| Shale | 1.5 | 1.5 | 0.5 | 0.68 | 0.15 | 140 |
| Sandstone with Shale interbeds | 1.5 | 1.5 | 0.6 | 0.6 | 0.15 | 145 |
| Hard Sandstone and Siltstone | 1 | 1 | 0.21 | 0.8 | 0.18 | 155 |
| Shale | 1 | 1 | 0.3 | 0.68 | 0.15 | 140 |
| Sandstone with Shale interbeds | 1 | 1 | 0.28 | 0.6 | 0.15 | 145 |

Given the existing site conditions and the results of the preliminary CSR analysis, it appears that a minimum slope height of 80 feet is necessary for any falling rock to reach beyond the catchment ditch. Consequently, the CSR analysis was performed only for the cut slope of 80 feet or higher along the proposed alignment. A summary of the CSR analysis results is presented in the following table. The output of the CSR analyses is included in Appendix B.

| Rock Cut # | Stations | Left Slope | Right Slope |
|----------------------|----------------------------------|-------------------|--------------------|
| US 52 Ramps A&B 1 | 40+50 – 54+00 & 54+00 – 61+25 | Failed** | Passed* |
| 2 | 77+00 – 106+25 | Passed | Not Run, < 80' |
| 3 | 138+75 – 173+25 | Passed | Passed |
| 4 | 177+75 – 207+25 | Not Run, < 80' | Passed |
| 5 | 212+25 – 228+00 | Not Run, < 80' | Not Run, < 80' |
| 6 | 257+75 – 268+25 | Not Run, < 80' | Not Run, < 80' |
| 7 | 269+75 – 290+25 | Not Run, < 80' | Not Run, < 80' |
| 8 | 305+75 – 317+25 | Not Run, < 80' | Not Run, < 80' |
| 9 | 322+75 – 328+25 | Not Run, < 80' | Not Run, < 80' |
| 10 | 329+25 – 343+75 | Passed | Not Run, < 80' |
| 11 | 347+25 – 351+50 | Not Run, < 80' | Not Run, < 80' |
| SR 140 Ramp A | 77+00 – 105+50 | Not Run, < 80' | Not Run, < 80' |
| SR 140 Ramp B | 60+92 – 77+95 | Not Run, < 80' | Not Run, < 80' |

*Passed = Greater than or equal to 95% rockfall catchment achieved at analysis point 2.

**Failed = Less than 95% rockfall catchment achieved at analysis point 2.

Based on the results of the CRSP analyses, a Type D barrier placed at the edge of the catchment ditch is recommended as a rockfall mitigation measure for the failure area in rock cut #1. The proposed location of the barrier is the left side of the cut between stations 52+50 and 54+50. The CRSP analyses did not identify other areas requiring rockfall mitigation measures.

9.0 ODOT GENERAL EARTHWORK DESIGN CHECKLIST

The ODOT General Earthwork Design Checklist – Centerline Cuts Checklist is included in Appendix C of this report.

10.0 CLOSING REMARKS

We appreciate having the opportunity to be of service to you on this project. Please do not hesitate to call if you have any questions concerning this report.

Respectfully submitted,

DLZ OHIO, INC.

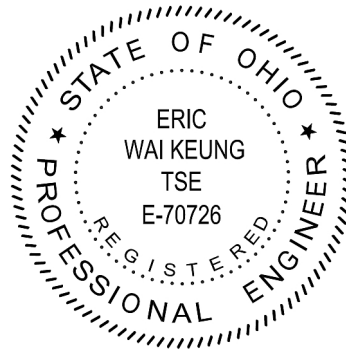
Eric W. Tse, P.E.
Senior Geotechnical Engineer

Andrew Jalbrzikowski
Geologist

Brian E. Mott
Senior Geologist, P.G.

BEM/aj/ewt

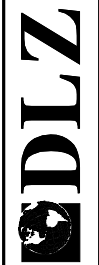
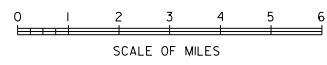
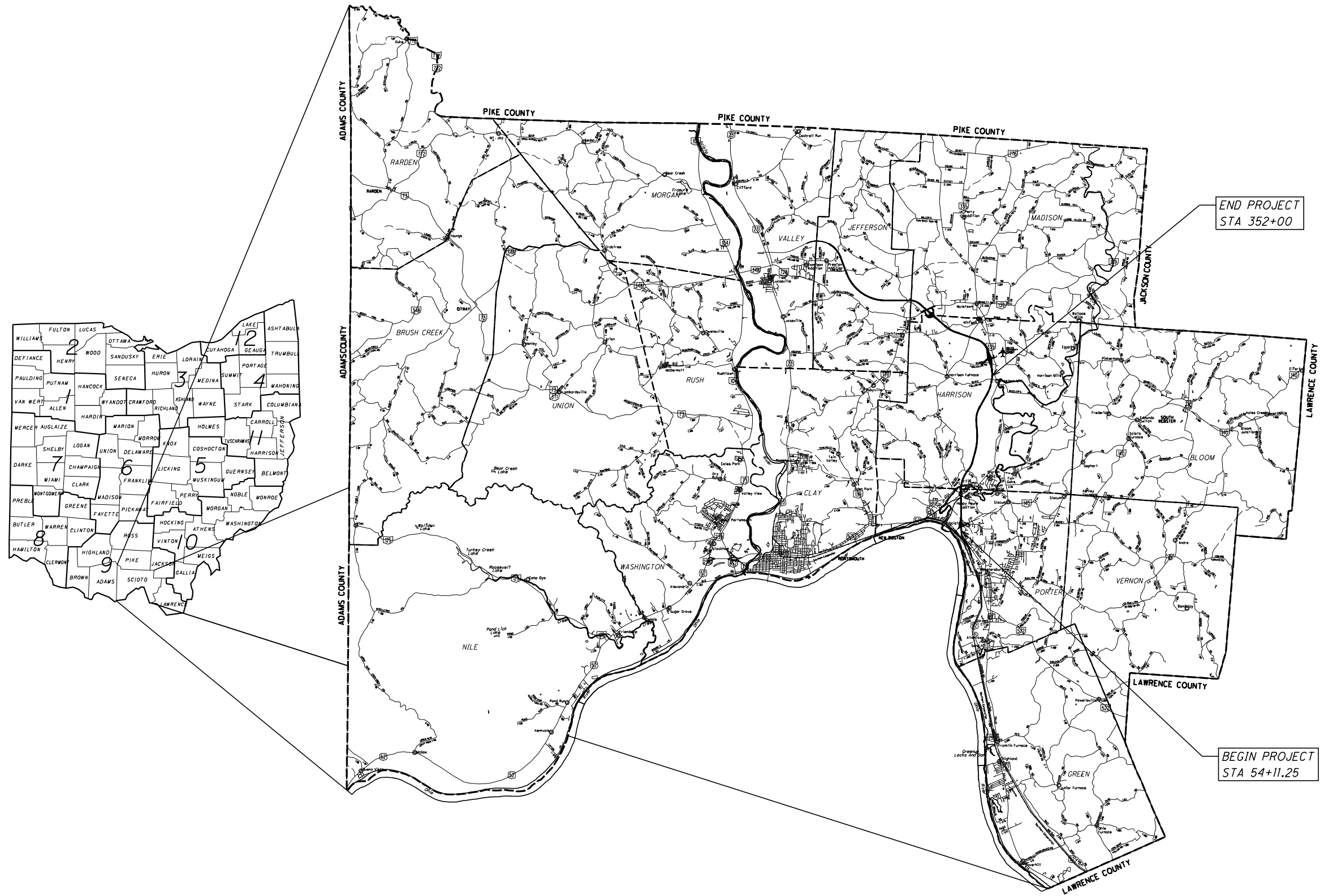
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APPENDIX A

Project Location Map
Project Alignment and Boring Plan

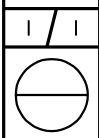
Project Location Map



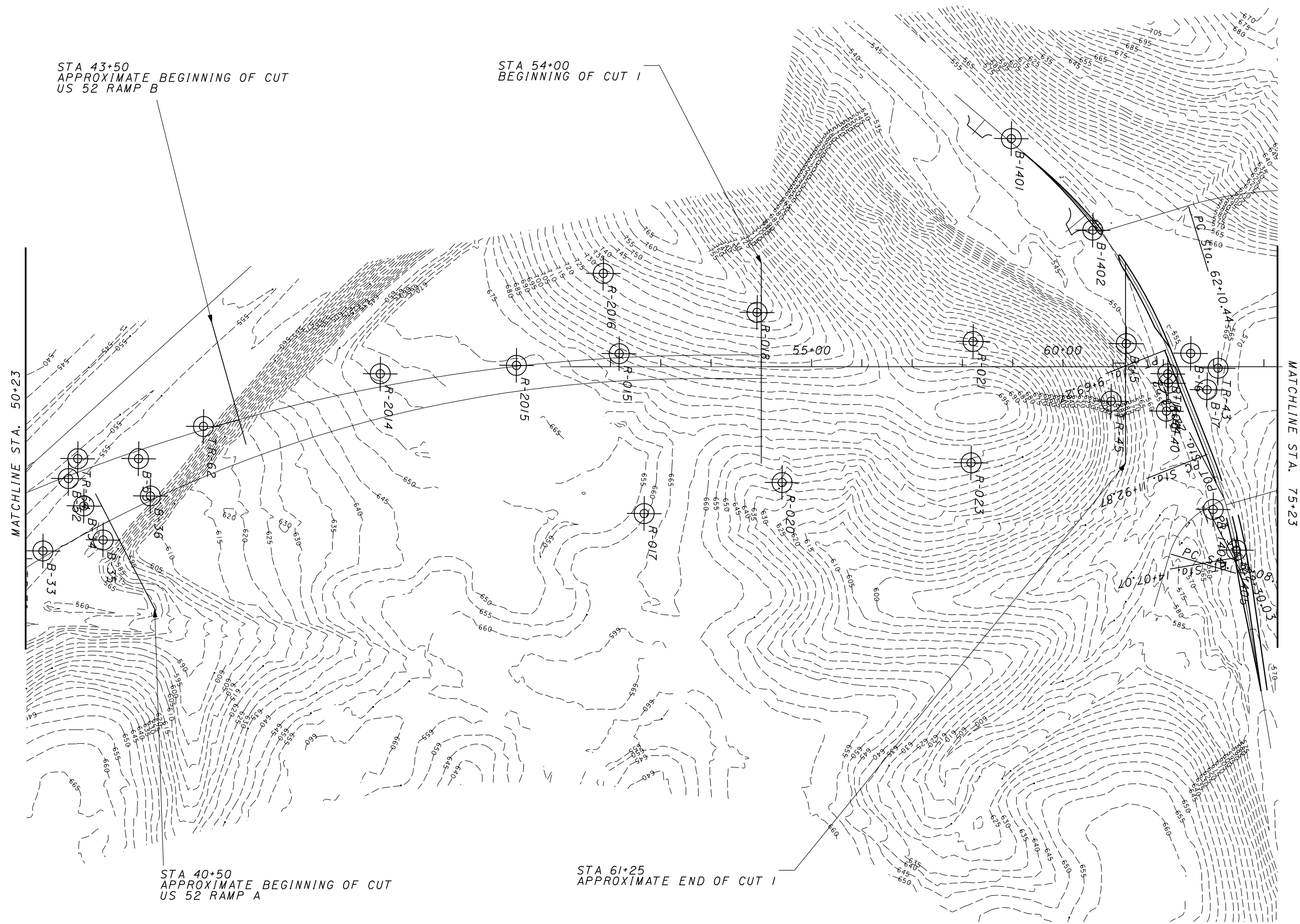
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**LOCATION MAP
PORTSMOUTH BYPASS PHASE 3**

SCI-823-00.0



Project Alignment and Boring Plan



DRAWN: RLS
 CHECKED: AMJ

ROCK CUT BORING PLAN

SCI-823-0.00

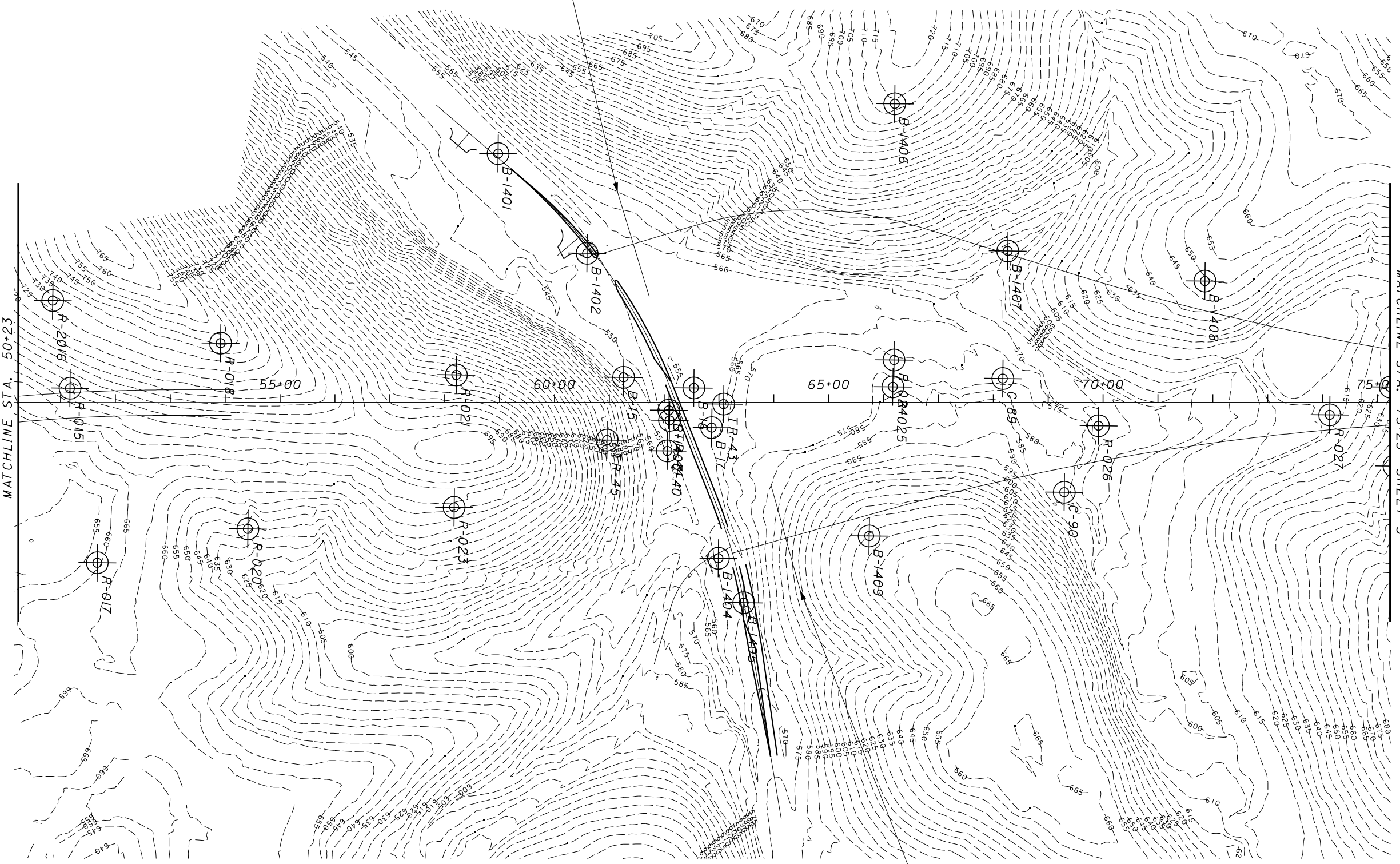


STA 61+00
APPROXIMATE BEGINNING OF
SR 140 RAMP B CUT

STA 64+00
APPROXIMATE BEGINNING OF
SR 140 RAMP A CUT

MATCHLINE STA. 50+23

MATCHLINE STA. 75+23 SHEET 3

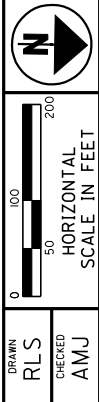
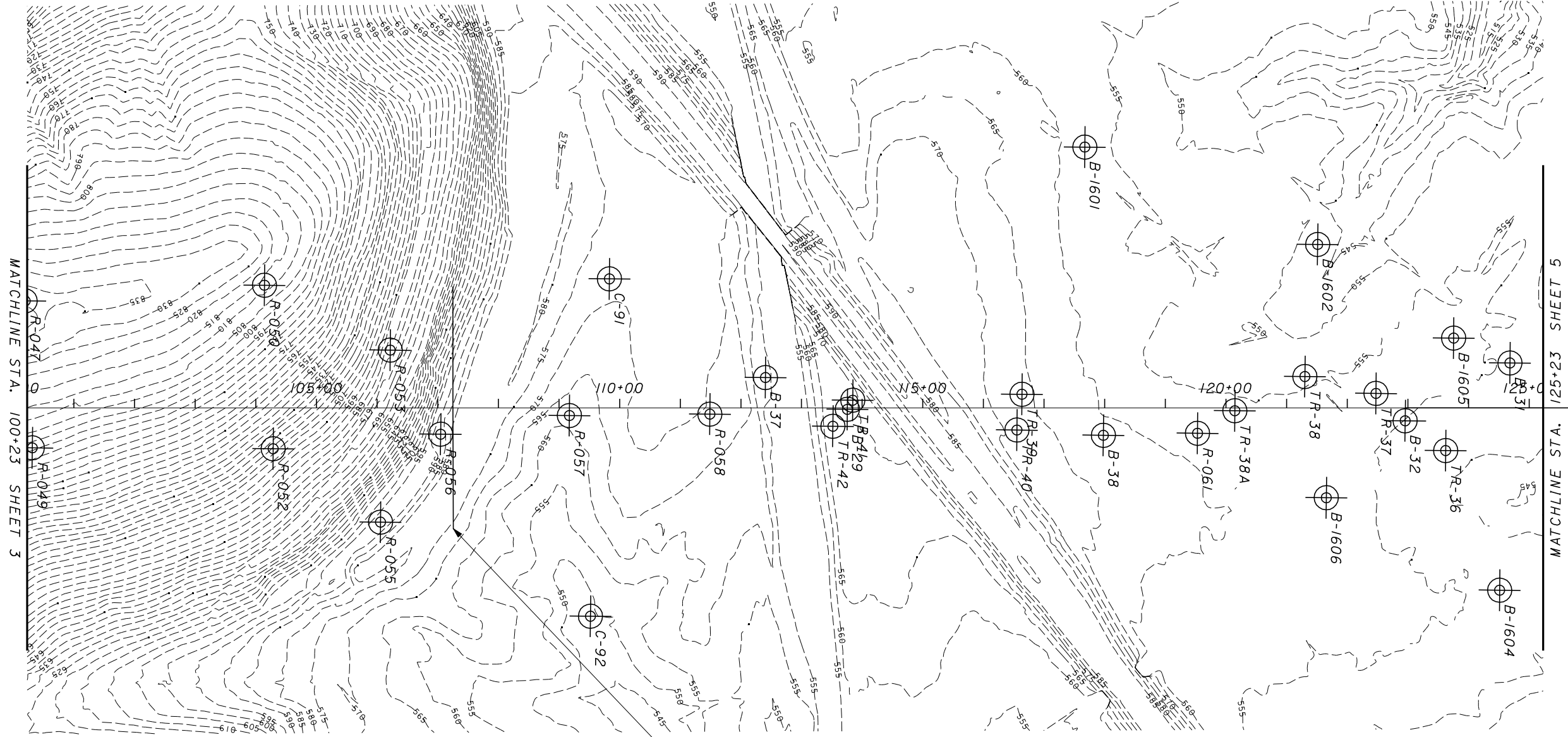


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ROCK CUT BORING PLAN

SCI-823-0.00



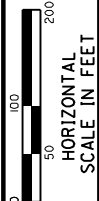
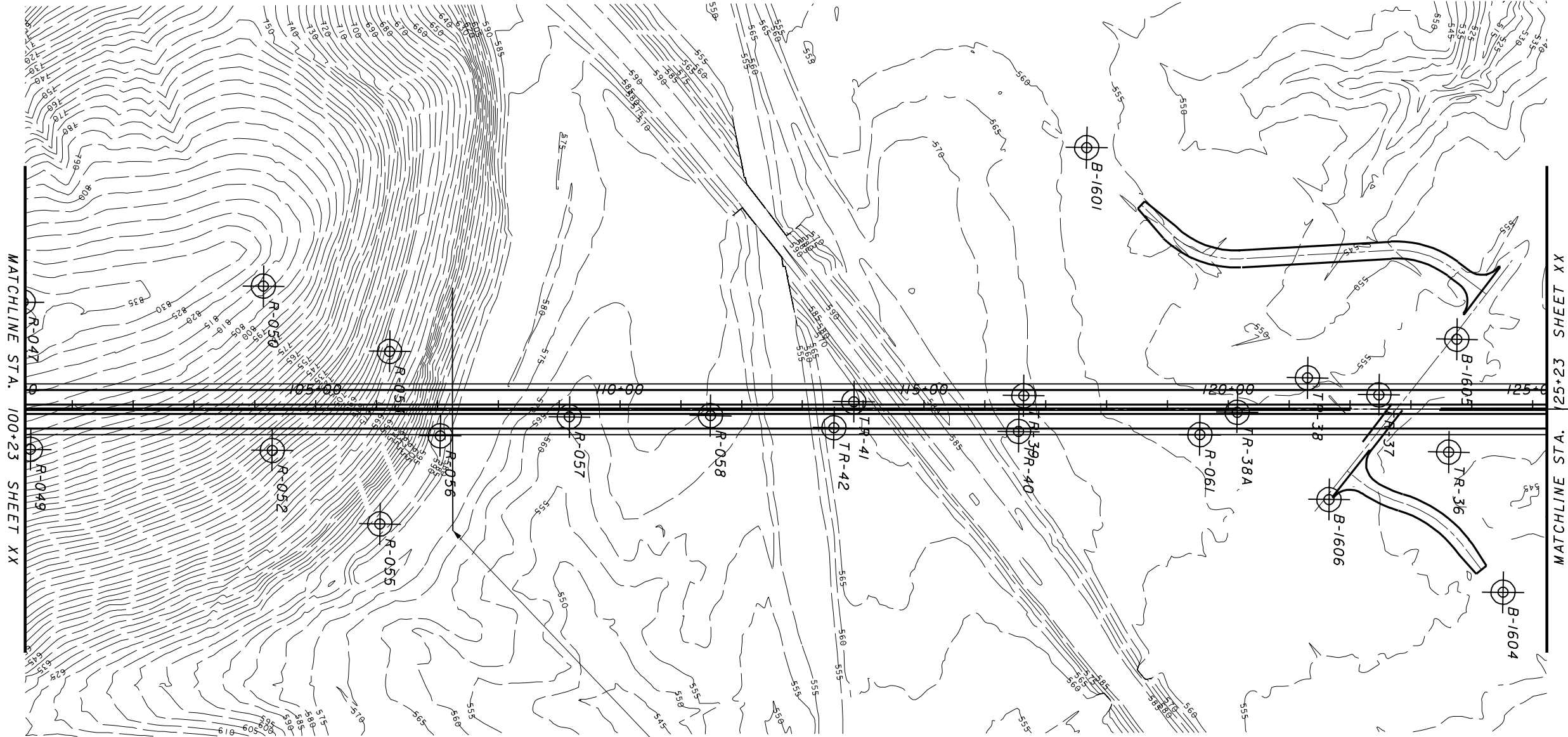


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AMJ

ROCK CUT BORING PLAN

SCI-823-0.00



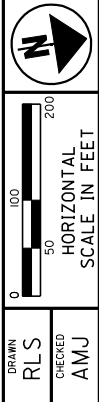
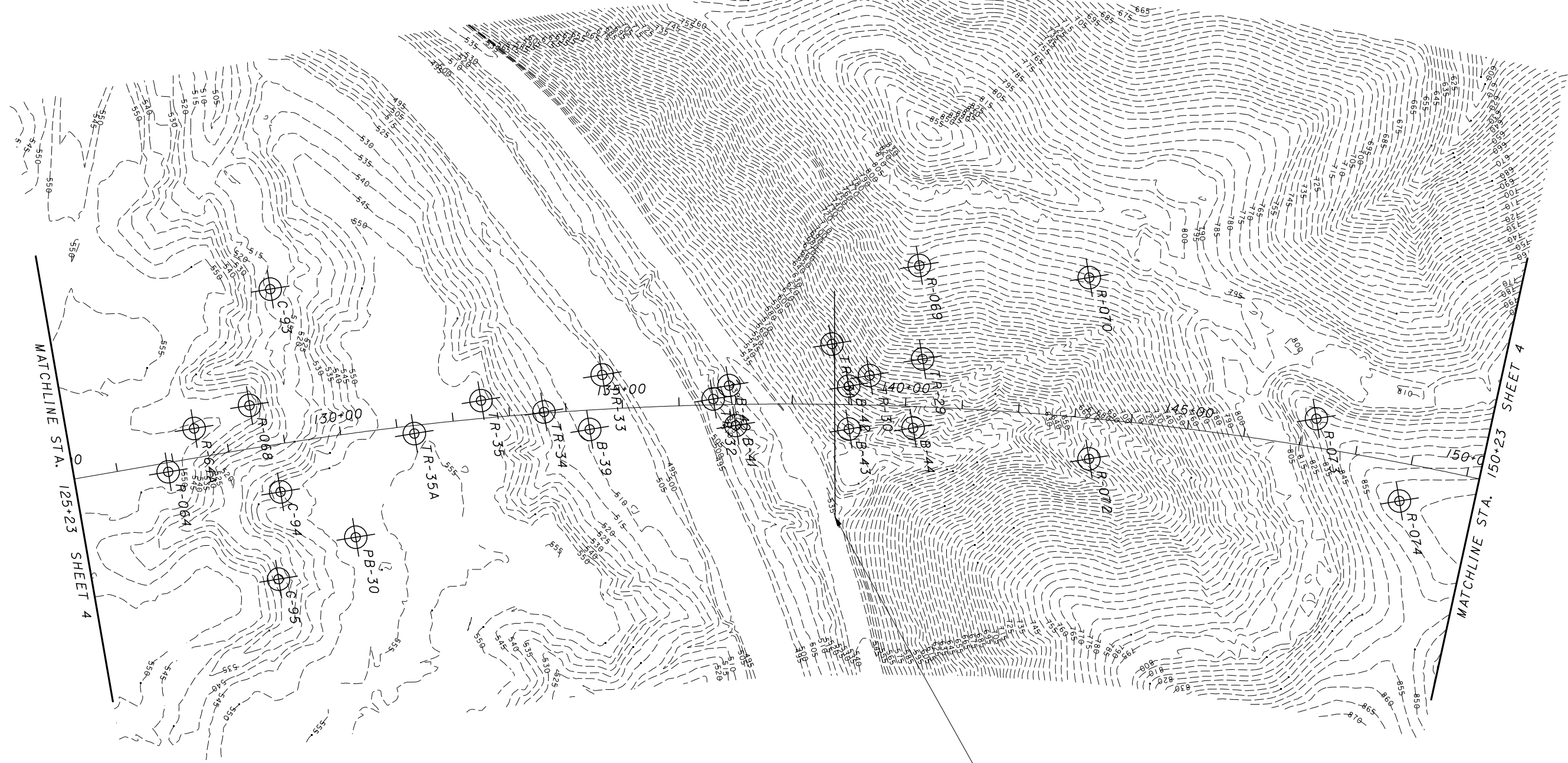


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DRAFT ROCK CUT BORING PLAN

SCI-823-0.00



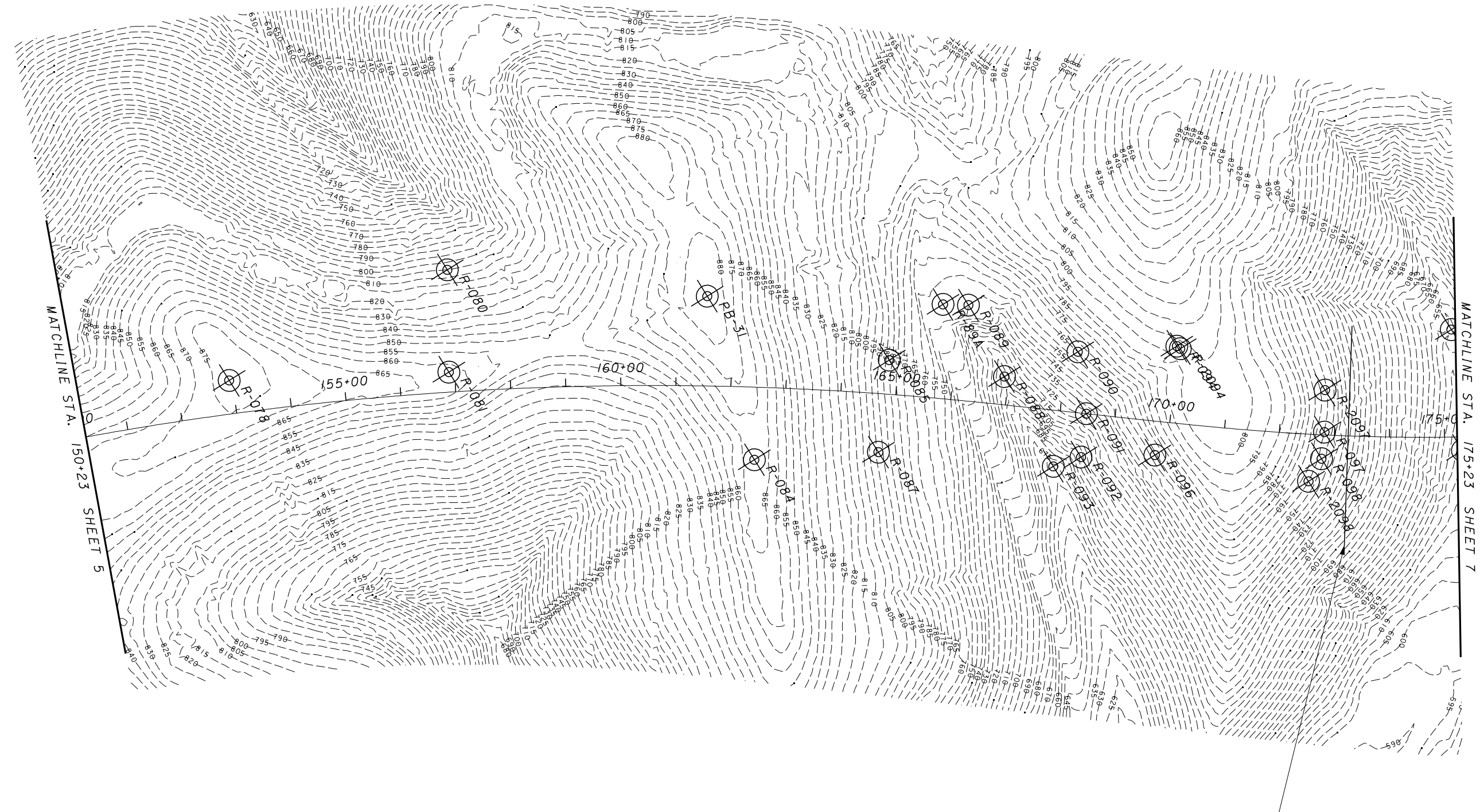


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ROCK CUT BORING PLAN

SCI-823-0.00





STA 173+25
APPROXIMATE END OF
ROCK CUT 3

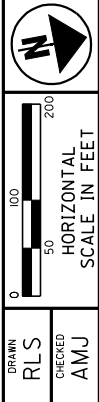
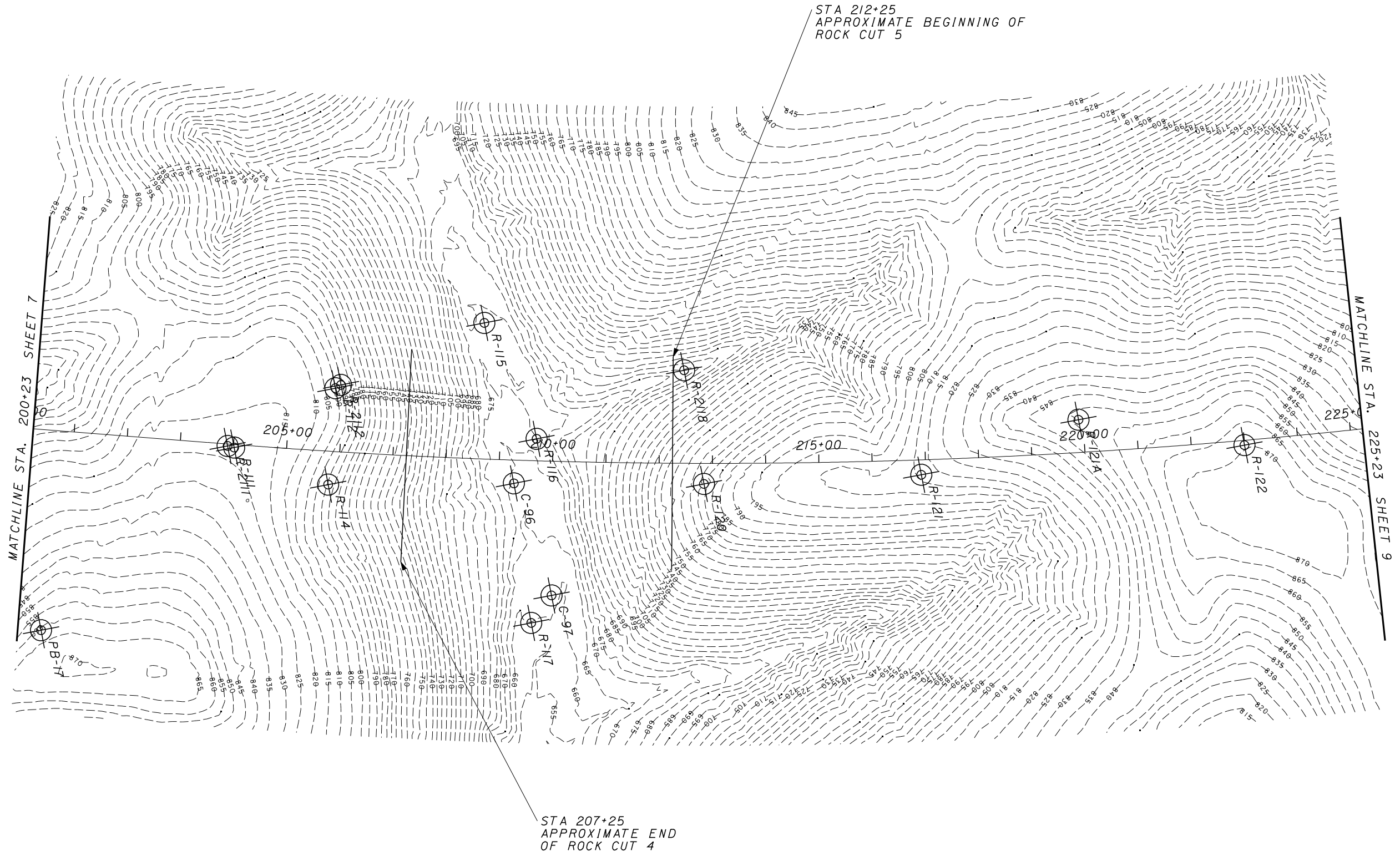


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RLS
CHECKED
AMJ

ROCK CUT BORING PLAN

SCI-823-0.00



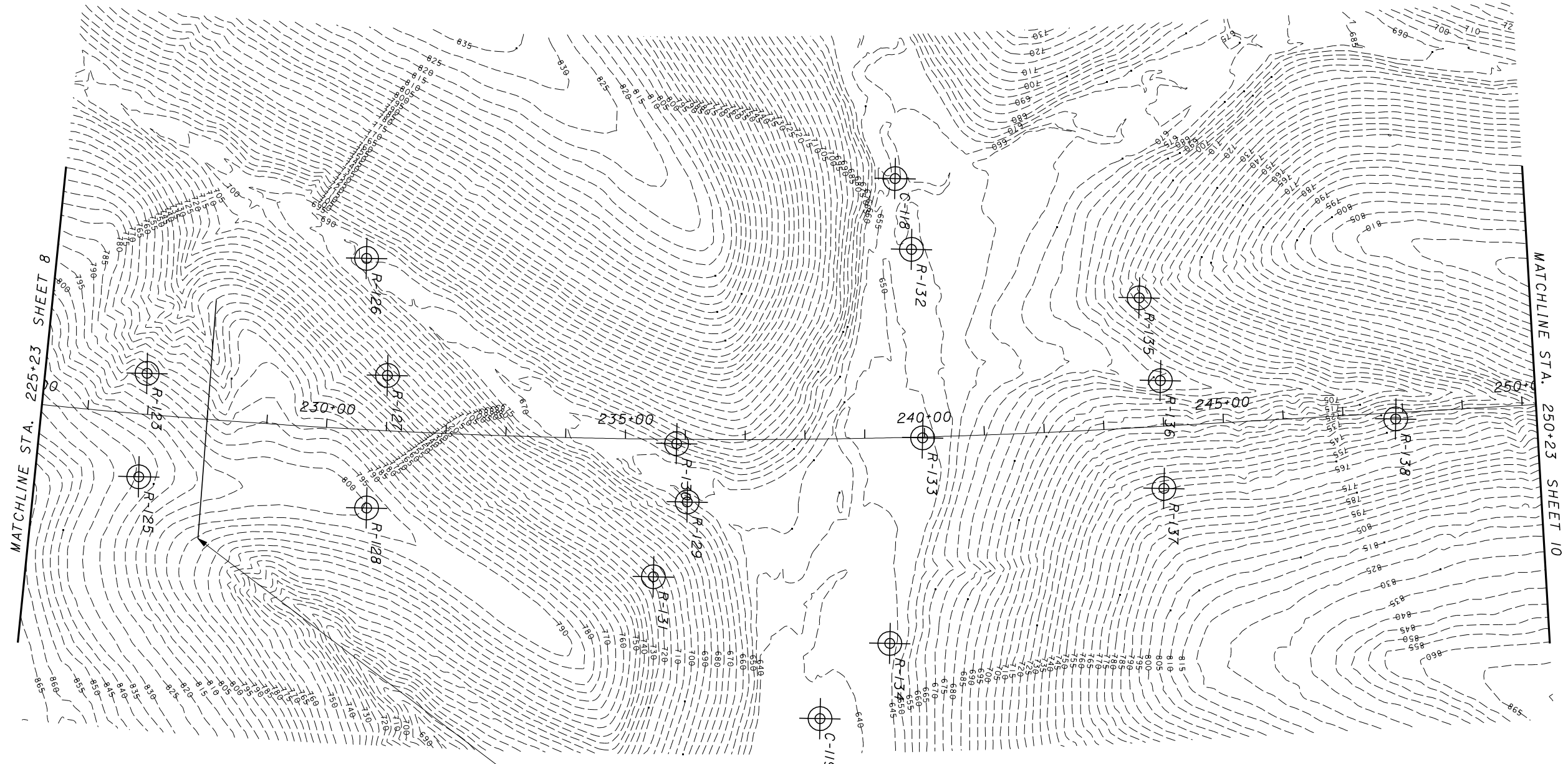


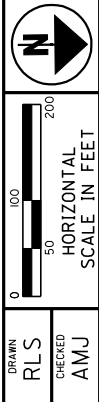
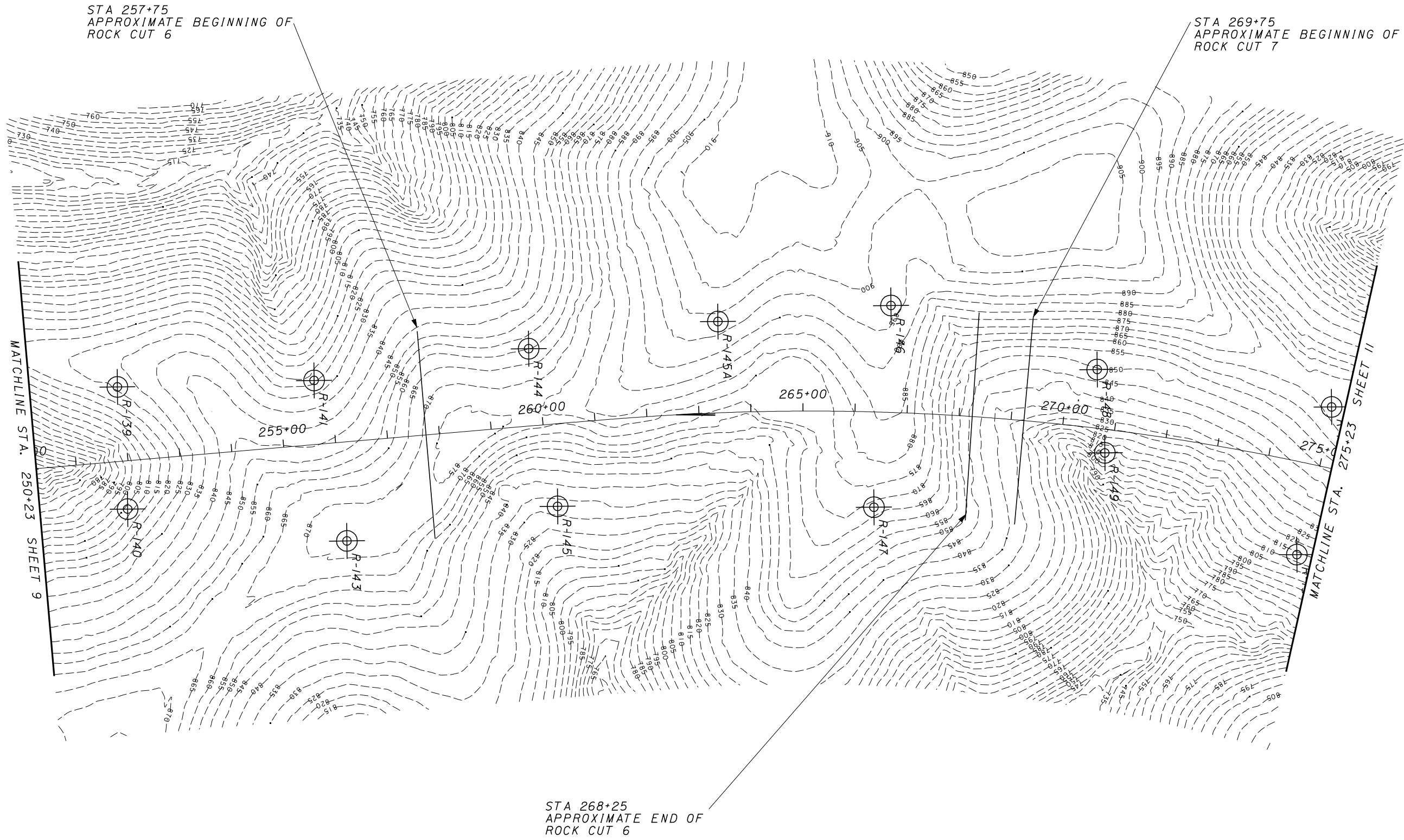
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ROCK CUT BORING PLAN

SCI-823-0.00





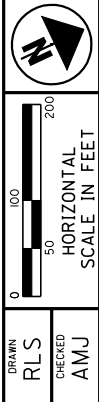
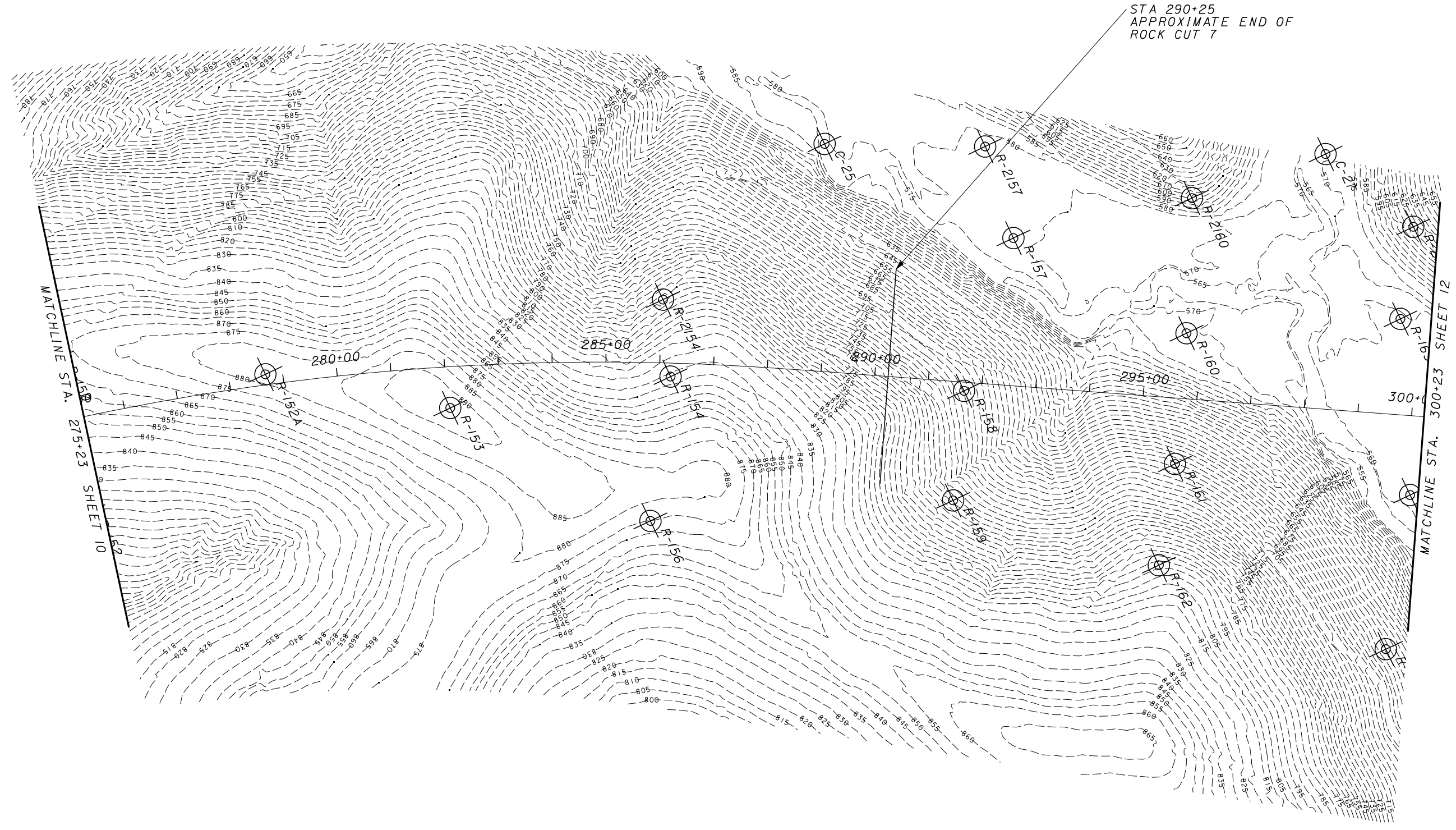


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AMJ

ROCK CUT BORING PLAN

SCI-823-0.00





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ROCK CUT BORING PLAN

SCI-823-0.00





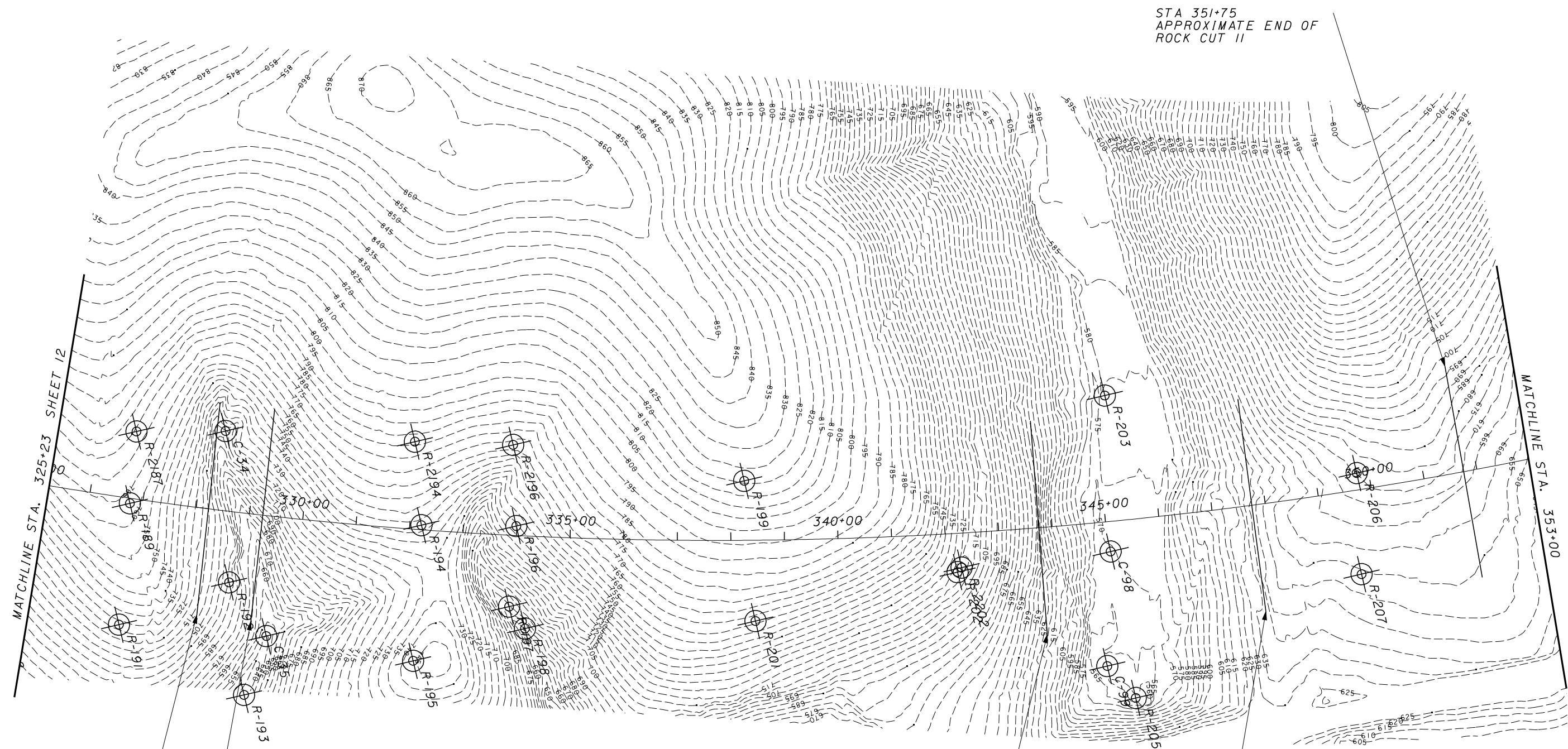
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ROCK CUT BORING PLAN

SCI-823-0.00



STA 351+75
APPROXIMATE END OF
ROCK CUT II



STA 328+25
APPROXIMATE END OF
ROCK CUT 9

329+25
APPROXIMATE BEGINNING OF
ROCK CUT 10

STA 347+25
APPROXIMATE BEGINNING OF
ROCK CUT II

STA 343+75
APPROXIMATE END OF
ROCK CUT 10

11/12/2007 11:24:46 AM m:\p\o\102\102\3070.03\cut slope designs\boring plans\plan12.dgn

APPENDIX B

Boring Logs
Results of Slake Durability Index and Uniaxial Compressive Tests
Cut Slope Cross Sections
Colorado Rock Fall Simulation Analysis

Boring Logs

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-15

Location: Sta. 51+17.4, 25.9 ft. LT of SR 823 CL

Date Drilled: 4/13/05 to 4/14/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 5.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0 | 692.2 | | | | | | | | | | | | | | | | | |
| 0.7 | 691.5 | | | | | | Topsoil - 8" | | | | | | | | | | | |
| | | 3 | | | | | Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp. | | | | | | | | | | | |
| | | 4 | 7 | 18 | 1 | 3.0 | | | | | | | | | | | | |
| | | 5 | | | | | 4.5+ | | | | | | | | | | | |
| | | 8 | 10 | 18 | 2 | 4.5+ | | | 5 | 5 | -- | 7 | 51 | 32 | | | | |
| 5 | | | | | | | 4.5+ | | | | | | | | | | | |
| | | 5 | 10 | 14 | 3 | 4.5+ | | | | | | | | | | | | |
| 8.0 | 684.2 | | | | | | Hard brown SILT (A-4b), some clay, little fine to coarse sand; contains sandstone fragments; damp. | | | | | | | | | | | |
| | | 6 | 16 | 49 | 4 | 4.5+ | | | | | | | | | | | | |
| 10 | | | | | | | 4.5+ | | | | | | | | | | | |
| | | 12 | 16 | 25 | 5 | 4.5+ | | | 0 | 5 | -- | 8 | 56 | 31 | | | | |
| | | 8 | 12 | 19 | 6 | 4.0 | 4.5+ | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | |
| | | 11 | 13 | 14 | 7 | 4.5+ | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | |
| | | 9 | 25 | 32 | 8 | 4.5+ | | | | | | | | | | | | |
| 19.0 | 673.2 | | | | | | Soft to medium hard brown and gray SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured to broken, with typical low angle iron stained fractures. | | | | | | | | | | | |
| 20 | | 18 | 38 | 50/3 | 9 | 4.5+ | | | | | | | | | | | | |
| 22.0 | 670.2 | | | | | | Soft to medium hard brownish gray SANDSTONE. | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 28.7 | 663.5 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/8/2007 4:10 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-17

Location: Sta. 51+67.2, 292.1 ft. RT of SR 823 CL

Date Drilled: 4/14/05 to 4/15/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 5.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 659.2 | | | | | | | | | | | | | | | | | | |
| -0.4 | 658.8 | | | | | | Topsoil - 5" | | | | | | | | | | | | |
| | | 1 3 5 | 18 | | | 1.0 | Very stiff to hard brown SILT AND CLAY (A-6a), some fine to coarse sand, little gravel; damp to moist. | | | | | | | | | | | | |
| | | 5 12 18 | 18 | | | 4.5+ | | 12 | 5 | -- | 20 | 39 | 24 | | | | | | |
| 5 | | 8 19 28 | 18 | | | 4.0 | | | | | | | | | | | | | |
| 8.0 | 651.2 | | | | | | Dense orangeish brown FINE SAND (A-3), little silt, trace clay; dry to damp. | | | | | | | | | | | | |
| | | 11 17 24 | 18 | | | | Severely weathered orangeish brown SANDSTONE. | | | | | | | | | | | | |
| 10.0 | 649.2 | | | | | | | | | | | | | | | | | | |
| | | 30 50/3 | 9 | | | | Hard gray SANDSTONE; very fine to fine grained, decomposed, argillaceous, micaceous, thinly bedded to thinly bedded. | | | | | | | | | | | | |
| 12.0 | 647.2 | | | | | | @ 12.9'-13.1', 14.0'-14.3', high angle iron stained fractures. | | | | | | | | | | | | |
| 14.5 | 644.7 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, contains few argillaceous laminations. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 76% | R-1 | *402 | @ 15.0', 17.4', 18.5', low angle clay filled fractures. @ 17.5', 17.6', 17.7', low angle iron stained fractures. @ 18.6', 18.7', 20.9', low angle clay filled fractures. @ 19.0'-19.3', broken zone. | | | | | | | | | | | | |
| 20 | | | | | | | @ 22.6', 23.2', 23.3', low angle clay filled fractures. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 98% | R-2 | *425 | @ 26.2', 29.9', 30.3', low angle clay filled fractures. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/8/2007 4:10 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-17

Location: Sta. 51+67.2, 292.1 ft. RT of SR 823 CL

Date Drilled: 4/14/05 to 4/15/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 5.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | |
| 60 | 599.2 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded. @ 60.8', 61.8', low angle fractures. @ 62.0'-63.0', SDI = 98.4%. @ 65.0'-65.4', qu = 9,419 psi. | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 100% | R-6 | *607 | | | | | | | | | | | | |
| 65 | | | | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | |
| 75 | | Core 120" | Rec 120" | RQD 100% | R-7 | *599 | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | |
| 85 | | Core 120" | Rec 120" | RQD 100% | R-8 | *457 | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-18

Location: Sta. 53+91.6, 108.0 ft. LT of SR 823 CL

Date Drilled: 4/13/05 to 4/14/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 40.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0 | 741.2 | | | | | | | | | | | | | | | | | | | | |
| -0.5 | 740.7 | | | | | | Topsoil - 6" | | | | | | | | | | | | | | |
| | | 3 | | | | 2.5 | Very stiff to hard brown SANDY SILT (A-4a), little clay, trace gravel; damp to moist. | | | | | | | | | | | | | | |
| | | 5 | 5 | 8 | 1 | | | | | | | | | | | | | | | | |
| -3.5 | 737.7 | | | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | | | |
| | | 10 | 18 | 22 | 13 | 2 | | | | | | | | | | | | | | | |
| 5 | | | | | | | Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle iron stained fractures. @ 7.0'-7.6', broken zone. @ 7.9'-8.4', high angle iron stained fracture. @ 10.8'-11.0', 12.7'-12.8', 12.9'-13.0', high angle iron stained fractures. @ 13.9'-15.7', 16.3'-16.8', 19.1'-20.0', high angle iron stained fractures. @ 21.4'-28.6' few to moderate argillaceous laminations. @ 20.6'-20.7', 21.1'-21.2', 21.8'-22.2', high angle iron stained fractures. @ 22.5'-22.8', 23.0'-23.2', 23.3'-23.4', high angle iron stained fractures. @ 24.0'-24.1', 24.2'-24.3', 26.1'-26.3', high angle iron stained fractures. @ 26.5'-27.5', SDI = 17.6%. @ 27.3'-28.0', high angle iron stained fracture. @ 29.0'-29.5', qu = 3,484 psi. | | | | | | | | | | | | | | |
| -7.0 | 734.2 | 25 | 50/5 | 11 | 3 | | | | | | | | | | | | | | | | |
| | | Core 36" | Rec 30" | | RQD 33% | R-1 | *241 | | | | | | | | | | | | | | |
| 10 | | | | | | | @ 13.9'-15.7', 16.3'-16.8', 19.1'-20.0', high angle iron stained fractures. @ 21.4'-28.6' few to moderate argillaceous laminations. @ 20.6'-20.7', 21.1'-21.2', 21.8'-22.2', high angle iron stained fractures. @ 22.5'-22.8', 23.0'-23.2', 23.3'-23.4', high angle iron stained fractures. @ 24.0'-24.1', 24.2'-24.3', 26.1'-26.3', high angle iron stained fractures. @ 26.5'-27.5', SDI = 17.6%. @ 27.3'-28.0', high angle iron stained fracture. @ 29.0'-29.5', qu = 3,484 psi. | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 29% | R-2 | | *179 | | | | | | | | | | | | | |
| 15 | | | | | | | @ 13.9'-15.7', 16.3'-16.8', 19.1'-20.0', high angle iron stained fractures. @ 21.4'-28.6' few to moderate argillaceous laminations. @ 20.6'-20.7', 21.1'-21.2', 21.8'-22.2', high angle iron stained fractures. @ 22.5'-22.8', 23.0'-23.2', 23.3'-23.4', high angle iron stained fractures. @ 24.0'-24.1', 24.2'-24.3', 26.1'-26.3', high angle iron stained fractures. @ 26.5'-27.5', SDI = 17.6%. @ 27.3'-28.0', high angle iron stained fracture. @ 29.0'-29.5', qu = 3,484 psi. | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 48% | R-3 | | *336 | | | | | | | | | | | | | |
| 20 | | | | | | | @ 13.9'-15.7', 16.3'-16.8', 19.1'-20.0', high angle iron stained fractures. @ 21.4'-28.6' few to moderate argillaceous laminations. @ 20.6'-20.7', 21.1'-21.2', 21.8'-22.2', high angle iron stained fractures. @ 22.5'-22.8', 23.0'-23.2', 23.3'-23.4', high angle iron stained fractures. @ 24.0'-24.1', 24.2'-24.3', 26.1'-26.3', high angle iron stained fractures. @ 26.5'-27.5', SDI = 17.6%. @ 27.3'-28.0', high angle iron stained fracture. @ 29.0'-29.5', qu = 3,484 psi. | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 48% | R-3 | | *336 | | | | | | | | | | | | | |
| 25 | | | | | | | @ 13.9'-15.7', 16.3'-16.8', 19.1'-20.0', high angle iron stained fractures. @ 21.4'-28.6' few to moderate argillaceous laminations. @ 20.6'-20.7', 21.1'-21.2', 21.8'-22.2', high angle iron stained fractures. @ 22.5'-22.8', 23.0'-23.2', 23.3'-23.4', high angle iron stained fractures. @ 24.0'-24.1', 24.2'-24.3', 26.1'-26.3', high angle iron stained fractures. @ 26.5'-27.5', SDI = 17.6%. @ 27.3'-28.0', high angle iron stained fracture. @ 29.0'-29.5', qu = 3,484 psi. | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 48% | R-3 | | *336 | | | | | | | | | | | | | |
| 30 | | | | | | | @ 13.9'-15.7', 16.3'-16.8', 19.1'-20.0', high angle iron stained fractures. @ 21.4'-28.6' few to moderate argillaceous laminations. @ 20.6'-20.7', 21.1'-21.2', 21.8'-22.2', high angle iron stained fractures. @ 22.5'-22.8', 23.0'-23.2', 23.3'-23.4', high angle iron stained fractures. @ 24.0'-24.1', 24.2'-24.3', 26.1'-26.3', high angle iron stained fractures. @ 26.5'-27.5', SDI = 17.6%. @ 27.3'-28.0', high angle iron stained fracture. @ 29.0'-29.5', qu = 3,484 psi. | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 48% | R-3 | | *336 | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/8/2007 4:10 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-20

Location: Sta. 54+41.5, 230.4 ft. RT of SR 823 CL

Date Drilled: 4/13/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 0 | 642.4 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 642.1 | 4 | 10 | 12 | 18 | 1 | -- | | | | | | | | | | | | | |
| 3.0 | 639.4 | 18 | 36 | 50/4 | 16 | 2 | | | | | | | | | | | | | | |
| 5.0 | 637.4 | | | | | | | | | | | | | | | | | | | |
| | | Core 84" | Rec 84" | RQD 49% | R-1 | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 14.3 | 628.1 | | | | | | | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 73% | R-2 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 22.9 | 619.5 | | | | | | | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 84% | R-3 | *304 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/8/2007 4:10 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-20

Location: Sta. 54+41.5, 230.4 ft. RT of SR 823 CL

Date Drilled: 4/13/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 30 | 612.4 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, contains pyritic inclusions, moderately to slightly fractured. @ 33.8',34.8', low angle fractures with argillaceous laminations. @ 35.1',35.2',35.5', 35.9', low angle fractures with shale laminae. @ 36.0' slightly to unfractured. @ 40.3',44.9',45.7', low angle fractures with argillaceous laminations. @ 40.5'-40.7', calcareous layer. @ 40.7'-41.1', 41.5'-41.7', turbidity bedding. | | | | | | | | | | | | | |
| 35 | | Core 120" | Rec 120" | RQD 93% | R-4 | *424 | | | | | | | | | | | | | | |
| 40 | | Core 120" | Rec 120" | RQD 100% | R-5 | *510 | | | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 120" | RQD 98% | R-6 | *479 | @ 57.1',57.2', calcareous laminae. @ 57.7',57.8', low angle fractures with argillaceous laminations. | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/8/2007 4:10 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring B-1407

Location: Sta. 67+98.8, 5.4 ft. LT of SR 140 Ramp B BL

Date Drilled: 01/16/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None (Prior to coring) Water level at completion: 17.0' (Includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 582.6 | | | | | | | | | | | | | | | | | | |
| -0.4 | 582.2 | | | | | | Topsoil - 5" | | | | | | | | | | | | |
| | | 3 | | | | 4.0 | Very stiff brown and gray SANDY SILT (A-4a), some gravel, trace to little clay; damp. | 23 | 13 | -- | 8 | 42 | 14 | | | | | | |
| | | 4 | 9 | 16 | | | | | | | | | | | | | | | |
| 5 | | 8 | 18 | 21 | 20 | 3.5 | | | | | | | | | | | | | |
| | | 7 | 12 | 18 | 18 | 2.0 | @ 7.5', contains sandstone fragments. | 32 | 15 | -- | 10 | 34 | 9 | | | | | | |
| 10.0 | 572.6 | 50/3 | | 2 | | 4 | Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, massive, moderately fractured. @ 11.5', 15.7', 16.9', 18.4', low angle fractures. @ 13.6'-14.6', highly fractured to broken. @ 14.4'-14.6', brown, decomposed to highly weathered. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 118" | | RQD 86% | R-1 | | | | | | | | | | | | | |
| 20.0 | 562.6 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring B-1408

Location: Sta. 71+61.3, 52.4 ft. LT of SR 140 Ramp B BL

Date Drilled: 1/16/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 54.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 648.6 | | | | | | | | | | | | | | | | | | |
| 0.3 | 648.3 | | | | | | Topsoil - 4" | | | | | | | | | | | | |
| 5 | | 6 10 12 | 13 | | | 1 | Medium dense to dense brown SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; dry to damp. | | | | | | | | | | | | |
| | | 7 13 17 | 18 | | | 2 | | | 27 | 21 | -- | 12 | 28 | 12 | | | | | |
| | | 5 12 24 | 16 | | | 3 | | | | | | | | | | | | | |
| 10 | | 10 32 31 | 15 | | | 4 | | | | | | | | | | | | | |
| 12.0 | 636.6 | | | | | | Hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 5 11 21 | 18 | | | 5 | | 2 | 6 | -- | 7 | 56 | 29 | | | | | | |
| 14.5 | 634.1 | | | | | | Severely weathered brownish gray SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 15 | | 30 50/4 | 11 | | | 6 | | | | | | | | | | | | | |
| 16.0 | 632.6 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to massive, highly fractured. @ 16.0'-16.8', decomposed. @ 16.5'-16.6', broken zone. @ 19.5'-19.6', iron staining. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 118" | | | RQD 73% | | | | | | | | | | | | | |
| 21.6 | 627.0 | | | | | | Medium hard to hard brown and gray SANDSTONE; slightly weathered, argillaceous, micaceous, pyritic, massive, slightly to moderately fractured. | | | | | | | | | | | | |
| 25 | | | | | | | @ 26.6'-27.5', iron staining, calcareous. @ 26.6', 26.8', low angle fractures. @ 26.8'-27.5', 26.6'-27.0', 30.2'-30.4', high angle fractures. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:41 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring B-1409

Location: Sta. 65+47.3, 37.2 ft. RT of SR 140 Ramp A BL

Date Drilled: 1/25/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 28.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 636.2 | | | | | | | | | | | | | | | | | | |
| 0.3 | 635.9 | | | | | | Topsoil - 4" | | | | | | | | | | | | |
| | | 4 | | | | 2.5 | Very stiff to hard brown SILT (A-4b), trace to little clay, trace fine to coarse sand; dry to damp. | | | | | | | | | | | | |
| | | 7 | 19 | | 1 | | | | | | | | | | | | | | |
| 4.5 | 631.7 | | | | | 4.5+ | Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; dry to damp. | 5 | 1 | -- | 3 | 47 | 44 | | | | | | |
| | | 14 | 13 | 15 | 20 | | | | | | | | | | | | | | |
| | | 5 | 10 | 14 | 19 | 4.5+ | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 10.0 | 626.2 | | | | | | Severely weathered brown SANDSTONE argillaceous, micaceous. | | | | | | | | | | | | |
| 11.0 | 625.2 | | | | | | Medium hard brown SANDSTONE; fine grained, highly weathered, argillaceous, thinly bedded to massive, highly fractured. | | | | | | | | | | | | |
| | | 13 | 50/5 | 12 | 4 | | @ 14.7'-14.9', 15.2'-15.5', 19.5'-20.0', 20.3'-20.4', high angle fractures. | | | | | | | | | | | | |
| | | | | | | | @ 16.2'-16.5', core loss, decomposed rock and fracture suspected. | | | | | | | | | | | | |
| | | | | | | | @ 17.9'-18.1', 18.3'-18.5', 18.5'-19.1', 20.0'-20.3', 20.6'-20.7', broken zones, iron stains throughout. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 113" | | RQD 52% | R1 | | | | | | | | | | | | | |
| 21.0 | 615.2 | | | | | | Hard gray SANDSTONE; very fine grained, slightly to highly weathered, argillaceous, micaceous, pyritic, massive, slightly fractured. | | | | | | | | | | | | |
| | | | | | | | @ 21.2'-21.3', 23.9'-24.2', multiple high angle fractures. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | | RQD 93% | R2 | *305 | | | | | | | | | | | | |
| | | | | | | | @ 26.0'-29.1', qu = 8,887 psi, SDI = 97.8%. | | | | | | | | | | | | |
| | | | | | | | @ 26.0'-26.2', broken zone. | | | | | | | | | | | | |
| | | | | | | | @ 29.1'-29.3', high angle fracture. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:41 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring B-1409

Location: Sta. 65+47.3, 37.2 ft. RT of SR 140 Ramp A BL

Date Drilled: 1/25/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 28.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 30 | 606.2 | | | | | | | | | | | | | | | | | | | |
| 31.0 | 605.2 | | | | | | Hard gray SANDSTONE; very fine grained, moderately weathered, argillaceous, pyritic, massive, moderately fractured. @ 31.2'-31.9', weathered and iron stained. @ 31.3'-32.9', 39.8'-39.9', high angle fractures. @ 41.1', 48.3', 49.2', low angle fractures. @ 46.7'-48.2', qu = 10,867 psi, SDI = 91.5%. @ 52.5'-52.6', 54.3'-54.6', 56.3'-56.8', calcareous. @ 59.2', low angle fracture. | | | | | | | | | | | | | |
| 35 | | Core 120" | Rec 119" | RQD 79% | R3 | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 120" | RQD 100% | R4 | *192 | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | |
| 55 | | Core 120" | Rec 120" | RQD 100% | R5 | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:41 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-26

Location: Sta. 66+91.6, 42.4 ft. RT of SR 823 CL

Date Drilled: 05/18/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 6.0' Water level at completion: None (prior to coring) 3.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 577.1 | | | | | | | | | | | | | | | | | | |
| 0.3 | 576.8 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 1 2 | 7 | | | | Loose to medium dense brown SANDY SILT (A-4a), little clay, trace to little gravel; damp to moist. | 10 | 22 | -- | 11 | 46 | 11 | | | | | | |
| | | 2 11 | 6 | 10 | | | | | | | | | | | | | | | |
| 5 | | WOH 1 | 6 | 13 | | | | | | | | | | | | | | | |
| 8.0 | 569.1 | 6 9 | 9 | 16 | | 3.25 | Very stiff gray and brown SILT (A-4b), some clay, little fine to coarse sand; damp to moist. | 0 | 1 | -- | 14 | 63 | 22 | | | | | | |
| 10 | | 3 4 | 7 | 15 | | 3.5 | @ 11.0', contains sandstone fragments. | | | | | | | | | | | | |
| 13.5 | 563.6 | 12 24 | 16 | 18 | | | Severely weathered gray SANDSTONE, argillaceous, micaceous. | | | | | | | | | | | | |
| 15 | | 50/5 | 4 | | | | | | | | | | | | | | | | |
| 17.0 | 560.1 | | | | | | Medium hard to hard gray SANDSTONE; very fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to medium bedded, moderately fractured. @ 17.5'-17.9', clay filled fractures. | | | | | | | | | | | | |
| 20 | | Core 60" | Rec 58" | | RQD 77% | R-1 | | | | | | | | | | | | | |
| 22.0 | 555.1 | | | | | | Bottom of Boring - 22.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:41 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-28

Location: Sta. 75+23.5, 28.0 ft. LT of SR 823 CL

Date Drilled: 4/11/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.8' (including drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 628.6 | | | | | | | | | | | | | | | | | | | |
| -0.4 | 628.2 | | | | | | Topsoil - 5" | | | | | | | | | | | | | |
| | | 3 | | | | 1 | 1.25 | | 1 | 9 | -- | 10 | 57 | 23 | | | | | | |
| | | 10 | 18 | | | | | | | | | | | | | | | | | |
| -3.5 | 625.1 | | | | | 2 | 4.5 | | 8 | 8 | -- | 18 | 48 | 18 | | | | | | |
| | | 15 | | | | | | | | | | | | | | | | | | |
| | | 25 | 18 | | | | | | | | | | | | | | | | | |
| | | 14 | | | | | | | | | | | | | | | | | | |
| | | 7 | | | | 3 | 3.75 | | | | | | | | | | | | | |
| | | 7 | 18 | | | | | | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | | | | | | | | | |
| | | 11 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | 4 | 3.5 | | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | | | | |
| | | 10 | 18 | | | | | | | | | | | | | | | | | |
| | | 11 | | | | | | | | | | | | | | | | | | |
| | | 7 | | | | 5 | 4.5 | | | | | | | | | | | | | |
| | | 11 | 18 | | | | | | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | | |
| -15.0 | 613.6 | 50/5 | 17 | | | 6 | 4.5+ | | | | | | | | | | | | | |
| -16.1 | 612.5 | | | | | | | Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to thickly bedded, slightly fractured. @ 15.0'-15.1', broken zone. @ 15.2', low angle clay filled fracture. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | | | RQD 93% | R-1 | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, thinly bedded to thickly bedded, slightly fractured. @ 16.4', 18.5', 22.2', low angle clay filled fractures. @ 23.3', 24.3', low angle clay filled fractures. | | | | | | | | | | | | |
| -25.0 | 603.6 | | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:41 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-30

Location: Sta 76+18.6, 34.4 ft. LT of SR 823 CL

Date Drilled: 4/8/05 to 4/11/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 9.8' (prior to coring) 5.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 643.5 | | | | | | | | | | | | | | | | | | |
| 0.3 | 643.2 | | | | | | Topsoil - 4" | | | | | | | | | | | | |
| | | 2 3 3 | 9 | | | 1 | 0.5 Soft grayish brown SILT (A-4b), little fine to coarse sand, little clay, trace gravel; organic, contains roots and sandstone fragments; moist. | 8 | 10 | -- | 8 | 56 | 18 | Non-Plastic | | | | | |
| 3.5 | 640.0 | 5 6 6 | 18 | | | 2 | 2.0 Very stiff brown SANDY SILT (A-4a), little clay, little gravel; contains sandstone fragments; damp. | 12 | 15 | -- | 12 | 44 | 17 | | | | | | |
| 5 | | 9 11 22 | 18 | | | 3 | 2.0 | | | | | | | | | | | | |
| 8.5 | 635.0 | 30 36 50/4 | 16 | | | 4 | Severely weathered brown SANDSTONE, fine grained, argillaceous. | | | | | | | | | | | | |
| 10.0 | 633.5 | Core 24" | Rec 24" | RQD 21% | R-1 | *38 | Soft brown SHALE, decomposed to highly weathered, arenaceous, highly fractured. | | | | | | | | | | | | |
| 13.2 | 630.3 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, highly to moderately fractured, contains few argillaceous laminations. @ 13.8', gray with siltstone interbeds. @ 13.8'-14.0' argillaceous zone | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 80% | R-2 | *395 | @ 19.3'-19.4', 19.6'-19.7', calcareous. @ 20.1', moderately fractured. @ 20.1'-20.9', 22.5'-22.8', calcareous. | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25.0 | 618.5 | Core 36" | Rec 36" | RQD 61% | R-3 | *454 | @ 22.8'-25.0', SANDSTONE interbedded with SILTSTONE, highly fractured. | | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:41 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-31

Location: Sta. 76+08.3, 123.6 ft. RT of SR 823 CL

Date Drilled: 4/11/05 to 4/12/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 19.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|--|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0 | 671.8 | | | | | | Topsoil - 4' | | | | | | | | | | |
| 0.3 | 671.5 | 2 | | | | 1 | | Loose brown SILT (A-4b), little to some clay, trace fine to coarse sand, trace gravel; contains sandstone fragments; damp. | | | | | | | | | |
| | | 4 | 15 | | | | | | | | | | | | | | |
| 3.5 | 668.3 | 14 | | | | 2 | Severely weathered brown SANDSTONE, fine grained, argillaceous. | | | | | | | | | | |
| | | 46 | 13 | | | | | | | | | | | | | | |
| 5.0 | 666.8 | 50/1 | | | | | Medium hard to hard brown SANDSTONE; fine grained, highly weathered, micaceous, highly to moderately fractured. @ 5.0'-6.2', broken. @ 6.2', 8.4', high angle fractures. @ 8.0', rust stained fracture. | | | | | | | | | | |
| | | Core 48" | Rec 48" | RQD 46% | R-1 | *187 | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | @ 13.4'-18.0', brownish gray. @ 16.0', high angle fracture. | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 80% | R-2 | *131 | | | | | | | | | | | |
| 18.0 | 653.8 | | | | | | Hard gray SANDSTONE; fine grained, slightly to moderately weathered, micaceous, moderately fractured. @ 19.3', rust stained fracture. | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | @ 26.8'-27.0', argillaceous zone. | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 88% | R-3 | *396 | | | | | | | | | | | |
| 30 | | | | | | | @ 29.2'-29.8', thinly laminated siltstone/sandstone layers. | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-32

Location: Sta. 80+19.3, 34.5 ft. LT of SR 823 CL

Date Drilled: 4/7/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 10.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 698.0 | | | | | | | | | | | | | | | | | | |
| -0.4 | 697.6 | | | | | | Topsoil - 5" / 6" soil removed before drilling | | | | | | | | | | | | |
| | | 3 | | | | | Loose brown SILT (A-4b), little fine to coarse sand, trace gravel; contains sandstone fragments; damp. | 9 | 4 | -- | 12 | 59 | 16 | Non-Plastic: ● | ○ | | | | |
| | | 4 | 12 | 1 | | | | | | | | | | | | | | | |
| 3.0 | 695.0 | | | | | | Hard brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp. | | | | | | | | ○ | | | | |
| | | 4 | 18 | 2 | | | | | | | | | | | | | | | |
| 5 | | 11 | | | | 4.5+ | | | | | | | | | | | | | |
| | | 28 | | | | | | | | | | | | | | | | | |
| 6.0 | 692.0 | | | | | | Severely weathered brown SANDSTONE, fine grained, argillaceous. | | | | | | | | | | | | |
| | | 50/4 | 4 | 3 | | | | | | | | | | | | | | | |
| 7.5 | 690.5 | | | | | | Soft brown SANDSTONE; fine grained, highly weathered, micaceous, highly fractured. @ 8.5', medium hard. @ 9.7', high angle fracture. @ 11.0', carbonaceous seam. @ 12.8'-13.4', clay filled fractures. @ 14.1', high angle fracture, rust staining. @ 14.7', decomposed SHALE interbeds. | | | | | | | | | | | | |
| | | Core 54" | Rec 54" | RQD 65% | R-1 | *53 | | | | | | | | | | | | | |
| 10 | | | | | | | Medium hard gray SANDSTONE; fine grained, moderately weathered, micaceous, highly fractured, contains clay filled fractures. @ 17.4'-22.0', abundant argillaceous, interbedded with SHALE. @ 22.0', gray. @ 23.8', fossiliferous. @ 24.5', moderately weathered, moderately fractured. | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 57% | R-2 | *208 | | | | | | | | | | | | | |
| 15.7 | 682.3 | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 88% | R-3 | *382 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-34

Location: Sta. 80+35.5, 180.0 ft. RT of SR 823 CL

Date Drilled: 4/7/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0' Water level at completion: 7.0' (prior to coring) 37.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 0 | 748.1 | | | | | | | | | | | | | | | | | | | |
| -0.4 | 747.7 | | | | | | Topsoil - 5" | | | | | | | | | | | | | |
| | | 1 | | | | 3.0 | Very stiff brown SANDY SILT (A-4a), little fine to coarse sand, little gravel; contains sandstone fragments; damp. | 18 | 7 | -- | 8 | 45 | 22 | | | | | | | |
| | | 2 | 14 | | | | | | | | | | | | | | | | | |
| -3.5 | 744.6 | 5 | | | | 2 | Severely weathered brown and gray SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| 5 | | 12 | 18 | | | | | | | | | | | | | | | | | |
| | | 16 | | | | 3 | Soft to medium hard brown SANDSTONE interbedded with SILTSTONE; fine grained, highly weathered, argillaceous, medium bedded, highly fractured, with typical low angle iron stained fractures. @ 7.1'-7.3', 9.7'-9.9', 13.5'- 13.6', high angle rust stained fractures. @ 7.4'-8.0', broken zone. @ 14.5'-15.0', core loss. @ 15.0'-15.1', 16.8'-17.0', 22.8'-23.0', high angle rust stained fractures. | | | | | | | | | | | | | |
| -7.0 | 741.1 | 50/5 | 11 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 10 | | Core 96" | Rec 89" | RQD 71% | R-1 | *157 | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | RQD 88% | R-2 | *172 | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| -25.3 | 722.8 | | | | | | Soft to medium hard grayish brown SHALE interbedded with SANDSTONE; highly weathered to decomposed, argillaceous, micaceous, thinly laminated to thinly bedded, highly fractured, with typical low angle clay filled fractures. @ 29.7'-30.0', broken zone. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 57% | R-3 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-37

Location: Sta. 84+54.5, 169.3 ft. RT of SR 823 CL

Date Drilled: 4/6/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 2.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 761.1 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 760.8 | 2 | | | | 0.5 | Topsoil - 3" | | | | | | | | | | | | | |
| | | 2 1 | 18 | | | | Soft to medium stiff brown and gray SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains roots; moist. | | | | | | | | | | | | | |
| 3.5 | 757.6 | 8 50/4 | 10 | | | | Very dense brown SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; damp. | 27 | 15 | -- | 12 | 33 | 13 | | | | | | | |
| 6.0 | 755.1 | 14 35 50/2 | 14 | | | | Severely weathered brown fine grained SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| 9.0 | 752.1 | 50/2 | 2 | | | | Medium hard brown SANDSTONE interbedded with SILTSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to thickly bedded, highly fractured, with low angle iron stained fractures.. @ 9.0'-9.2', 11.5'-11.8', 13.4'-13.7', broken zone. @ 9.5-9.6', 9.9'-10.0', high angle iron stained fractures. | | | | | | | | | | | | | |
| | | Core 60" | Rec 56" | RQD 67% | R-1 | | | | | | | | | | | | | | | |
| 15 | | Core 60" | Rec 60" | RQD 100% | R-2 | *157 | | | | | | | | | | | | | | |
| 20 | | | | | | | @ 19.2'-19.3', 26.6'-26.8', broken zones. @ 19.5'-19.7, 21.8'-21.9', 24. 6'-25.0', 26.0'-26.5', high angle iron stained fractures. | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 64% | R-3 | *141 | | | | | | | | | | | | | | |
| 27.0 | 734.1 | | | | | | Soft to medium hard gray SHALE interbedded with SANDSTONE; highly weathered to decomposed, micaceous, thinly laminated to thinly bedded, moderately fractured. | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-41

Location: Sta. 92+20.4, 115.9 ft. LT of SR 823 CL

Date Drilled: 4/5/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 29.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0.2 | 777.7 | | | | | | | | | | | | | | | | | | |
| | 777.5 | | | | | | Topsoil - 2" | | | | | | | | | | | | |
| | | WOH 2 | | | | 1.5 | Stiff brown SILT AND CLAY (A-6a), little to some fine to coarse sand, some gravel; contains roots; damp. | 24 | 7 | -- | 13 | 33 | 23 | | | | | | |
| | | 5 | | | | 4.5+ | @ 3.5'-5.0', hard, contains sandstone fragments. | | | | | | | | | | | | |
| | | 11 | | | | | | | | | | | | | | | | | |
| 5 | | 31 | 13 | | | | | | | | | | | | | | | | |
| 6.0 | 771.7 | 50/5 | 5 | | | | Severely weathered brown fine grained SANDSTONE, argillaceous. | | | | | | | | | | | | |
| | | 50/5 | 5 | | | | | | | | | | | | | | | | |
| 10.0 | 767.7 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle iron stained fractures. @ 10.0'-10.3', 10.5'-10.7', 13.8'-13.9', 17.8'-17.9', 19.1'-19.4', broken zones. @ 10.7'-11.2', 14.5'-14.6', high angle iron stained fractures. | | | | | | | | | | | | |
| 15 | | Core 108" | Rec 108" | | RQD 63% | R-1 | *197 | | | | | | | | | | | | |
| 20 | | | | | | | @ 19.0'-19.5', 19.7'-19.9', high angle iron stained fractures. @ 21.0'-21.2', 22.0'-22.7', high angle iron stained fractures. @ 21.3'-21.5', 21.6'-21.8', broken zones. | | | | | | | | | | | | |
| 23.0 | 754.7 | | | | | | Medium hard to hard brownish gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, contains few argillaceous laminations. @ 25.2'-25.3', broken zone. @ 27.5', 28.6', low angle fractures. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | | RQD 68% | R-2 | *314 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-43

Location: Sta. 92+21.9, 189.4 ft. RT of SR 823 CL

Date Drilled: 03/31/05 to 04/01/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0 | 806.0 | | | | | | | | | | | | | | | | | |
| -0.4 | 805.6 | | | | | | Topsoil - 5" | | | | | | | | | | | |
| | | 4 | | | | 1 | Very stiff to hard light reddish brown SILTY CLAY (A-6b), some fine to coarse sand, trace gravel; damp. | | | | | | | | | | | |
| | | 4 | 7 | 18 | | | | | | | | | | | | | | |
| | | 7 | | | | 2 | | | | | | | | | | | | |
| 5 | | 9 | 10 | 18 | | | | | 9 | 10 | -- | 15 | 28 | 38 | | | | |
| | | 7 | | | | 3 | @ 6.0', brown. | | | | | | | | | | | |
| | | 12 | 14 | 18 | | | | | | | | | | | | | | |
| | | 8 | | | | 4 | | | | | | | | | | | | |
| -10.0 | 796.0 | 25 | 32 | 18 | | | Severely weathered brownish gray SHALE, contains interbedded sand seams. | | | | | | | | | | | |
| | | 18 | | | | 5 | | | | | | | | | | | | |
| | | 27 | 50/5 | 17 | | | | | | | | | | | | | | |
| -13.0 | 793.0 | | | | | | Soft to medium hard grayish brown SHALE; decomposed, arenaceous, thinly bedded, highly fractured. | | | | | | | | | | | |
| 15 | | | | | | | @ 13.6'-14.3', lost recovery. | | | | | | | | | | | |
| | | | | | | | @ 14.3'-14.6', 14.9-15.1', 22. 5'-23.0', 23.0'-23.4', broken zones. | | | | | | | | | | | |
| | | | | | | | @ 16.6'-17.6', 24.5'-24.7', high angle iron stained fractures. | | | | | | | | | | | |
| | | | | | | | @ 18.4'-18.6', coal seam. | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| | | | | | | | @ 23.0'-23.3', highly weathered. | | | | | | | | | | | |
| -24.7 | 781.3 | | | | | | Soft to medium hard gray SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded, highly fractured, with typical low angle clay filled fractures; contains moderate to abundant argillaceous laminations. | | | | | | | | | | | |
| | | | | | | | @ 28.6'-30.3', qu = 10,909 psi SDI = 39.4%. | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-44

Location: Sta. 96+33.4, 121.5 ft. LT of SR 823 CL

Date Drilled: 3/31/05 to 4/4/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 46.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 60 | 752.7 | | | | | | <p>DESCRIPTION</p> <p>Hard gray very fine to fine grained SANDSTONE, moderately to slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured; contains few argillaceous laminations.</p> <p>@ 67.2'-67.5' very fine grained.</p> <p>Medium hard very fine grained SANDSTONE; argillaceous, micaceous, thinly bedded to massive, slightly fractured; contains few argillaceous laminations.</p> <p>@ 80.0', becomes SILTSHALE like.</p> <p>Hard gray very fine to fine grained SANDSTONE; moderately weathered to slightly weathered, argillaceous, micaceous, massive, slightly to unfractured.</p> | | | | | | | | | | | | |
| 65 | | Core 120" | Rec 120" | RQD 100% | R-5 | *427 | | | | | | | | | | | | | |
| 68.0 | 744.7 | | | | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | | |
| 75 | | Core 120" | Rec 120" | RQD 100% | R-6 | *124 | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | |
| 81.3 | 731.4 | | | | | | | | | | | | | | | | | | |
| 85 | | Core 120" | Rec 120" | RQD 100% | R-7 | *482 | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-46

Location: Sta. 96+23.1, 84.5 ft. RT of SR 823 CL

Date Drilled: 03/30/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 14.5' (3/28/05 AM) 18.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 793.8 | | | | | | | | | | | | | | | | | | | |
| 0.7 | 793.1 | 4 | | | | 3.75 | Topsoil - 8" | | | | | | | | | | | | | |
| | | 4 | 18 | | | | Stiff to very stiff light brown SILTY CLAY (A-6b), some fine to coarse sand, trace gravel; damp to moist. | | | | | | | | | | | | | |
| | | 5 | | | | 1.25 | | | | | | | | | | | | | | |
| | | 6 | 18 | | | | Severely weathered gray SANDSTONE, argillaceous, rust stained. | | | | | | | | | | | | | |
| 5 | | 9 | | | | | | | | | | | | | | | | | | |
| 6.0 | 787.8 | 16 | 18 | | | | | | | | | | | | | | | | | |
| | | 20 | | | | | Soft to medium hard brownish gray SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded, broken to highly fractured . @ 10.0'-10.4', 12.3'-12.5', 12.8'-13.0', broken zones. @ 10.4'-10.9', lost recovery. @ 11.7', 11.9', low angle clay filled fractures. @ 12.1'-12.3', 15.9'-16.0', 16.8'-17.0', high angle iron stained fractures. | | | | | | | | | | | | | |
| | | 31 | | | | | | | | | | | | | | | | | | |
| | | 50/1 | 1 | | | | | | | | | | | | | | | | | |
| 10.0 | 783.8 | | | | | | Soft to medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massively bedded, moderately fractured, with typical low angle clay filled fractures. @ 23.4'-25.0', 25.5'-26.0, contains poorly cemented argillaceous zones. | | | | | | | | | | | | | |
| | | Core 36" | Rec 30" | RQD 28% | R-1 | *401 | | | | | | | | | | | | | | |
| 18.1 | 775.7 | | | | | | Soft to medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massively bedded, moderately fractured, with typical low angle clay filled fractures. @ 23.4'-25.0', 25.5'-26.0, contains poorly cemented argillaceous zones. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 91% | R-2 | *401 | | | | | | | | | | | | | | |
| 20 | | | | | | | Soft to medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massively bedded, moderately fractured, with typical low angle clay filled fractures. @ 23.4'-25.0', 25.5'-26.0, contains poorly cemented argillaceous zones. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 84% | R-3 | *351 | | | | | | | | | | | | | | |
| 25 | | | | | | | Soft to medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massively bedded, moderately fractured, with typical low angle clay filled fractures. @ 23.4'-25.0', 25.5'-26.0, contains poorly cemented argillaceous zones. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 84% | R-3 | *351 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-46

Location: Sta. 96+23.1, 84.5 ft. RT of SR 823 CL

Date Drilled: 03/30/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 14.5' (3/28/05 AM) 18.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
| 60 | 733.8 | | | | | | Soft to medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, thinly laminated to thinly bedded, highly to moderately fractured. @ 62.2'-63.5' gravel to SILTSTONE/ SILT to SHALE, highly fractured to broken. Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, thinly bedded to thickly bedded, moderately to slightly fractured. @ 64.1', low angle clay filled fractures. @ 65.9', 66.1', 66.2', 66.4', low angle clay filled fractures. | | | | | | | | | | | | | | |
| 63.5 | 730.3 | | | | | | | | | | | | | | | | | | | | |
| 65 | | Core 120" | Rec 120" | RQD 91% | R-7 | *464 | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | | | | |
| 75 | | Core 120" | Rec 120" | RQD 100% | R-8 | *547 | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | | | |
| 85 | | Core 120" | Rec 120" | RQD 100% | R-9 | *779 | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-47

Location: Sta. 100+19.8, 176.4 ft. LT of SR 823 CL

Date Drilled: 03/24/05 to 03/30/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 14.8' (3/30/35 am) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 838.6 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 838.3 | | | | | | Topsoil - 4" | | | | | | | | | | | | | |
| | | WOH 2 | | | | 1 | Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; damp. | | | | | | | | | | | | | |
| | | 6 | 16 | | | | | | | | | | | | | | | | | |
| 4.0 | 834.6 | 9 | | | | 2 | Severely weathered brown SANDSTONE, rust stained. | | | | | | | | | | | | | |
| | | 30 | | | | | | | | | | | | | | | | | | |
| 5.0 | 833.6 | 50/0 | 12 | | | | Medium hard reddish brown SANDSTONE; very fine to fine grained, highly weathered, broken; contains breccia. @ 5.0'-5.1', 5.8'-10.0', relithified sediments. | | | | | | | | | | | | | |
| | | Core 60" | Rec 35" | | | RQD 8% | | | | | | | | | | | | | | |
| | | | | | | R-1 | | | | | | | | | | | | | | |
| 10.0 | 828.6 | | | | | | Hard brown SANDSTONE; fine to medium grained, moderately weathered, medium bedded to thickly bedded with cross bedding, highly fractured with high angle fractures. | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | | | RQD 58% | | | | | | | | | | | | | | |
| | | | | | | R-2 | | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 90" | | | RQD 34% | @ 24.5'-25.9', qu = 2,629 psi. @ 26.0'-26.6', contains gray decomposed, argillaceous laminations. @ 26.0'-27.0', SDI = 80.1%. | | | | | | | | | | | | | |
| | | | | | | R-3 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-47

Location: Sta. 100+19.8, 176.4 ft. LT of SR 823 CL

Date Drilled: 03/24/05 to 03/30/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 14.8' (3/30/35 am) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
| 60 | 778.6 | | | | | | Hard light gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, medium to massively bedded, slightly fractured to unfractured, contains occassional siltstone or shale clast. @ 60.8'-61.8', SDI = 84.5%. @ 62.0'-62.4', qu = 5,340 psi. @ 62.7', 67.7', 68.2', argillaceous laminations. @ 62.7', 67.2', low angle fractures. @ 70.0', 70.3', argillaceous laminations. | | | | | | | | | | | | | | |
| 65 | | Core 120" | Rec 120" | RQD 100% | R-7 | *350 | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | | | | |
| 75 | | Core 120" | Rec 120" | RQD 100% | R-8 | *454 | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | | | |
| 82.5 | 756.1 | | | | | | Hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to medium bedded. | | | | | | | | | | | | | | |
| 85 | | Core 120" | Rec 120" | RQD 100% | R-9 | *799 | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-50

Location: Sta 104+14.4, 202.2 ft. LT of SR 823 CL

Date Drilled: 03/24/05 to 03/28/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 2.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 812.1 | | | | | | | | | | | | | | | | | | | |
| -0.5 | 811.6 | | | | | 3.5 | Topsoil - 6" | | | | | | | | | | | | | |
| | | 3 5 | 5 | 18 | | | Very stiff light reddish brown SILT AND CLAY (A-6a), little fine sand; damp. | | | | | | | | | | | | | |
| -3.5 | 808.6 | | | | | | Severely weathered gray SANDSTONE, fine grained, argillaceous. | | | | | | | | | | | | | |
| | | 14 16 | | 18 | | | | | | | | | | | | | | | | |
| | | 12 50/5 | | 11 | | | | | | | | | | | | | | | | |
| | | 39 25 50/4 | | 16 | | | Hard gray and light brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded, highly fractured with low to high angle fractures with clay infilling, contains decomposed zones, argillaceous. | | | | | | | | | | | | | |
| -10.0 | 802.1 | Core 12" | Rec 12" | | RQD 83% | R-1 | | | | | | | | | | | | | | |
| | | | | | | | Medium hard to hard light gray and light brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly laminated to medium bedded, moderately fractured with low to high angle fractures with clay infilling. | | | | | | | | | | | | | |
| -15.6 | 796.5 | Core 120" | Rec 120" | | RQD 69% | R-2 | | *255 | | | | | | | | | | | | |
| | | | | | | | Soft to hard gray SANDSTONE; very fine to medium grained, interbedded with SHALE, micaceous, decomposed to moderately weathered, shale zones typically highly weathered to decomposed. | | | | | | | | | | | | | |
| -26.6 | 785.5 | Core 120" | Rec 120" | | RQD 78% | R-3 | | *256 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-52

Location: Sta 104+28.8, 67.4 ft. RT of SR 823 CL

Date Drilled: 03/29/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 14.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|---------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|----|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 711.6 | | | | | | | | | | | | | | | | | | |
| -0.5 | 711.1 | | | | | | Topsoil - 6" | | | | | | | | | | | | |
| | | 4 8 10 | 18 | | | 1 | Very stiff brown SANDY SILT (A-4a), "and" gravel, little clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 8 14 17 | 18 | | | 2 | | | | 41 | 13 | -- | 8 | 26 | 12 | | | | |
| 5 | | 9 10 12 | 18 | | | 3 | | | | | | | | | | | | | |
| -8.5 | 703.1 | | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| | | 3 5 6 | 1 | | | 4 | | | | | | | | | | | | | |
| 10 | | 50/1 | 1 | | | 5 | | | | | | | | | | | | | |
| -13.0 | 698.6 | | | | | | Medium hard brown SANDSTONE; fine grained, moderately to highly weathered, micaceous, highly fractured. @ 13.0'-13.4', broken. @ 15.8'-18.0', possible core loss. | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 95" | RQD 51% | R-1 | *425 | @ 18.7',19.2',20.0', clay filled fractures. @ 18.8', high angle fracture. @ 19.2'-19.8', gray. @ 20.5'-24.9', argillaceous, with rust staining, highly weathered. | | | | | | | | | | | | |
| -24.9 | 686.7 | | | | | | Medium hard to hard gray SANDSTONE; fine grained, moderately weathered, micaceous, highly fractured. @ 23.6'-23.9', broken zone, possible core loss. @ 25.8',27.1', clay filled fractures. @ 28.5'-28.7', moderate argillaceous laminations. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 114" | RQD 79% | R-2 | *173 | | | | | | | | | | | | | |
| 24.9 | 686.7 | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-52 Location: Sta 104+28.8, 67.4 ft. RT of SR 823 CL Date Drilled: 03/29/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 14.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | |
| 60 | 651.6 | | | | | | Medium hard to hard gray SANDSTONE; fine grained, moderately weathered, micaceous, moderately to slightly fractured. @ 62.3', contains argillaceous laminations, moderately to highly weathered. | | | | | | | | | | |
| | | Core 24" | Rec 24" | RQD 100% | R-6 | *374 | | | | | | | | | | | |
| 65.0 | 646.6 | | | | | | Bottom of Boring - 65.0' | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-53

Location: Sta. 106+21.7, 95.2 ft. LT of SR 823 CL

Date Drilled: 03/22/05 to 03/23/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 9.1' (3/23/05 am) 8.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|--|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0 | 680.5 | | | | | | <p>Topsoil - 5"</p> <p>Medium dense brown SANDY SILT (A-4a), "and" gravel, little clay; contains sandstone fragments; damp.</p> | | | | | | | | | | | |
| -0.4 | 680.1 | 4 | 7 | 18 | 1 | | | | | | | | | | | | | |
| 3.5 | 677.0 | 39 | 27 | 9 | 1 | 2 | | <p>Severely weathered brown SANDSTONE, argillaceous.</p> | | | | | | | | | | |
| 5 | | 6 | 8 | 17 | 18 | 3 | | | | | | | | | | | | |
| 10.0 | 670.5 | 25 | 28 | 50/3 | 15 | 4 | <p>Medium hard to hard gray and brown SANDSTONE interbedded with SILTSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, broken with low to high angle fractures with clay infilling; contains argillaceous decomposed zones, few to moderate argillaceous laminations. @ 13.0'-14.0', argillaceous zone. @ 15.3'-15.7', 16.9'-17.7', high angle rust stained fractures. @ 17.7'-19.0', argillaceous zone.</p> | | RQD 33% | R-1 | | | | | | | | |
| 15 | | Core 120" | Rec 120" | | | RQD 31% | | R-2 | *256 | | | | | | | | | |
| 19.0 | 661.5 | | | | | | | <p>Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to medium bedded, broken to highly fractured, contains low angle fractures with clay infilling; contains few to moderate argillaceous laminations. @ 22.5'-23.5', broken zone.</p> | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | | | RQD 78% | R-3 | | *306 | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:49 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-70

Location: Sta. 143+03.0, 247.2 ft. LT of SR 823 CL

Date Drilled: 3/4/05 to 3/7/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 21.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 767.5 | | | | | | | | | | | | | | | | | | |
| 0.6 | 766.9 | | | | | | Topsoil - 7" | | | | | | | | | | | | |
| | | 5 8 11 | 18 | | | 1 | 4.5+ | | | | | | | | | | | | |
| | | 6 6 9 | 18 | | | 2 | 4.5+ | | | | | | | | | | | | |
| 5 | | 15 21 28 | 18 | | | 3 | 4.5+ | | | | | | | | | | | | |
| 9.0 | 758.5 | 21 50/4 | 10 | | | 4 | 4.5+ | | | | | | | | | | | | |
| 10 | | | | | | | Severely weathered SANDSTONE. | | | | | | | | | | | | |
| 11.5 | 756.0 | Core 30" | Rec 30" | RQD 72% | R-1 | *16 | Medium hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, highly fractured, moderate to abundant argillaceous laminations. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 92% | R-2 | *561 | @ 17.7', interbedded with SILTSTONE and CLAYSTONE. @ 21.9'-22.2', decomposed CLAYSTONE. @ 22.0', high angle fracture. @ 22.2'-22.5', broken zone. @ 23.0'-23.6', rust staining. | | | | | | | | | | | | |
| 23.6 | 743.9 | | | | | | Medium hard to hard gray SANDSTONE; fine grained, moderately weathered, micaceous, moderately fractured low angle fractures, contains few argillaceous laminations. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 85% | R-3 | *317 | @ 26.9'-27.3', low angle fracture. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-74

Location: Sta. 148+91.8, 66.8 ft. RT of SR 823 CL

Date Drilled: 03/01/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 57.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
| 120 | 742.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, massive to thickly bedded, slightly fractured to unfractured. @ 143.3', contains few argillaceous laminations. @ 143.7',143.8',143.9', low angle fractures. | | | | | | | | | | | | | | |
| 125 | | Core 120" | Rec 120" | RQD 94% | R13 | | | | | | | | | | | | | | | | |
| 130 | | Core 60" | Rec 60" | RQD 100% | R14 | | | | | | | | | | | | | | | | |
| 135 | | Core 84" | Rec 84" | RQD 100% | R15 | *475 | | | | | | | | | | | | | | | |
| 140 | | | | | | | | | | | | | | | | | | | | | |
| 145 | | Core 120" | Rec 120" | RQD 98% | R16 | *525 | | | | | | | | | | | | | | | |
| 150 | | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-74

Location: Sta. 148+91.8, 66.8 ft. RT of SR 823 CL

Date Drilled: 03/01/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 57.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | |
| 180 | 682.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thinly bedded to thickly bedded. @ 192.8'-194.0', 194.7'-195.8', 199.9'-205.0', contains moderate argillaceous laminations. | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 100% | R20 | *236 | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 100% | R21 | *486 | | | | | | | | | | | |
| | | Core 36" | Rec 36" | RQD 100% | R22 | | | | | | | | | | | | |
| 205.0 | 657.3 | | | | | | Bottom of Boring - 205.0' | | | | | | | | | | |
| 210 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-81

Location: Sta. 156+89.8, 36.4 ft. LT of SR 823 CL

Date Drilled: 11/16/04 to 11/17/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0' Water level at completion: 6.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 862.3 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 862.0 | | | | | | Topsoil - 3" | | | | | | | | | | | | | |
| | | 1 3 | 18 | | | 2.5 | Very stiff brown SILT AND CLAY (A-6a); moist. | | | | | | | | | | | | | |
| 3.0 | 859.3 | 1 5 | 18 | | | | Medium dense brown COARSE AND FINE SAND (A-3a), trace clay; possible weathered sandstone; damp. | | | | | | | | | | | | | |
| | | 5 7 | 18 | | | | | | | | | | | | | | | | | |
| | | 12 13 | 18 | | | | | | | | | | | | | | | | | |
| 10 | | 10 | | | | | | | | | | | | | | | | | | |
| 11.5 | 850.8 | 17 44 | 16 | | | | Severely weathered SANDSTONE. | | | | | | | | | | | | | |
| | | 50/5 | | | | | | | | | | | | | | | | | | |
| | | 28 40 | 14 | | | | | | | | | | | | | | | | | |
| 15 | | 50/5 | | | | | | | | | | | | | | | | | | |
| | | 30 | 6 | | | | | | | | | | | | | | | | | |
| 17.0 | 845.3 | 50/1 | | | | | Soft to medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded, highly fractured, with typical low angle clay filled fractures, turbidity interbedded with silt and clay size grains, poorly cemented orange/grey. @ 20.0'-30.0', SDI = 76.5%. | | | | | | | | | | | | | |
| | | Core 36" | Rec 36" | | RQD 42% | R1 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 57% | R2 | *338 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 26.5 | 835.8 | | | | | | Hard gray SANDSTONE; fine to medium grained, highly weathered, argillaceous, medium bedded, highly fractured to broken, turbidity bedding. | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-84 Location: Sta. 162+46.9, 131.9 ft. RT of SR 823 CL Date Drilled: 11/09/04 to 11/10/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 27.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0.2 | 868.3 | | | | | | Topsoil - 2" | | | | | | | | | | | | | | |
| | 868.1 | 2 | | | | 1 | Medium dense to dense brown COARSE AND FINE SAND (A-3a), trace clay; possible decomposed sandstone; damp. | | | | | | | | | | | | | | |
| | | 6 | 12 | 18 | | | | | | | | | | | | | | | | | |
| | | 9 | | | | 2 | | | | | | | | | | | | | | | |
| 5 | | 22 | 34 | 18 | | | | | | | | | | | | | | | | | |
| | | 17 | | | | 3 | @ 6.0', contains weathered micaceous sandstone fragments. | | | | | | | | | | | | | | |
| | | 50/5 | | 8 | | | | | | | | | | | | | | | | | |
| | | 30 | | | | 4 | | | | | | | | | | | | | | | |
| | | 50/4 | | 8 | | | | | | | | | | | | | | | | | |
| 10.0 | 858.3 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typically low angle rust stained fractures. | | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 73" | | RQD 40% | R-1 | *10 | | | | | | | | | | | | | | |
| 20 | | | | | | | @ 18.0'-18.6',19.3'- 21.4',22.5'-23.0', broken zones. | | | | | | | | | | | | | | |
| | | | | | | | @ 23.9'-24.7', argillaceous zone. | | | | | | | | | | | | | | |
| 24.6 | 843.7 | | | | | | Medium hard gray SHALE; highly to moderately weathered, arenaceous, micaceous, thinly to thickly bedded, moderately fractured, contains abundant arenaceous laminations. | | | | | | | | | | | | | | |
| 25 | | Core 102" | Rec 77" | | RQD 46% | R-2 | *26 | | | | | | | | | | | | | | |
| 30 | | Core 18" | Rec 18" | | RQD 100% | R-3 | *150 | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-84 Location: Sta. 162+46.9, 131.9 ft. RT of SR 823 CL Date Drilled: 11/09/04 to 11/10/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 27.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 150 | 718.3 | | | | | | DESCRIPTION Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, unfractured to slightly fractured. | | | | | | | | | | | | | |
| 155 | | Core 120" | Rec 120" | RQD 100% | R16 | *490 | | | | | | | | | | | | | | |
| 160.0 | 708.3 | | | | | | Bottom of Boring - 160.0' | | | | | | | | | | | | | |
| 165 | | | | | | | | | | | | | | | | | | | | |
| 170 | | | | | | | | | | | | | | | | | | | | |
| 175 | | | | | | | | | | | | | | | | | | | | |
| 180 | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-85

Location: Sta. 164+83.3, 62.1 ft. LT of SR 823 CL

Date Drilled: 11/4/04 to 11/4/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 6.0' Water level at completion: 11.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 783.3 | | | | | | | | | | | | | | | | | | |
| | 783.0 | 2 | | | | 1.5 | Topsoil - 4"/2" soil removed before drilling | | | | | | | | | | | | |
| | | 2 | 18 | | | | Stiff reddish brown SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp. | | | | | | | | | | | | |
| | | 3 | | | | 4.0 | @ 3.5'-7.5', hard. | 5 | 2 | -- | 5 | 52 | 36 | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | | | |
| | | 7 | | | | 4.5+ | | | | | | | | | | | | | |
| | | 9 | 18 | | | | | | | | | | | | | | | | |
| | | 11 | | | | | | | | | | | | | | | | | |
| 8.0 | 775.3 | 7 | | | | | Medium dense brown and gray SANDY SILT (A-4a), trace fine sand, trace clay possible decomposed sandstone; dry to damp. | | | | | | | | | | | | |
| | | 13 | 18 | | | | | | | | | | | | | | | | |
| | | 11 | | | | | | | | | | | | | | | | | |
| | | 38 | 8 | | | | @ 11.0'-13.8', very dense. | 38 | 12 | -- | 14 | 36 | | | | | | | |
| | | 50/4 | | | | | | | | | | | | | | | | | |
| | | 50/3 | 3 | | | | | | | | | | | | | | | | |
| 14.5 | 768.8 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, highly fractured, with typical low angle fractures. | | | | | | | | | | | | |
| | | Core 60" | Rec 60" | RQD 90% | R-1 | *229 | @ 15.5'-15.7', 17.1'-17.8', 19.0'-19.2', 21.4'-21.7', rust stained high angle fractures. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 21.7 | 761.6 | | | | | | Medium hard brown SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle fractures. | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 79% | R-2 | *38 | @ 24.2'-27.9', contains few argillaceous laminations. | | | | | | | | | | | | |
| | | | | | | | @ 27.9'-29.6', abundant to moderate argillaceous laminations. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-88

Location: Sta. 166+92.7, 51.3 ft. LT of SR 823 CL

Date Drilled: 11/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 5.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 699.7 | | | | | | | | | | | | | | | | | | |
| 0.3 | 699.4 | 50/2 | 2 | 1 | | | Topsoil - 3" | | | | | | | | | | | | |
| 2.0 | 697.7 | | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 5 | | Core 120" | Rec 57" | RQD 0% | R-1 | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thickly bedded, broken, contains large filled fractures. | | | | | | | | | | | | |
| 13.7 | 686.0 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typically low angle fractures, contains few argillaceous laminations. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 78% | R-2 | *578 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25.0 | 674.7 | Core 36" | Rec 36" | RQD 100% | R-3 | *667 | | | | | | | | | | | | | |
| 25.0 | | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-90

Location: Sta. 168+20.2, 110.2 ft. LT of SR 823 CL

Date Drilled: 10/28/04 to 10/29/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 764.1 | | | | | | | | | | | | | | | | | | | |
| -0.5 | 763.6 | 5 | | | | 4.5+ | Topsoil - 6" | | | | | | | | | | | | | |
| | | 6 12 | 18 | | | | Hard brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| -4.0 | 760.1 | 16 26 40 | 18 | | | 2 | Severely weathered SANDSTONE. | | | | | | | | | | | | | |
| 5 | 758.6 | | | | | | Soft gray and brown SILTSTONE; highly weathered, argillaceous, highly fractured, with typical low angle fractures. | | | | | | | | | | | | | |
| 10 | | Core 90" | Rec 90" | | RQD 69% | R-1 | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| -17.5 | 746.6 | Core 120" | Rec 120" | | RQD 91% | R-2 | *549 Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| -24.6 | 739.5 | Core 120" | Rec 120" | | RQD 100% | R-3 | *595 Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured. | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-91

Location: Sta. 168+47.7, on CL SR 823

Date Drilled: 11/1/04 to 11/1/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 2.6 (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|--|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 728.9 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 728.6 | 50/4 | 3 | 1 | | | Topsoil - 4" | | | | | | | | | | | | | |
| 2.0 | 726.9 | | | | | | Severely weathered SANDSTONE. | | | | | | | | | | | | | |
| 5 | | | | | | | Hard to very hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured with typically low angle clay filled fractures. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 70% | R-1 | *1023 | @ 2.0'-2.4', 2.6'-2.8', 3.0'-3.4', 8.7'-9.0', broken zones. | | | | | | | | | | | | |
| | | | | | | | @ 6.5'-6.6', 7.3'-7.4', high angle fractures. | | | | | | | | | | | | | |
| 13.3 | 715.6 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 92% | R-2 | *583 | @ 12.0'-12.1', 13.5'-13.9', high angle rust stained fractures. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | Core 36" | Rec 36" | | RQD 100% | R-3 | *617 | @ 24.0'-24.3', argillaceous zone. | | | | | | | | | | | | |
| 25.0 | 703.9 | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-92

Location: Sta. 168+46.5, 79.3 ft. RT of SR 823 CL

Date Drilled: 11/2/04 to 11/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 9.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 697.2 | | | | | | | | | | | | | | | | | | |
| -0.4 | 696.8 | | | | | | Topsoil - 5"/2.5' soil removed before drilling | | | | | | | | | | | | |
| 2.0 | 695.2 | 27 50/1 | 7 | 1 | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 5 | | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | |
| 8.1 | 689.1 | Core 120" | Rec 120" | RQD 96% | R1 | *311 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 100% | R2 | *519 | @ 11.2', low angle rust stained fracture. | | | | | | | | | | | | |
| 20 | | | | | | | @ 20.0'-20.1', 20.9'-21.0', arenaceous zones. | | | | | | | | | | | | |
| 25 | | | | | | | @ 24.0', 24.7', 25.3', low angle fractures. | | | | | | | | | | | | |
| 30.0 | 667.2 | Core 96" | Rec 96" | RQD 100% | R3 | *96 | @ 24.0'-25.3', contains moderate to few argillaceous laminations. | | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-94

Location: Sta. 169+98.5, 139.6 ft. LT of SR 823 CL

Date Drilled: 10/29/04 to 11/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 3.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 803.1 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 802.8 | | | | | | Topsoil - 3" | | | | | | | | | | | | | |
| 2.0 | 801.1 | 3 9 25 | 18 | | | 1 | 4.5+ Hard brown SANDY SILT (A-4a); dry to damp. Severely weathered SANDSTONE. | | | | | | | | | | | | | |
| 5 | | 40 50/1 | 6 | | | 2 | | | | | | | | | | | | | | |
| 7.0 | 796.1 | 50/2 | 2 | | | 3 | | | | | | | | | | | | | | |
| 10 | | Core 42" | Rec 42" | RQD 52% | R-1 | *291 | Medium hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle rust stained fractures. @ 7.0'-7.3', 7.9'-8.1', 9.6'- 10.8', decomposed, broken. | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 72% | R-2 | *149 | @ 9.8'-10.1', 19.9'-21.0', high angle rust stained fractures. @ 11.4'-12.1', contains moderate argillaceous laminations. @ 18.1'-18.6', 25.1'-25.5', contains abundant to moderate argillaceous laminations. @ 24.0'-24.6', 29.8'-30.0', high angle rust stained fractures. | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 85% | R-3 | *216 | @ 25.5'-25.9', broken zone. | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-97

Location: Sta. 172+81.7, 5.1 ft. LT of SR 823 CL

Date Drilled: 10/28/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 8.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|----------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 755.0 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 754.7 | | | | | | Topsoil - 3"/6" soil removed before drilling | | | | | | | | | | | | | |
| | | 5 6 9 | 18 | | | 1.5 | Stiff to very stiff brown SANDY SILT (A-4a), trace gravel, trace clay; contains sandstone fragments; dry to damp. | | | | | | | | | | | | | |
| | | 5 12 16 | 18 | | | 4.0 | | | | | | | | | | | | | | |
| 5 | 749.5 | | | | | | Hard gray SILT AND CLAY (A-6a), trace fine to coarse sand; dry to damp. | | | | | | | | | | | | | |
| | | 13 15 19 | 18 | | | 4.5+ | | | | | | | | | | | | | | |
| | | 35 50/4 | 10 | | | 4.5+ | @ 8.5', brown. | | | | | | | | | | | | | |
| 10.0 | 745.0 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, highly fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 85% | R-1 | *455 | @ 10.0'-10.5', rust stained broken zone. | | | | | | | | | | | | | |
| 16.4 | 738.6 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded weathered. | | | | | | | | | | | | | |
| 20.0 | 735.0 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2097

Location: Sta. 172+79.1, 81.4 ft. LT of SR 823 CL

Date Drilled: 1/18/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.8' (inside hollowstem augers) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 756.2 | | | | | | | | | | | | | | | | | | |
| 0.6 | 755.6 | 6 | 5 | 1 | | | Topsoil - 7"/6" soil removed before drilling | | | | | | | | | | | | |
| 3.0 | 753.2 | 6 9 11 | 12 | 2 | | | Medium dense brown SANDY SILT (A-4a), trace gravel, little clay; moist. | 10 | 14 | -- | 14 | 48 | 14 | | | | | | |
| 5 | | 12 13 15 | 14 | 3 | | | Very stiff to hard grayish brown SILT AND CLAY (A-6a), little to some fine to coarse sand, trace gravel; contains sandstone fragments; damp. | 3 | 15 | -- | 7 | 47 | 28 | | | | | | |
| 10 | | 10 25 20 | 15 | 4 | | | | | | | | | | | | | | | |
| 10.5 | 745.7 | 50/5 | 5 | 5 | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 13.5 | 742.7 | | | | | | Hard light brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to massive, moderately fractured. @ 14.5'-14.7', broken. @ 14.7'-15.1', gray. | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 15.8 | 740.4 | Core 78" | Rec 78" | RQD 100% | R1 | | Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, massive, unfractured to slightly fractured. | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 100% | R2 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2098

Location: Sta. 172+57.4, 85.5 ft. RT of SR 823 CL

Date Drilled: 1/18/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 53.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 754.6 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 754.3 | | | | | | Topsoil - 4" | | | | | | | | | | | | | |
| 3 | | 5 | 13 | | 1 | 4.5+ | Hard brown and gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| 5 | | 6 | 14 | | 2 | 4.5+ | | 3 | 6 | -- | 4 | 53 | 33 | | | | | | | |
| | | 4 | 14 | | 3 | 4.5+ | | 7 | 1 | -- | 3 | 58 | 31 | | | | | | | |
| 10.0 | 744.6 | 50/5 | 3 | | 4 | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | | |
| 10.5 | 744.1 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, highly fractured to broken. @ 10.5'-11.6', decomposed. @ 10.7',10.8',10.9',11.1', 11.2',12.5',13.2',13.3', 13.7',13.8', 14.0',14.5', 14.9',16.4',17.2', low angle fractures. @ 11.5'-11.6', broken zones. | | | | | | | | | | | | | |
| 14.9 | 739.7 | Core 120" | Rec 120" | RQD 82% | R-1 | *1508 | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured. @ 18.8'-18.9', clay filled fracture. @ 18.9'-19.4', 20.8'-21.0', broken zones. @ 21.6'-21.7', multiple low angle fractures. @ 23.9', 29.7', 29.9', low angle fractures. | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 96% | R-2 | *1511 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring TR-29

Location: Sta. 140+26.7, 84.5 ft. LT of SR 823 CL

Date Drilled: 3/8/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 48.7' (after 48 hrs.) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 667.6 | | | | | | | | | | | | | | | | | | |
| -0.4 | 667.2 | | | | | | Topsoil - 5" / 3.0' soil removed before drilling | | | | | | | | | | | | |
| 5 | | Core 120" | Rec 30" | RQD 0% | R-1 | | Soft gray SANDSTONE; very fine to fine grained, decomposed, argillaceous, thinly bedded, very broken. @ 1.9'-9.5', lost recovery due to decomposed rock. | | | | | | | | | | | | |
| 9.5 | 658.1 | Core 36" | Rec 36" | RQD 64% | R-2 | | Soft to medium hard brown and gray SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly to thickly bedded, highly fractured, with typically low angle clay filled fractures. | | | | | | | | | | | | |
| 15 | | | | | | | @ 15.4' to 15.5', high angle rust stained fracture. | | | | | | | | | | | | |
| 15.5 | 652.1 | Core 120" | Rec 120" | RQD 92% | R-3 | | Medium hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly to thickly bedded, moderately fractured, contains few to moderate argillaceous laminations. | | | | | | | | | | | | |
| 20 | | | | | | | @ 21.0', 22.0', 22.3', low angle clay filled fractures. | | | | | | | | | | | | |
| 25 | | | | | | | @ 27.5'-28.1', high angle rust stained fracture. | | | | | | | | | | | | |
| 26.5 | 641.1 | Core 120" | Rec 120" | RQD 92% | R-4 | | @ 28.2', low angle rust stained fracture. | | | | | | | | | | | | |
| 30 | | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, slightly fractured. | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 9:55 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-102

Location: Sta. 181+02.4, 182.6 ft. RT of SR 823 CL

Date Drilled: 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 8.5'-35.0' Water level at completion: 8.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|---------------|---------------|------------|--------------|---|--|------------------------------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 30 | 582.8 | | | | | | Medium dense gray SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp to moist. | | | | | | | | | | | | |
| 35 | | 6 10 13 | 18 | | 13 | | | Severely weathered gray SANDSTONE. | | | | | | | | | | | |
| 36.0 | 576.8 | 50/3 | 3 | | 14 | | | | | | | | | | | | | | |
| 39.0 | 573.8 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, thickly bedded, slightly fractured. | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 120" | RQD 100% | R-1 | *678 | | | | | | | | | | | | | |
| 49.0 | 563.8 | | | | | | Bottom of Boring - 49.0' | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:13 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-104

Location: Sta. 184+80.6, 37.3 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 5.0', 16.0'-30.0' Water level at completion: 4.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 30.0 | 597.5 | | | | | | Severely weathered gray SANDSTONE, very fine to fine grained, argillaceous. | | | | | | | | | | | |
| 34.0 | 593.5 | 50 | 5 | 13 | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly to thickly bedded, slightly to moderately fractured. @ 41.5'-43.0', argillaceous zone. | | | | | | | | | | |
| 44.0 | 583.5 | | | | | | Bottom of Boring - 44.0' | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:13 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-105

Location: Sta. 185+04.3, 215.9 ft. RT of SR 823 CL

Date Drilled: 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 6.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 684.5 | | | | | | | | | | | | | | | | | | |
| 0.3 | 684.2 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 5 9 12 | 18 | | | 1 | Medium dense brown SILT (A-4b), some fine to coarse sand, little clay, trace gravel; contains sandstone fragments and roots; damp to moist. | 9 | 16 | -- | 10 | 54 | 11 | | | | | | |
| 3.5 | 681.0 | 50/2 | 0 | | | 2 | Severely weathered SANDSTONE. | | | | | | | | | | | | |
| 5.0 | 679.5 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical low angle fractures. | | | | | | | | | | | | |
| 10 | | Core 96" | Rec 96" | RQD 40% | R-1 | *428 | @ 9.0'-10.8', 12.5'-12.8', rust stained high angle fractures. | | | | | | | | | | | | |
| 12.8 | 671.7 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly to thickly bedded, slightly fractured to unfractured. | | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 100% | R-2 | *441 | | | | | | | | | | | | | |
| 20.0 | 664.5 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-106

Location: Sta. 188+85.1, 50.5 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 9.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 647.4 | | | | | | | | | | | | | | | | | | |
| 0.3 | 647.1 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 4 | | | | 1 | Medium dense brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp to moist. | | | | | | | | | | | | |
| | | 4 | 6 | 18 | | | | | | | | | | | | | | | |
| | | 4 | | | | 2 | | | | | | | | | | | | | |
| | | 6 | 9 | 18 | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 5.5 | 641.9 | | | | | 3 | Soft to stiff mottled brown and gray SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains sandstone fragments; damp to moist. | 9 | 4 | -- | 8 | 55 | 24 | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | |
| | | 6 | 7 | 18 | | | | | | | | | | | | | | | |
| | | 12 | | | | 4 | | | | | | | | | | | | | |
| | | 16 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 10.5 | 636.9 | | | | | 5 | Hard brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp to moist. | 0 | 4 | -- | 9 | 64 | 23 | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | |
| | | 22 | | | | | | | | | | | | | | | | | |
| | | 29 | | | | | | | | | | | | | | | | | |
| | | 12 | | | | 6 | | | | | | | | | | | | | |
| | | 15 | | | | | | | | | | | | | | | | | |
| 15.0 | 632.4 | | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | |
| | | 15 | | | | | | | | | | | | | | | | | |
| 15.0 | 632.4 | | | | | | | | | | | | | | | | | | |
| | | 12 | | | | 7 | | | | | | | | | | | | | |
| | | 50/3 | | | | | | | | | | | | | | | | | |
| 17.0 | 630.4 | | | | | | Soft gray and brown SANDSTONE; very fine to fine grained, decomposed to highly weathered, argillaceous, thinly to thickly bedded, highly fractured to broken, with typical low angle fractures. | | | | | | | | | | | | |
| | | Core 72" | | | | R-1 | | | | | | | | | | | | | |
| | | Rec 72" | | | | | *609 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21.2 | 626.2 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, thickly bedded, moderately to highly fractured. @ 23.0', slightly fractured. | | | | | | | | | | | | |
| | | Core 84" | | | | R-2 | | | | | | | | | | | | | |
| | | Rec 84" | | | | | *615 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 30.0 | 617.4 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:13 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-107

Location: Sta. 194+85.7, 32.6 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 11.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 685.7 | | | | | | | | | | | | | | | | | | |
| 0.3 | 685.4 | | | | | | Topsoil - 3"/1.1' soil removed before drilling | | | | | | | | | | | | |
| | | 3 | | | | 0.25 | Soft brown SILT AND CLAY (A-6a), some fine to coarse sand, trace to little gravel; contains sandstone fragments; damp to moist. | 4 | 5 | -- | 16 | 46 | 29 | | | | | | |
| | | 6 | 18 | | | 1.0 | | | | | | | | | | | | | |
| 5 | | 8 | 12 | | | 3.5 | @ 6.0', very stiff to hard. | | | | | | | | | | | | |
| | | 11 | 15 | 18 | | 2.5 | | | | | | | | | | | | | |
| | | 10 | 11 | 13 | | 4.5+ | | | | | | | | | | | | | |
| 10 | | 10 | 12 | 14 | | | | | | | | | | | | | | | |
| | | 10 | 12 | 14 | | | | | | | | | | | | | | | |
| 13.0 | 672.7 | | | | | | Severely weathered brown and gray SANDSTONE. | | | | | | | | | | | | |
| | | 19 | 50/2 | 8 | | | | | | | | | | | | | | | |
| 15.0 | 670.7 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly laminated to thickly bedded, slightly to highly fractured, with typically low angle fractures; contains few argillaceous laminations. | | | | | | | | | | | | |
| | | Core 96" | Rec 96" | | RQD 76% | R-1 | *477 | | | | | | | | | | | | |
| 20 | | | | | | | @ 20.6'-22.5', broken with clay filled fractures. | | | | | | | | | | | | |
| | | | | | | | @ 22.5'-26.7', moderate to abundant argillaceous laminations, fissile. | | | | | | | | | | | | |
| | | Core 84" | Rec 84" | | RQD 80% | R-2 | *127 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30.0 | 655.7 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-108

Location: Sta. 198+95.5, 46.1 ft. LT of SR 823 CL

Date Drilled: 10/25/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ | | | | | |
| 0 | 737.6 | | | | | | | | | | | | | | | | | | |
| 0.8 | 736.8 | 4 | | | | | Topsoil - 9" | | | | | | | | | | | | |
| | | 6 | 18 | | | 1 | Medium dense reddish brown SANDY SILT (A-4a), little gravel, little clay; contains sandstone fragments; damp to moist. | 18 | 7 | -- | 16 | 38 | 21 | | | | | | |
| | | 9 | | | | | @ 3.5'-4.1', very dense. | | | | | | | | | | | | |
| | | 12 | 7 | | | 2 | | | | | | | | | | | | | |
| | | 50/1 | | | | | | | | | | | | | | | | | |
| 5.0 | 732.6 | | | | | | Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly to thickly bedded, highly fractured, with typical low angle rust stained fractures. | | | | | | | | | | | | |
| 6.3 | 731.3 | | | | | | @ 5.0'-5.3', high angle rust stained fracture. | | | | | | | | | | | | |
| | | Core 96" | Rec 96" | RQD 85% | R-1 | *494 | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured, contains few argillaceous laminations. | | | | | | | | | | | | |
| | | | | | | | @ 20.8', low angle fractures. | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 100% | R-2 | *531 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | Core 84" | Rec 84" | RQD 100% | R-3 | *592 | | | | | | | | | | | | | |
| 30.0 | 707.6 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-111

Location: Sta. 204+01.7, 5.7 ft. RT of SR 823 CL

Date Drilled: 10/21/04 to 10/22/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 2.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0 | 817.4 | | | | | | | | | | | | | | | | | |
| 0.3 | 817.1 | | | | | | Topsoil - 4" | | | | | | | | | | | |
| | | 2 | | | | 1 | 2.0 | 5 | 6 | -- | 13 | 47 | 29 | | | | | |
| | | 4 | 18 | | | | Stiff to very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; moist. | | | | | | | | | | | |
| 3.0 | 814.4 | | | | | 2 | 4.5+ | | | | | | | | | | | |
| | | 13 | | | | | Hard light brown CLAY (A-7-6), trace fine to coarse sand, trace gravel; dry to damp. | | | | | | | | | | | |
| | | 31 | 18 | | | | | | | | | | | | | | | |
| 5 | | | | | | 3 | 4.5+ | | | | | | | | | | | |
| | | 5 | | | | | @ 6.0', brown and gray. | | | | | | | | | | | |
| | | 8 | 18 | | | | | 1 | 3 | -- | 3 | 23 | 70 | | | | | |
| | | 13 | | | | | | | | | | | | | | | | |
| 9.0 | 808.4 | | | | | 4 | | | | | | | | | | | | |
| | | 9 | | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | |
| | | 24 | 12 | | | | | | | | | | | | | | | |
| 10 | | | | | | 5 | | | | | | | | | | | | |
| | | 16 | 8 | | | | | | | | | | | | | | | |
| | | 50/2 | | | | | | | | | | | | | | | | |
| 12.5 | 804.9 | | | | | | Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to thickly bedded. | | | | | | | | | | | |
| 13.8 | 803.6 | | | | | | @ 13.4', low angle rust stained fracture. | | | | | | | | | | | |
| 15 | | | | | | R-1 | Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | |
| | | Core 96" | Rec 96" | | | | @ 17.7'-18.7', SDI = 57.8%. | | | | | | | | | | | |
| | | | | | | | @ 18.0'-20.6', contains abundant to moderate argillaceous laminations. | | | | | | | | | | | |
| | | | | | | | @ 18.0', 18.3', 19.2', low angle clay filled fractures. | | | | | | | | | | | |
| | | | | | | | @ 19.4', 26.9', 27.0', low angle clay filled fractures. | | | | | | | | | | | |
| | | | | | | | @ 20.1'-20.5', qu = 12,399 psi. | | | | | | | | | | | |
| | | | | | | | @ 21.5'-23.0', contains moderate argillaceous laminations. | | | | | | | | | | | |
| | | | | | | | @ 26.4'-27.2', contains abundant to moderate argillaceous laminations. | | | | | | | | | | | |
| | | | | | | | @ 26.9'-27.2', broken. | | | | | | | | | | | |
| 25 | | | | | | R-2 | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 27.1 | 790.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly to thickly bedded. | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:13 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-114

Location: Sta. 205+82.1, 62.6 ft. RT of SR 823 CL

Date Drilled: 10/20/04 to 10/21/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 11.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 789.5 | | | | | | | | | | | | | | | | | | |
| 0.3 | 789.2 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 1 | | | | | Very loose dark brown SILT (A-4b), some clay, little fine to coarse sand; contains roots; moist. | 8 | 8 | -- | 7 | 54 | 23 | | | | | | |
| | | 1 | 12 | 1 | | | | | | | | | | | | | | | |
| | | 2 | | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | |
| | | 3 | 5 | 18 | 2 | | | | | | | | | | | | | | |
| 5 | | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded, highly fractured, with typical low angle fractures. @ 9.7'-10.5', high angle rust stained fracture. @ 10.6'-11.0', 12.3'-12.5', broken zones. | | | | | | | | | | | | |
| 6.0 | 783.5 | 9 | | | 3 | | | | | | | | | | | | | | |
| | | 20 | 50/5 | 16 | | | Medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately fractured, with typical low angle fractures. @ 12.5'-13.4', 14.4'-15.3', 16.3'-17.1', 18.6'-18.8', 19.8'-20.5', rust stained. | | | | | | | | | | | | |
| 7.5 | 782.0 | | | | | | | | | | | | | | | | | | |
| | | Core 90" | Rec 90" | | RQD 73% | R-1 | *255 | | | | | | | | | | | | |
| 12.5 | 777.0 | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | | |
| | | Core 120" | Rec 115" | | RQD 92% | R-2 | | *495 | | | | | | | | | | | |
| 25.0 | 764.5 | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2110

Location: Sta. 198+94.2, 150.5 ft. RT of SR 823 CL

Date Drilled: 01/24/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (Prior to coring) 90.0' (Includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|------------------------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 795.9 | | | | | | Topsoil - 3" Hard brown and gray SILT AND CLAY (A-6a), little fine to coarse sand; contains sandstone fragments; damp. | | | | | | | | | | | | |
| 0.3 | 795.6 | | | | | | | | | | | | | | | | | | |
| | | 8 | | | | 4.5+ | | | | | | | | | | | | | |
| | | 9 | 14 | | | | | | | | | | | | | | | | |
| | | 15 | | | | | | | | | | | | | | | | | |
| 5.0 | 790.9 | | | | | | Severely weathered brown SANDSTONE, argillaceous. Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to massive, moderately to highly fractured, iron stained fractures. @ 5.5'-6.6', broken zone. @ 6.6'-7.6', lost recovery. | | | | | | | | | | | | |
| 5.5 | 790.4 | 24 | 12 | | | | | | | | | | | | | | | | |
| | | 50/2 | | | | | | | | | | | | | | | | | |
| 10 | | Core 120" | Rec 109" | | RQD 43% | R-1 | *870 | | | | | | | | | | | | |
| 15 | | | | | | | @ 14.3'-15.0', decomposed broken zone. | | | | | | | | | | | | |
| 16.0 | 779.9 | | | | | | Soft to medium hard brownish gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded. @ 16.3'-16.9', 21.0'-21.3', iron stained zones. @ 16.5'-16.8', 21.0'-21.3', argillaceous, decomposed, broken. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 119" | | RQD 87% | R-2 | | *1120 | | | | | | | | | | | |
| 21.7 | 774.2 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 22.2'-22.3', medium grained with low angle fracture. | | | | | | | | | | | | |
| 25 | | | | | | | | @ 26.6', low angle fracture. | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2112

Location: Sta. 205+94.6, 125.6 ft. LT of SR 823 CL

Date Drilled: 1/20/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 70.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 795.4 | | | | | | | | | | | | | | | | | | |
| 0.3 | 795.1 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 9 | | | | -- | Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; damp. | | | | | | | | | | | | |
| 4.0 | 791.4 | 7 | 8 | 16 | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | |
| 5 | | 50/6 | | 0 | | | | | | | | | | | | | | | |
| 5.5 | 789.9 | | | | | | Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to massive, broken to moderately fractured, iron stains. @ 5.5'-9.0', broken to highly fractured. @ 7.3'-7.8', high angle fracture. | | | | | | | | | | | | |
| 10 | | Core 120" | Rec 116" | | RQD 67% | R-1 | @ 9.9'-10.5', core loss due to washout. | | | | | | | | | | | | |
| 15 | | | | | | | @ 14.8'-16.3', broken to highly fractured, contains argillaceous laminations. | | | | | | | | | | | | |
| 16.3 | 779.1 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, massive, moderately fractured. @ 18.5'-18.6' shale bed. @ 18.7', 19.1', 20.8', 22.0', 25.2', low angle fractures. @ 20.2'-23.0', iron stained. @ 20.8'-21.6', calcareous zone, abundant burrows throughout. @ 20.1'-20.2', high angle fracture. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | | RQD 87% | R-2 | @ 25.3'-26.0', iron stained vertical fracture | | | | | | | | | | | | |
| 25 | | | | | | | @ 27.5'-27.7', rust stained high angle fracture. | | | | | | | | | | | | |
| 30 | | | | | | | @ 26.7', 27.3', 30.0', low angle fractures, rust stained. | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:13 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-121A

Location: Sta. 219+91.4, 61.4 ft. LT of SR 823 CL

Date Drilled: 10/20/04 to 10/21/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 3.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 850.3 | | | | | | | | | | | | | | | | | | |
| 0.3 | 850.0 | 50/4 | 4 | 1 | | 3.0 | Topsoil - 3" Very stiff brown SILT AND CLAY (A-6a), little to some fine to coarse sand, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | |
| 3.0 | 847.3 | | | | | | Soft to medium hard brown SANDSTONE; fine grained, broken to highly weathered to decomposed, argillaceous, thinly bedded, highly fractured, contains clay filled fractures. @ 3.0'-3.2', 4.4'-5.5', broken zones. | | | | | | | | | | | | |
| 5 | | Core 120" | Rec 120" | | RQD 30% | R-1 | *192 | | | | | | | | | | | | |
| 10 | | | | | | | @ 9.8'-11.9, broken zones. | | | | | | | | | | | | |
| 13.0 | 837.3 | | | | | | Soft to medium hard dark gray CLAYSTONE; highly weathered to decomposed, argillaceous, carbonaceous, thinly bedded, moderately fractured, with typically low angle fractures. @ 14.8'-15.4', coal seam. | | | | | | | | | | | | |
| 15.4 | 834.9 | | | | | | Medium hard to hard brown and gray SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded, highly fractured, with typical low angle clay filled fractures. @ 15.3'-15.5', 17.2'-17.7', 18.8'- 19.2', broken zones. @ 20.0'-21.9', lost recovery. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 97" | | RQD 37% | R-2 | *285 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 23.0 | 827.3 | | | | | | Soft to medium hard dark gray SHALE; highly weathered to decomposed, argillaceous, carbonaceous, thinly laminated to thinly bedded, moderately fractured. @ 26.9'-27.8', coal blossom. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | | RQD 73% | R-3 | *116 | | | | | | | | | | | | |
| 29.0 | 821.3 | | | | | | Soft to medium hard gray SANDSTONE. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:15 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-122 Location: Sta. 222+99.5, 9.0 ft. RT of SR 823 CL Date Drilled: 10/19/04 to 10/20/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 90 | 779.0 | | | | | | Medium hard to very hard SANDSTONE; fine grained moderately weathered, argillaceous, massive bedded, slightly fractured. @ 95.1'-96.1', SDI = 97.6%. @ 98.2'-99.3', moderate argillaceous and carbonaceous laminations. @ 96.2'-96.6', qu = 11,696 psi. @ 99.0', coal stringers. @ 103.7', coal stringers. @ 103.5'-104.5' moderate argillaceous and carbonaceous laminations. @ 109.7'-110.7', fine to medium grained BRECCIA, poorly cemented. | | | | | | | | | | | | | |
| 95 | | | | | | | | | | | | | | | | | | | | |
| 100 | | | | | | | | | | | | | | | | | | | | |
| 105 | | | | | | | | | | | | | | | | | | | | |
| 110 | | | | | | | | | | | | | | | | | | | | |
| 112.8 | 756.2 | | | | | | | | | | | | | | | | | | | |
| 115 | | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to laminated, contains moderate argillaceous laminations. | | | | | | | | | | | | | |
| 120.0 | 749.0 | | | | | | | | | | | | | | | | | | | |

Bottom of Boring - 120.0'

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-125

Location: Sta. 226+94.5, 105.0 ft. RT of SR 823 CL

Date Drilled: 10/13/04 to 10/14/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 5.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 824.4 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | 824.1 | 3 | | | | 4.5+ | Hard brown SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp. @ 1.0'-2.5', contains roots. | | | | | | | | | | | | |
| | | 7 | 18 | 1 | | | | | | | | | | | | | | | |
| | | 5 | | | | 4.5+ | | | | | | | | | | | | | |
| 5 | | 9 | 18 | 2 | | | | | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | |
| | | 10 | | | | 4.5+ | | | | | | | | | | | | | |
| | | 16 | 18 | 3 | | | | | | | | | | | | | | | |
| | | 24 | | | | | | | | | | | | | | | | | |
| 8.0 | 816.4 | | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| | | 11 | | | | | | | | | | | | | | | | | |
| | | 22 | 13 | 4 | | | | | | | | | | | | | | | |
| | | 50/5 | | | | | | | | | | | | | | | | | |
| 10 | | 10 | | | | | @ 11.0'-12.5', gray. | | | | | | | | | | | | |
| | | 24 | 16 | 5 | | | | | | | | | | | | | | | |
| | | 40 | | | | | | | | | | | | | | | | | |
| | | 18 | | | | | | | | | | | | | | | | | |
| | | 33 | 16 | 6 | | | | | | | | | | | | | | | |
| | | 50/4 | | | | | | | | | | | | | | | | | |
| 15 | | 33 | | | | | | | | | | | | | | | | | |
| | | 50/4 | | | | | | | | | | | | | | | | | |
| | | 33 | 7 | 7 | | | | | | | | | | | | | | | |
| | | 50/3 | | | | | | | | | | | | | | | | | |
| | | 50/5 | 5 | 8 | | | | | | | | | | | | | | | |
| 19.0 | 805.4 | | | | | | | | | | | | | | | | | | |
| 19.6 | 804.8 | | | | | | Medium hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded, broken, with typical high angle rust stained fractures. | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21.2 | 803.2 | Core 72" | Rec 67" | RQD 55% | R-1 | *149 | Medium hard brown and red SILTSTONE; highly weathered to decomposed, micaceous, highly fractured, with typical high angle fractures. | | | | | | | | | | | | |
| | | | | | | | Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, thinly bedded, moderately fractured, with typical low angle fractures, contains abundant to moderate argillaceous laminations. | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 90% | R-2 | | @ 25.5'-37.4', contains coal stringers. | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:15 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-145

Location: Sta. 260+14.3, 158.4 ft. RT of SR 823 CL

Date Drilled: 10/6/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 831.6 | | | | | | | | | | | | | | | | | | |
| 2.0 | | 2 4 5 9 | | | | 1 | No topsoil/12" soil removed before drilling Very stiff dark brown SANDY SILT (A-4a), trace clay; damp. | | | | | | | | | | | | |
| 3.5 | | 3 5 5 13 | | | | 2 | | | | | | | | | | | | | |
| 5.5 | 826.1 | | | | | | | | | | | | | | | | | | |
| 2.25 | | 2 3 4 9 | | | | 3 | Very stiff dark brown CLAY (A-7-6), "and" fine to coarse sand, trace gravel; damp. | 1 | 8 | -- | 28 | 29 | 34 | | | | | | |
| 8.0 | 823.6 | | | | | | | | | | | | | | | | | | |
| 4.0 | | 5 8 11 14 | | | | 4 | Very stiff to hard brown and gray SILTY CLAY (A-6b), little fine to coarse sand; moist. | 0 | 5 | -- | 7 | 27 | 61 | | | | | | |
| 4.0 | | 4 9 13 14 | | | | 5 | | | | | | | | | | | | | |
| 13.0 | 818.6 | 50/3 | 3 | | | 6 | | | | | | | | | | | | | |
| 13.5 | 818.1 | Core 18" | Rec 15" | RQD 28% | R-1 | *557 | Severely weathered gray SANDSTONE, argillaceous, micaceous. | | | | | | | | | | | | |
| 15 | | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typically low angle clay filled fractures. @ 14.8', low angle rust stained fracture. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | RQD 48% | R-2 | *530 | @ 19.8'-20.2', moderate to abundant argillaceous laminations, poorly cemented, decomposed zone. @ 22.5'-22.8', 23.8'-24.0', 24.7'- 25.0', broken zones. @ 22.5'-30.0', abundant argillaceous laminations, poorly cemented, decomposed zone. @ 27.9'-28.1', 30.4'-30.9', broken with typical low angle fractures. @ 26.9'-28.2', contains abundant to moderate argillaceous laminations, decomposed to highly weathered, highly fractured. @ 29.3', fractured, argillaceous lamination. | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 79% | R-3 | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:17 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-145A

Location: Sta. 263+43.1, 175.4 ft. LT of SR 823 CL

Date Drilled: 10/7/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 27.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|--|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 898.4 | | | | | | | | | | | | | | | | | | |
| 0.3 | 898.1 | | | | | | Topsoil - 4" | | | | | | | | | | | | |
| | | 4 | 8 | 9 | | 1 | 2.5 | Very stiff brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp to moist. | | | | | | | | | | | |
| 3.0 | 895.4 | | | | | 2 | 4.5 | Very stiff to hard brown SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp. | | | | | | | | | | | |
| | | 7 | 8 | 9 | 12 | | | | | | | | | | | | | | |
| | | 8 | 15 | 22 | 2 | 3 | 3.5 | | 0 | 7 | -- | 6 | 52 | 35 | | | | | |
| 8.0 | 890.4 | | | | | 4 | 4.5+ | Hard gray SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; dry to damp. | 1 | 11 | -- | 7 | 51 | 30 | | | | | |
| 9.5 | 888.9 | | | | | | | Severely weathered gray SHALE. | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| | | 18 | 34 | 50/5 | 16 | 5 | | | | | | | | | | | | | |
| 12.5 | 885.9 | | | | | | | Soft to medium hard gray and brown SHALE; highly weathered to decomposed, micaceous, arenaceous, thinly laminated to thinly bedded, highly fractured, with typical low angle rust stained fractures. | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 91% | R-1 | *26 | | | | | | | | | | | |
| 20 | | | | | | | | @ 14.7'-14.8', high angle rust stained fracture. | | | | | | | | | | | |
| 23.7 | 874.7 | | | | | | | Soft to medium hard gray SHALE; highly weathered to decomposed, arenaceous, thinly laminated to thinly bedded, highly fractured, with typical low angle clay filled fractures. | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 29% | R-2 | | | | | | | | | | | | |
| 30 | | | | | | | | @ 29.8'-30.5', broken zone. | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:17 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-147

Location: Sta. 266+41.3, 183.1 ft. RT of SR 823 CL

Date Drilled: 10/07/04 to 10/11/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 3.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|--|--|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 867.5 | | | | | | No topsoil Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp. | | | | | | | | | | | | | |
| | | 4 7 10 | 18 | 1 | | 4.25 | | | | | | | | | | | | | | |
| | | 12 17 36 | 18 | 2 | | 4.5+ | Severely weathered brown SHALE, arenaceous, micaceous. | | | | | | | | | | | | | |
| -5.0 | 862.5 | 18 23 36 | 18 | 3 | | | | | | | | | | | | | | | | |
| -7.5 | 860.0 | | | | | | Medium hard to hard brown SHALE; decomposed, arenaceous, micaceous, thinly bedded to thinly laminated, contains moderate arenaceous laminations. @ 9.5',12.1',12.6',14.3',19.2', low angle fractures. | | | | | | | | | | | | | |
| 10 | | Core 66" | Rec 66" | RQD 58% | R-1 | *40 | | | | | | | | | | | | | | |
| 15 | | | | | | | @ 15.8'-17.6', SANDSTONE seam with few to moderate argillaceous laminations. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 58% | R-2 | *296 | | | | | | | | | | | | | | |
| -19.9 | 847.6 | | | | | | Medium hard to hard gray SHALE; highly weathered, moderately weathered, arenaceous, micaceous, thinly laminated to thinly bedded, highly fractured, contains moderate arenaceous laminations. | | | | | | | | | | | | | |
| 25 | | | | | | | | @ 23.0'-25.5', black decomposed, carbonaceous. | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 67% | R-3 | | | | | | | | | | | | | | | |
| -28.5 | 839.0 | | | | | | Soft to medium hard gray SANDSTONE, interbedded with | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:17 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-150 Location: Sta. 274+98.0, 115.8 ft. LT of SR 823 CL Date Drilled: 10/05/04 to 10/06/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 5.0' Water level at completion: None (prior to coring) 18.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0.2 | 867.1 | | | | | | Topsoil - 2" | | | | | | | | | | | |
| | 866.9 | 4 | 7 | 9 | 18 | 1 | 4.5+ | Hard brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; dry to damp. | | | | | | | | | | |
| | | 7 | 11 | 13 | 18 | 2 | 4.5+ | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 5.5 | 861.6 | 13 | 24 | 38 | 18 | 3 | 4.5+ | Hard brown and gray CLAY (A-7-6), trace fine to coarse sand; dry to damp. | | | | | | | | | | |
| 8.0 | 859.1 | 50/2 | | | 2 | 4 | | Severely weathered brown SANDSTONE. | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 10.5 | 856.6 | Core 66" | Rec 66" | RQD 58% | R-1 | *36 | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded, highly fractured, with typical low angle clay filled fractures, contains moderate argillaceous laminations. | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | |
| 16.3 | 850.8 | Core 120" | Rec 120" | RQD 75% | R-2 | *122 | | Medium hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, moderately to thinly bedded. @ 14.5'-15.4', high angle rust stained fracture. | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| 23.5 | 843.6 | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 67% | R-3 | | | Medium hard to very soft brown, black and gray SHALE; decomposed, arenaceous, carbonaceous, thinly laminated to thinly bedded, contains few arenaceous laminations. @ 28.4'-28.9', broken zone. | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:19 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-152

Location: Sta. 274+93.1, 175.7 ft. RT of SR 823 CL

Date Drilled: 10/7/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.7'(includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 813.3 | | | | | | | | | | | | | | | | | | |
| 0.3 | 813.0 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 7 8 12 | 8 | | | 1 | 4.25 Hard brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| 3.5 | 809.8 | 17 50/3 | 9 | | | 2 | Severely weathered brown SANDSTONE. | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 7.5 | 805.8 | 18 24 50/1 | 13 | | | 3 | Medium hard to soft lt. brown SHALE, decomposed to highly weathered, arenaceous, highly fractured, thinly laminated to thinly bedded. | | | | | | | | | | | | |
| 10 | | Core 66" | Rec 66" | RQD 83% | R-1 | *26 | | | | | | | | | | | | | |
| 11.9 | 801.4 | | | | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle clay filled fractures, contains few argillaceous laminations. | | | | | | | | | | | | |
| 14.8 | 798.5 | | | | | | @ 13.0'-13.3', iron stained broken zone. @ 13.6',13.9', low angle rust stained fractures. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | RQD 84% | R-2 | *384 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle fractures. @ 16.8'-17.1', 18.3'-20.0', contains moderate to abundant argillaceous laminations. @ 23.0'-24.4', contains moderate argillaceous laminations, broken. | | | | | | | | | | | | |
| 25 | | | | | | | @ 24.3',24.5', low angle clay filled fractures. | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 87% | R-3 | *421 | @ 26.4', 27.1' 28.6', 28.7' 29.4', low angle fractures. | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:19 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-152A

Location: Sta. 278+68.2, 19.5 ft. LT of SR 823 CL

Date Drilled: 10/04/04 to 10/05/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 32.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 882.3 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 882.0 | | | | | | Topsoil - 3" | | | | | | | | | | | | | |
| | | 4 6 11 | 18 | | | 1 | 4.5+ | | | | | | | | | | | | | |
| | | 6 13 15 | 18 | | | 2 | 4.5+ | | | | | | | | | | | | | |
| 5 | 876.8 | | | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | | |
| 5.5 | | 11 30 50/4 | 12 | | | 3 | | | | | | | | | | | | | | |
| 7.5 | 874.8 | | | | | | Soft brown SHALE; very fine to fine grained, highly weathered, argillaceous, thinly laminated to thinly bedded, decomposed to highly fractured, with typical low angle clay filled fractures, contains moderate to few argillaceous laminations. | | | | | | | | | | | | | |
| 10 | | Core 30" | Rec 30" | | | RQD 85% | | R-1 | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | | | RQD 53% | @ 14.0'-18.1', dark gray to black, carbonaceous. | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 20.5 | 861.8 | | | | | | Medium hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | | | RQD 16% | @ 20.5'-23.4', contains moderate argillaceous laminations. @ 25.3'-25.6', 27.8'-28.0', broken zones. | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:19 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-152A Location: Sta. 278+68.2, 19.5 ft. LT of SR 823 CL Date Drilled: 10/04/04 to 10/05/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 32.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
| 60 | 822.3 | | | | | | MEDIUM HARD DARK GRAY TO BLACK SHALE; highly weathered, carbonaceous, thinly laminated to thinly bedded, moderately fractured. @ 61.7'-62.3', gray SILTSTONE seam. Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately to slightly fractured. @ 63.6'-64.4', SDI = 18.7%. @ 64.5'-64.9', qu = 5,416 psi. @ 62.9'-66.2', 66.4'-67.9', decomposed, abundant argillaceous laminations. | | | | | | | | | | | | | | |
| 63.0 | 819.3 | | | | | | | | | | | | | | | | | | | | |
| 65 | | Core 120" | Rec 120" | RQD 97% | R-7 | | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | | | | |
| 75 | | Core 120" | Rec 120" | RQD 100% | R-8 | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | | | |
| 85 | | Core 120" | Rec 120" | RQD 100% | R-9 | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-153

Location: Sta. 282+05.8, 76.5 ft. RT of SR 823 CL

Date Drilled: 10/04/04 to 10/05/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 8.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | | |
| 60 | 832.0 | | | | | | Soft to medium hard black SHALE; highly weathered to decomposed, arenaceous, carbonaceous. @ 61.1'-61.2', 61.8'-62.0', SILTSTONE seams. Medium hard to hard dark gray to black SHALE; moderately weathered, arenaceous, carbonaceous, thinly bedded to thinly laminated, slightly fractured, with typical low angle clay filled fractures, contains moderate to few arenaceous laminations. @ 64.8'-65.8', SDI = 41.1%. @ 66.2'-66.7', qu = 1,891 psi. @ 71.9'-73.0', SDI = 38.8%. @ 71.9',73.9', low angle fractures. Soft to medium hard gray SHALE; highly weathered to decomposed. @ 77.0', low angle clay filled fracture. @ 81.3'-82.8', qu = 5,348 psi, SDI = 41.9%. Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, moderately fractured. | | | | | | | | | | | | | | | |
| 63.0 | 829.0 | | | | | | | | | | | | | | | | | | | | | |
| 65 | | Core 120" | Rec 120" | RQD 100% | R-7 | *369 | | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | | | | | |
| 74.9 | 817.1 | | | | | | | | | | | | | | | | | | | | | |
| 80 | | Core 120" | Rec 120" | RQD 73% | R-8 | *118 | | | | | | | | | | | | | | | | |
| 85.1 | 806.9 | | | | | | | | | | | | | | | | | | | | | |
| 90 | | Core 120" | Rec 120" | RQD 91% | R-9 | *286 | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:19 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-156

Location: Sta. 285+89.0, 293.9 ft. RT of SR 823 CL

Date Drilled: 9/30/04

to 10/04/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 22.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|-----|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 874.4 | | | | | | | | | | | | | | | | | | |
| 0.3 | 874.1 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 2 4 | 18 | 1 | | 4.5+ | Very stiff to hard reddish brown CLAY (A-7-6), trace to little fine to coarse sand, trace gravel; damp. | 0 | 4 | -- | 5 | 37 | 54 | | | | | | 54 |
| | | 3 4 | 18 | 2 | | 2.5 | | 2 | 8 | -- | 7 | 41 | 42 | | | | | | |
| 5 | 868.9 | 5 6 | 18 | 3 | | 4.5+ | Hard brown SILT AND CLAY (A-6a), trace gravel, trace to little fine to coarse sand; contains shale fragments; dry to damp. | 3 | 7 | -- | 6 | 49 | 35 | | | | | | |
| 5.5 | | 5 21 | 18 | 4 | | 4.5+ | | | | | | | | | | | | | |
| | | 10 28 | 18 | 5 | | 4.5+ | | | | | | | | | | | | | 54 |
| | | 12 26 | 18 | 6 | | 4.5+ | Severely weathered dark brown SANDSTONE. | | | | | | | | | | | | 69 |
| 13.5 | 860.9 | 12 41 | 18 | 7 | | 4.5+ | Medium hard to hard light gray and dark gray SANDSTONE, interbedded with dark SHALE, highly weathered. | | | | | | | | | | | | 67 |
| 15 | | 12 50/4 | 6 | | | 4.5+ | | | | | | | | | | | | | 50+ |
| 17.0 | 857.4 | | | | | | | | | | | | | | | | | | |
| 20.0 | 854.4 | | | | | | Medium hard to hard tan SANDSTONE, medium grained, highly weathered, argillaceous, thinly bedded, highly fractured. @ 20.0'-27.5', decomposed argillaceous zone. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 114" | RQD 20% | R-2 | *136 | @ 27.5'-28.2, broken. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:19 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-171

Location: Sta. 306+41.8, 398.7 ft. RT of SR 823 CL

Date Drilled: 9/22/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|-----|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 0 | 646.1 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 645.8 | 25 50/3 | 9 | 1 | | | Topsoil - 3" | | | | | | | | | | | | | |
| | | 50/1 | 1 | 2 | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | | 50+ |
| 5.0 | 641.1 | | | | | | Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical high angle rust stained fractures. | | | | | | | | | | | | | |
| 10 | | Core 96" | Rec 96" | RQD 57% | R-1 | *202 | | | | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 88% | R-2 | | @ 15.2', low angle rust stained fracture. | | | | | | | | | | | | | |
| 18.0 | 628.1 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured. | | | | | | | | | | | | | |
| 20.0 | 626.1 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-172

Location: Sta. 306+32.2, 647.2 ft. RT of SR 823 CL

Date Drilled: 9/15/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|---|---|---|---|---|---|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 569.3 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 569.0 | | | | | | Topsoil - 4" | | | | | | | | | | | | | |
| | | 5 | | | | 2.25 | Very stiff brown SANDY SILT (A-4a), some gravel, little clay; damp. | 26 | 11 | -- | 7 | 40 | 16 | ● | ○ | ○ | ○ | ○ | ○ | ○ |
| | | 7 | 18 | 1 | | | | | | | | | | | | | | | | |
| | | 12 | | | | 3.0 | Severely weathered brown and gray SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| | | 14 | 18 | 2 | | | | | | | | | | | | | | | | |
| 5 | 563.8 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical high angle rust stained fractures. | | | | | | | | | | | | | |
| 5.5 | | 30 | 10 | 3 | | | | | | | | | | | | | | | | |
| 7.0 | 562.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, contains few argillaceous laminations. @ 13.1',14.0',18.7', low angle rust stained fractures. | | | | | | | | | | | | | |
| | | 50/5 | | | | | | | | | | | | | | | | | | |
| 10 | | Core 72" | Rec 72" | RQD 14% | R-1 | | | | | | | | | | | | | | | |
| 13.0 | 556.3 | | | | | *612 | | | | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 90% | R-2 | | | | | | | | | | | | | | | |
| 20.0 | 549.3 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:21 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-177

Location: Sta. 310+79.1, 269.6 ft. RT of SR 823 CL

Date Drilled: 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 5.0' Water level at completion: None (prior to coring) 5.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 581.1 | | | | | | | | | | | | | | | | | | |
| 0.3 | 580.8 | | | | | | Topsoil - 4" | | | | | | | | | | | | |
| | | 9 | | | | | Medium dense brown SANDY SILT (A-4a), little gravel; damp. | | | | | | | | | | | | |
| | | 9 | 18 | | | 1 | | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | |
| | | 9 | 18 | | | 2 | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | |
| 5 | | 9 | | | | | | | | | | | | | | | | | |
| | | 9 | 18 | | | | | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | |
| | | 11 | 18 | | | 3 | | | | | | | | | | | | | |
| 8.5 | 572.6 | 3 | | | | | Loose to medium dense brown and gray SILT (A-4b), trace fine to coarse sand, trace gravel; damp to moist. | | | | | | | | | | | | |
| | | 4 | | | | | @ 11.0'-12.5', some fine to coarse sand. | | | | | | | | | | | | |
| 10 | | 4 | 18 | | | 4 | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | |
| | | 16 | | | | | | | | | | | | | | | | | |
| | | 19 | 18 | | | 5 | | 2 | 11 | -- | 23 | 51 | 13 | | | | | | |
| | | 50/0 | 0 | | | 6 | | | | | | | | | | | | | |
| 14.0 | 567.1 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, slightly to highly weathered, argillaceous, micaceous, thinly laminated to thickly bedded, moderately to highly fractured. | | | | | | | | | | | | |
| 15 | | | | | | | @ 13.3'-13.4', 18.2'-18.5', 19.5'- 19.6', broken with typical low angle clay filled fractures. | | | | | | | | | | | | |
| | | Core 72" | Rec 72" | | | RQD 54% | | | | | | | | | | | | | |
| | | | | | | R-1 | *244 | | | | | | | | | | | | |
| 20.0 | 561.1 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-179

Location: Sta. 313+45.2, 377.7 ft. RT of SR 823 CL

Date Drilled: 9/24/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 35.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 742.1 | | | | | | | | | | | | | | | | | | |
| -0.4 | 741.7 | | | | | | Topsoil - 5" | | | | | | | | | | | | |
| 2.5 | 739.6 | | | | | | Medium dense to dense brown SANDY SILT (A-4a); contains sandstone fragments; damp. | | | | | | | | | | | | |
| 5 | | Core 30" | Rec 30" | RQD 77% | R-1 | *288 | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately fractured, with typical high angle rust stained fractures. @ 3.9',7.8', low angle rust stained fractures. | | | | | | | | | | | | |
| 10 | | Core 60" | Rec 60" | RQD 77% | R-2 | *285 | @ 9.5'-10.0', broken zone light brown low angle fractures. | | | | | | | | | | | | |
| 13.1 | 729.0 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured. @ 13.5'-13.7', light brown, broken zone with low angle fractures. @ 18.4',24.7', low angle clay filled fractures. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 100% | R-3 | *409 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 100% | R-4 | *485 | @ 24.7', low angle clay filled fractures. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-179

Location: Sta. 313+45.2, 377.7 ft. RT of SR 823 CL

Date Drilled: 9/24/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 35.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
| 30 | 712.1 | | | | | | DESCRIPTION Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured. @ 37.4-37.9', rust stained zone with fossils. | | | | | | | | | | | | | | |
| 35 | | Core 120" | Rec 120" | RQD 100% | R-5 | *489 | | | | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 120" | RQD 100% | R-6 | *518 | | | | | | | | | | | | | | | |
| 55 | | Core 120" | Rec 120" | RQD 100% | R-7 | *331 | | | | | | | | | | | | | | | |
| 60.0 | 682.1 | | | | | | Bottom of Boring - 60.0' | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:21 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-180

Location: Sta. 315+33.5, 92.5 ft. RT of SR 823 CL

Date Drilled: 9/23/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 13.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 30 | 734.7 | | | | | *438 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered to slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured to unfractured, contains few argillaceous laminations. | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | |
| 40 | | Core 120" | Rec 120" | RQD 100% | R-4 | *490 | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | |
| 50 | | Core 120" | Rec 120" | RQD 100% | R-5 | *495 | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | |
| 60 | | Core 120" | Rec 120" | RQD 100% | R-6 | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:21 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-2174 Location: Sta. 308+35.4, 167.2 ft. LT of SR 823 CL Date Drilled: 12/14/05 to 12/16/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 31.8' (prior to coring) 34.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | |
| 60 | 734.6 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured, turbidity. @ 65.0'-70.0', unweathered. @ 65.3',66.3',66.9',67.6', 67.7',68.2',69.3', low angle fractures. | | | | | | | | | | |
| 65 | | Core 60" | Rec 60" | RQD 100% | R-7 | *1868 | | | | | | | | | | | |
| 70.0 | 724.6 | | | | | | Bottom of Boring - 70.0' | | | | | | | | | | |
| 75 | | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-189

Location: Sta. 326+76.5, 9.4 ft. RT of SR 823 CL

Date Drilled: 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 50.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 30 | 732.6 | | | | | *320 | <p>Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, moderately fractured, with typical low angle clay filled fractures; contains few argillaceous laminations.</p> <p>@ 35.7',37.9',40.5', low angle fractures.</p> <p>@ 35.8'-37.5', qu = 8,880 psi, SDI = 97.9%.</p> <p>@ 42.8'-43.0', 44.0'-44.3', 44.7'-44.8', low angle fractures, moderate argillaceous laminations.</p> <p>@ 45.3',45.8',47.9',51.2', low angle fractures, argillaceous lamination zones.</p> <p>@ 50.0'-50.2', argillaceous zone with fractures.</p> <p>@ 52.7',59.8'-66.3', few to moderate argillaceous laminations.</p> <p>@ 53.5', 53.7', low angle fractures with argillaceous zones.</p> <p>@ 59.6', 59.8',60.4', 62.3',69.8', low angle fractures.</p> <p>@ 60.8'-61.1', 62.5'-63.3', broken.</p> | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | |
| 40 | | Core 120" | Rec 118" | RQD 75% | R-4 | *373 | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | |
| 50 | | Core 120" | Rec 120" | RQD 75% | R-5 | *496 | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | |
| 60 | | Core 120" | Rec 120" | RQD 61% | R-6 | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:26 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-189 Location: Sta. 326+76.5, 9.4 ft. RT of SR 823 CL Date Drilled: 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 50.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
| 60 | 702.6 | | | | | *448 | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, moderately fractured, with typical low angle clay filled fractures. @ 65.5',65.9',69.2',69.3', 70.8',71.3',71.6',71.7', 71.8',73.9', low angle fractures. @ 70.7'-75.0', moderate argillaceous laminations. @ 72.3'-73.0', broken. | | | | | | | | | | | |
| 65 | | | | | | | | | | | | | | | | | | |
| 70 | | Core 120" | Rec 120" | RQD 57% | R-7 | *483 | | | | | | | | | | | | |
| 75.0 | 687.6 | | | | | | Bottom of Boring - 75.0' | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2186

Location: Sta. 324+28.8, 133.1 ft. LT of SR 823 CL

Date Drilled: 12/27/05 to 12/28/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: Not reported | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---------------------------------|--|--------------------|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | Blows per foot - ○ | | | |
| 0 | 767.7 | | | | | | | | | | | | | | | | | | |
| 0 | | 5 | | | | 3.75 | Topsoil - 0" | | | | | | | | | | | | |
| 1 | | 4 | 11 | 10 | | 3.75 | Very stiff to hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; contains sandstone fragments; damp to moist. | 10 | 7 | -- | 5 | 38 | 40 | | | | | | |
| 2 | | 5 | | | | 3.5 | @ 3.0', brown and gray. | 8 | 6 | -- | 6 | 43 | 37 | | | | | | |
| 3 | | 5 | 12 | 22 | 12 | 4.5 | | | | | | | | | | | | | |
| 4 | | 50/5 | | 6 | | | Severely weathered dark brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 8.0 | 759.7 | | | | | | | | | | | | | | | | | | |
| 10.0 | 757.7 | | | | | | Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, massive, moderately to highly fractured. | | | | | | | | | | | | |
| | | | | | | | @ 10.1'-11.2', calcareous. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 117" | | RQD 88% | R1 | *1059 | | | | | | | | | | | | |
| 17.1 | 750.6 | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | Hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, moderately fractured. | | | | | | | | | | | | |
| | | | | | | | @ 18.5', 19.3', 21.5', 25.8', low angle fractures. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 119" | | RQD 98% | R2 | *1137 | | | | | | | | | | | | |
| | | | | | | | @ 25.8', gray and slightly weathered. | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:26 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2187

Location: Sta. 326+69.3, 125.1 ft. LT of SR 823 CL

Date Drilled: 12/28/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: Not reported | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ | | | | | | | |
| 0 | 774.6 | | | | | | | | | | | | | | | | | | | | |
| | | 2 | | | | 3.5 | Topsoil - 0" | | | | | | | | | | | | | | |
| | | 4 | 21 | | | | Very stiff brown SILT AND CLAY (A-6a), trace gravel, trace fine to coarse sand; damp. | 6 | 4 | -- | 4 | 52 | 34 | | | | | | | | |
| | | 14 | | | | | | | | | | | | | | | | | | | |
| | | 12 | | | | 4.5+ | @ 3.5', contains sandstone fragments. | | | | | | | | | | | | | | |
| | | 38 | 10 | | | | | | | | | | | | | | | | | | |
| | | 50/5 | | | | | | | | | | | | | | | | | | | |
| | | 8 | | | | 4.5+ | | | | | | | | | | | | | | | |
| | | 22 | 14 | | | | | | | | | | | | | | | | | | |
| | | 30 | | | | | | | | | | | | | | | | | | | |
| | | 8 | | | | 4.5+ | | | | | | | | | | | | | | | |
| | | 30 | 16 | | | | | 0 | 2 | -- | 6 | 58 | 34 | | | | | | | | |
| | | 38 | | | | | | | | | | | | | | | | | | | |
| | | 8 | | | | 4.5+ | | | | | | | | | | | | | | | |
| | | 17 | 14 | | | | | | | | | | | | | | | | | | |
| | | 31 | | | | | | | | | | | | | | | | | | | |
| | | 18 | | | | 4.5+ | @ 13.5', dark brown. | | | | | | | | | | | | | | |
| | | 50/2 | 5 | | | | | | | | | | | | | | | | | | |
| 15.0 | 759.6 | | | | | | Very hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, calcareous, medium bedded to massive, highly fractured to broken. | | | | | | | | | | | | | | |
| | | | | | | | @ 15.8'-15.9', 17.3'-17.4', broken. | | | | | | | | | | | | | | |
| | | | | | | | @ 16.1'-18.3', calcareous. | | | | | | | | | | | | | | |
| | | | | | | | @ 22.5'-26.0', moderately to highly weathered, contains gray colored zones. | | | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 118" | | RQD 78% | R-1 | *711 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | |
| 26.0 | 748.6 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 119" | | RQD 98% | R-2 | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:26 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-199

Location: Sta. 338+25.8, 111.0 ft. LT of SR 823 CL

Date Drilled: 9/15/04 to 9/22/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 21.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|------------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 820.4 | | | | | | | | | | | | | | | | | | |
| -0.5 | 819.9 | | | | | | Topsoil - 6" | | | | | | | | | | | | |
| | | 3 6 7 18 | | | | 1 | 4.5+ | | | | | | | | | | | | |
| | | 5 9 11 18 | | | | 2 | 4.5+ | 0 | 11 | -- | 7 | 37 | 45 | | | | | | |
| 5 | | 9 11 16 18 | | | | 3 | 4.5+ | | | | | | | | | | | | |
| | | 5 9 16 18 | | | | 4 | 4.5+ | | | | | | | | | | | | |
| 10 | 809.9 | 7 14 21 18 | | | | 5 | 4.5+ | 4 | 12 | -- | 14 | 36 | 34 | | | | | | |
| | | 7 24 41 18 | | | | 6 | 4.25 | | | | | | | | | | | | |
| 15 | | 13 32 40 12 | | | | 7 | 4.5+ | | | | | | | | | | | | |
| | | 16 33 39 15 | | | | 8 | 4.5+ | | | | | | | | | | | | |
| 18.0 | 802.4 | 16 27 32 18 | | | | 9 | 4.5+ | | | | | | | | | | | | |
| 20 | | 11 23 50/5 16 | | | | 10 | 4.5+ | 6 | 4 | -- | 10 | 33 | 47 | | | | | | |
| 25 | 794.9 | 27 50/5 10 | | | | 11 | | | | | | | | | | | | | |
| 25.5 | | 28 50/5 8 | | | | 12 | | | | | | | | | | | | | |
| 30 | | | | | | | Severely weathered gray SHALE, arenaceous. | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:38 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-199

Location: Sta. 338+25.8, 111.0 ft. LT of SR 823 CL

Date Drilled: 9/15/04 to 9/22/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 21.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|--------------------------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Blows per foot - ○ | | | | | | | |
| 90 | 730.4 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, slightly fractured. | | | | | | | | | | | | | | |
| 95 | | Core 120" | Rec 117" | RQD 98% | R-6 | *299 | | | | | | | | | | | | | | | |
| 100 | | | | | | | | | | | | | | | | | | | | | |
| 105 | | Core 120" | Rec 116" | RQD 96% | R-7 | *467 | | | | | | | | | | | | | | | |
| 110 | | | | | | | | | | | | | | | | | | | | | |
| 115 | | Core 120" | Rec 120" | RQD 100% | R-8 | *395 | | | | | | | | | | | | | | | |
| 120 | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:38 AM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-201 Location: Sta. 338+44.5, 150.8 ft. RT of SR 823 CL Date Drilled: 9/15/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|---------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.3 | 762.5 | | | | | | | | | | | | | | | | | | | |
| | 762.2 | | | | | | Topsoil - 3" | | | | | | | | | | | | | |
| | | 6 23 12 | 18 | | | 1 | 4.5+ | | | | | | | | | | | | | |
| | | 7 13 20 | 18 | | | 2 | 4.5+ | 15 | 4 | -- | 14 | 47 | 20 | ● | | | | | | |
| 5 | | 11 50/2 | 8 | | | 3 | 4.5+ | | | | | | | | | | | | | |
| 6.0 | 756.5 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, broken, with typically low angle rust stained fractures. @ 8.2'-8.5', 12.2'-13.8', broken with typical high angle rust stained fractures. | | | | | | | | | | | | | |
| 10 | | Core 108" | Rec 108" | RQD 34% | R-1 | | *254 | | | | | | | | | | | | | |
| 15 | | | | | | | @ 19.8'-20.0', interbedded shale. | | | | | | | | | | | | | |
| | | | | | | | @ 20.3', low angle rust stained fracture. | | | | | | | | | | | | | |
| 20.2 | 742.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyrtic, thinly bedded to massive, moderately to slightly fractured. | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 96% | R-2 | | *294 | | | | | | | | | | | | | |
| | | | | | | | @ 28.2', low angle fracture. | | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 100% | R-3 | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:38 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-201

Location: Sta. 338+44.5, 150.8 ft. RT of SR 823 CL

Date Drilled: 9/15/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 60 | 702.5 | | | | | *503 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to massive. @ 64.2'-64.7', 65.8'-70.0', moderately argillaceous. | | | | | | | | | | | | | |
| 65 | | Core 60" | Rec 60" | RQD 100% | R-7 | *344 | | | | | | | | | | | | | | |
| 70.0 | 692.5 | | | | | | Bottom of Boring - 70.0' | | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2194

Location: Sta. 331+97.8, 163.1 ft. LT of SR 823 CL

Date Drilled: 12/30/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 3.3' (includes drilling water) 23.5' (after 12 hours) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
| 0 | 780.4 | | | | | | Topsoil - 0" | | | | | | | | | | | |
| 1.8 | | 18 | | | | 3.25 | Very stiff brown SILT (A-4b), some clay, little fine to coarse sand, trace gravel; moist. | 4 | 2 | -- | 10 | 61 | 23 | ● | | | | |
| 2.1 | | 21 | | | | | | | | | | | | | | | | |
| 2.7 | | 27 | 20 | 1 | | | | | | | | | | | | | | |
| 3.0 | 777.4 | | | | | | | | | | | | | | | | | |
| 3.0 | | 22 | | | | 2 | Severely weathered brown and gray SILTSTONE, arenaceous. | | | | | | | | | | | |
| 4.0 | | 40 | | | | | Severely weathered brown and gray SHALE, arenaceous. | | | | | | | | | | | |
| 5.0 | | 50/4 | 18 | 2 | | | | | | | | | | | | | | |
| 5.0 | | | | | | | | | | | | | | | | | | |
| 6.0 | | 18 | | | | 3 | Severely weathered brown and gray SHALE, arenaceous. | | | | | | | | | | | |
| 7.0 | | 50/6 | 13 | 3 | | | | | | | | | | | | | | |
| 8.0 | 772.4 | | | | | 4 | Soft brown and gray SHALE interbedded with SANDSTONE; very fine to fine grained, highly weathered to decomposed, arenaceous, massive, highly fractured. | | | | | | | | | | | |
| 9.0 | | 36 | | | | | | | | | | | | | | | | |
| 10.0 | 770.4 | | | | | | Soft brown and gray SHALE interbedded with SANDSTONE; very fine to fine grained, highly weathered to decomposed, arenaceous, massive, highly fractured. | | | | | | | | | | | |
| 10.0 | | 50/3 | 12 | 4 | | | | | | | | | | | | | | |
| 15.0 | | Core 120" | Rec 114" | RQD 82% | R-1 | *133 | @ 21.0',21.3', low angle fractures. | | | | | | | | | | | |
| 20.0 | | | | | | | | | | | | | | | | | | |
| 21.7 | 758.7 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, massive, slightly fractured. @ 21.7'-21.8', conglomerate bed. | | | | | | | | | | | |
| 21.7 | | | | | | | | | | | | | | | | | | |
| 25.0 | | Core 120" | Rec 120" | RQD 88% | R-2 | *1108 | @ 21.8', 23.6',23.8',23.9',25.5', low angle fractures. @ 25.3'-25.5', iron stained, vuggy zone. | | | | | | | | | | | |
| 25.0 | | | | | | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/7/2007 10:38 AM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2202

Location: Sta. 342+27.0, 64.3 ft. RT of SR 823 CL

Date Drilled: 1/9/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 34.7' (includes drilling water) 16.0' (after 27.4 hours) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 60 | 661.9 | | | | | *1505 | Medium hard to hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, massive, unfractured to slightly fractured. | | | | | | | | | | | | | |
| 65 | | Core 60" | Rec 60" | RQD 100% | R-7 | *1073 | | | | | | | | | | | | | | |
| 70.0 | 651.9 | | | | | | Bottom of Boring - 70.0' | | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-206

Location: Sta. 349+77.5, 31.4 ft. LT of SR 823 CL

Date Drilled: 9/1/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 21.0' Water level at completion: None (prior to coring) 6.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|-----------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0 | 674.4 | | | | | | | | | | | | | | | | | |
| 2.5 | | 10 10 10 | 18 | 1 | | | No topsoil Very stiff brown SILT AND CLAY (A-6a), little fine sand; damp to moist. | | | | | | | | | | | |
| 2.75 | | 8 10 12 | 18 | 2 | | | | 0 | 0 | -- | 11 | 61 | 28 | | | | | |
| 2.0 | | 3 5 7 | 18 | 3 | | | | | | | | | | | | | | |
| 4.5 | 666.4 | 8 11 17 | 18 | 4 | | | Hard light brown and gray CLAY (A-7-6), "and" silt, trace fine sand; damp. | 0 | 1 | -- | 6 | 53 | 40 | | | | | |
| 1.5 | | 6 6 8 | 18 | 5 | | | | | | | | | | | | | | |
| 1.25 | 661.4 | 4 7 11 | 18 | 6 | | | Stiff light gray SILT (A-4b), little to some fine sand, little clay; contains sand seams; moist. | | | | | | | | | | | |
| 1.75 | 658.9 | 6 11 50/5 | 17 | 7 | | | Dense brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp to moist. | | | | | | | | | | | |
| 1.75 | | 7 23 25 | 18 | 8 | | | | | | | | | | | | | | |
| 1.75 | | 10 16 25 | 18 | 9 | | | | 5 | 10 | -- | 40 | 29 | 16 | | | | | |
| 1.75 | 650.9 | 28 50/5 | 11 | 10 | | | Severely weathered gray SANDSTONE, argillaceous. | | | | | | | | | | | |
| 1.75 | 648.3 | 50/1 | 0 | 11 | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to massive, moderately fractured. @ 26.8'-26.9', high angle clay filled fracture. | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

Results of Slake Durability Index and Uniaxial Compressive Tests

Cut Slope Cross Sections

Colorado Rock Fall Simulation Analysis

APPENDIX C

ODOT General Earthwork Design Checklist - Centerline Cuts Checklist