REPORT

OF

SUBSURFACE INVESTIGATION

FOR

SHUMWAY HOLLOW ROAD INTERCHANGE

PROJECT SCI-823-6.81

PHASE 1 – STAGE I

SCIOTO COUNTY, OHIO

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1.0 INTRODUCTION

The project consists of the construction of a new interchange where proposed State Route 823 will cross Shumway Hollow Road (TWP 234) in Minford Township, Scioto County, Ohio. Approximately 1.4 miles of new ramps are planned and 1.7 miles of existing roadway will be improved as part of the project. The project area can be found on the USGS Minford Quadrangle and is part of the SCI-823-6.81 (Portsmouth Bypass) project. The exploration presented in this report has been performed essentially in accordance with DLZ Ohio, Inc.'s proposal for the project.

The purpose of this 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 rock cut slopes and the roadway embankments and pavements.

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 GENERAL PROJECT INFORMATION

It is understood that proposed State Route 823 will cross Shumway Hollow Road (Township Road 234) between Blake Hollow Road and Barklow Road. Four new ramps will be constructed and Shumway Hollow Road will be improved as part of the project between Stations 10+91 and 41+17. A maximum embankment height of 66.0 feet and a maximum cut of 90.0 feet are anticipated.

The analyses and recommendations presented in this report have been made on the basis of the foregoing information. If the proposed locations or structural concept is changed or differs from that assumed, DLZ Ohio, Inc. should be informed of the changes so that recommendations and conclusions presented in this report may be revised as necessary.

3.0 SUBSURFACE INVESTIGATION

The subsurface investigation consisted of 107 borings drilled between the dates of July 27, 2004 and September 27, 2006. The borings were extended to depths of 6.0 to 85.0 feet and were drilled with both ATV-mounted and truck-mounted drill rigs. The locations of the borings are shown on the Boring Location Plan in Appendix A.

Representatives of DLZ Ohio, Inc. (DLZ) planned and staked the interchange boring locations in the field. Similarly, representatives of Lockwood, Lanier, Mathias and Noland, Inc. (2LMN) staked the locations of the non-interchange roadway borings in the Phase 1 area. Representatives of 2LMN also determined the as-drilled ground surface elevations and locations of most of the boring locations. The as-drilled boring locations and ground surface elevations are shown on the individual boring logs in Appendix A. At the time this document was drafted, the as-drilled locations of several boring locations had not been established. In lieu of survey information, the as-per-plan stations, offsets, and elevations were estimated and are included on the boring logs for boring locations that were not surveyed. Information concerning the drilling procedures and the boring log terminology is also presented in Appendix A.

4.0 FINDINGS

4.1 General

The soils at the interchange site are of the Minford Silt complex, generally compressible, highly plastic clays. At this site, the Minford deposits are relatively thick, extending to bedrock that was encountered at depths of 2 to 74 feet below the ground surface. More details regarding the subsurface conditions are presented in the following sections.

4.2 Geology

The genesis of the soils varies across the site. Residual and colluvial soils are found on the ridge tops and the hillsides near the site. These soils are generally thin to moderately deep, covering moderate to steep slopes. Lacustrine soils, found in the valleys, are commonly known as "Minford Silts" or the Minford Complex. These deposits were formed during the early to middle Pleistocene age when the northward flowing Teays River system was blocked by the southward advance of the Kansan aged ice sheets. As the glaciers advanced, the course of the Teays River was blocked south of Chillicothe and a large lake was formed from the impoundment of the waterways. As a result of the impoundment, vast quantities of sediments were deposited ranging from 10 to 80 feet in thickness, thinning towards the margins. In this area, the Minford Complex is characterized by clays of high plasticity and high compressibility.

Bedrock within the area is primarily sandstone of the Logan Formation that is of Mississippian Age. Bedrock of the Pennsylvanian Breathitt Formation can be found at the top of the slopes, roughly above elevation 870.

4.3 Soil Conditions

At the surface, the interchange borings encountered 2 to 12 inches of topsoil. The average thickness of topsoil was 6 inches.

Below the topsoil the borings encountered brown sandy silt (A-4a), silt (A-4b), brown silt and clay (A-6a), brown silt (A-4b), or brown silty clay (A-6b) to depths of 2 to 21 feet

overlying brown or gray stiff to hard elastic clay (A-7-5) and clay (A-7-6) to depths of 8 to 57 feet. In many of the borings, a layer of dense silt, sand, or gravel was encountered beneath these soils. The granular material, when encountered, ranged in thickness between 2 and 19.5 feet. Weathered siltstone, shale, or sandstone was encountered beneath the granular layers.

4.4 Landslides

One area within the Shumway Hollow Interchange area showed recent signs of significant instability near or within the limits of construction. All slope instability appeared to be relatively shallow soil creep contained within the overburden. In the steep terrain of Scioto County, soil creep is common. Areas of slope instability were first identified using aerial photography and then verified during the fieldwork. Additional details on the findings and results are presented in the Portsmouth Bypass Phase 1 Geology and Field Reconnaissance Report, which is a separate submittal.

Station 352+00 to Station 356+00
The aerial photography showed hummocky terrain from Station 352+00 continuing to Station 356+00. This area exhibited signs of recent instability. This is most likely due to erosion and shallow soil creep along the steep drainage channels of intermittent streams in the area.

4.5 Bedrock Conditions

Bedrock was encountered in many of the borings and confirmed by coring in 104 borings. The bedrock consisted mainly of medium hard to hard slightly to highly weathered siltstone, shale, or sandstone. The RQD of the cored samples ranged from 12% to 100% with an average of 80%.

4.6 Groundwater Considerations

Seepage was encountered in 59 borings between approximate depths of 3.5 and 60.0 feet. There were no measurable water levels in 38 borings prior to rock coring. Measurable water levels prior to rock coring when encountered ranged between depths of 8.5 and 42.0 feet. Water was used during rock coring and masked any seepage zones that may exist in the rock. Measurable water levels were present in 96 borings upon the completion of coring between approximate depths of 0.8 and 53.5 feet.

It should be noted that groundwater levels may fluctuate with seasonal variations and following periods of heavy or prolonged precipitation, and therefore, the readings indicated on the boring logs may not be representative of the long-term groundwater level. Long-term monitoring would be needed to obtain a more accurate estimate of the groundwater table elevation.

4.7 Shumway Hollow Roadway Borings (TWP 234)

Borings were also taken along Shumway Hollow Road for improvements to the roadway (between Stations 10+91 and 41+17). These borings were drilled to depths of 15.5 to 85 feet. The borings encountered 3 to 13 inches of asphalt concrete and aggregate base overlying granular and cohesive top layers consisting mainly of gravel with sand and silt (A-2-4), sandy silt (A-4a), silt (A-4b), silt and clay (A-6a), silty clay (A-6b). Beneath the top soil layers, the borings encountered Minford silts underlain by rock to the end of the borings. Additional details on the findings and results of these borings are presented in the Portsmouth Bypass Phase 1 Subgrade Report, which is a separate submittal.

4.8 Laboratory Testing

In the laboratory, all samples were examined and visually classified by a soils engineer. The moisture content, grain size analysis, and plasticity characteristics of samples considered representative of the subsurface materials were determined. In addition, consolidation tests and triaxial tests (unconfined compression, unconsolidated-undrained, and consolidated-undrained tests) were performed on relatively undisturbed (shelby tube) samples. The results of the laboratory testing are presented in Appendix B, and on the boring logs in Appendix A.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

Subgrades and embankments should be constructed in accordance with Ohio Department of Transportation Construction and Material Specification (ODOT-CMS) Item 203, "Roadway Excavation and Embankment."

Topsoil was encountered in the majority of the borings drilled for the proposed interchange to depths of between 2 and 12 inches. The average topsoil thickness was 6 inches. All topsoil should be removed prior to placing fill or pavement materials.

5.2 Pavement Design and Group Index

5.2.1 General

The results of the borings and the subgrade evaluations for the project (Phase 1) have been submitted in a separate document. However, the conclusions from the evaluations are presented below. It should be noted that unsuitable soils were encountered in the Phase 1 area. Restrictions for the use of these materials should conform to ODOT CMS Item 203.03. Similarly, all subgrade treatments should conform to ODOT CMS Item 206.

5.2.2 Proposed 823 and Ramps (Shumway Hollow Interchange)

For the proposed mainline alignment and the ramps at Shumway Hollow Interchange, (Stations 352+00 to 416+00) it is recommended that the pavements be designed based on a CBR value of six (6). Most of the mainline and ramp alignments will be on embankment.

It is anticipated that subgrade will be in rock along Ramp D alignment between Stations 384+00 and 386+00 and along the SCI-823 roadway main alignment between Stations 355+00 to 362+00 and Stations 415+00 to 416+00. Any bedrock encountered at or near subgrade should be overexcavated and replaced in accordance with ODOT CMS Item 204.

5.2.3 Proposed Shumway-Hollow Road

The pavements for the improvements to Shumway Hollow Road (Stations 10+91 to 41+17) should be designed based on a CBR of five (5). In addition, the GB-1 evaluation of the subgrade samples indicated that silt (A-4b) and clay (A-7-6) exist at the subgrade elevation and hence the subgrade should be treated prior to the construction of the roadway.

It is anticipated that subgrade will be in rock along the alignment section of Shumway Hollow Road between Stations 18+00 and 26+00. Any bedrock encountered at or near subgrade should be overexcavated and replaced in accordance with ODOT CMS Item 204.

However, the majority of the roadway alignment between Stations 10+91 and 18+00, and Stations 26+00 and 41+17 encountered silt (A-4b) and clay (A-7-5) at the proposed subgrade elevation. Silt (A-4b) and clay (A-7-5) encountered at the subgrade elevations should be undercut and replaced by controlled, engineered fill as outlined by ODOT CMS Item 204.07.

5.3 Culverts

As discussed earlier in this report, ten (10) culverts are presently planned for within the limits of the interchange. Foundation recommendations for the culverts have been presented in a separate report.

5.4 Embankment Evaluations

5.4.1 Slope/Embankment Stability – General Information

Slope/embankment stability is not considered to be a significant concern for most areas of the State Route 823 interchange intersection with Shumway Hollow Road. However, a 56.5-foot high embankment is to be constructed for the State Route 823

main alignment within the interchange footprint area. In addition, embankments of 5 to 51 feet, 5 to 66 feet, 5 feet to 40 feet, and 7 to 51 feet in height are to be constructed for Ramps A, B, C, and D, respectively. The areas of the embankments are characterized by relatively deep deposits of soft to medium stiff cohesive soils with relatively high moisture contents within the north area of the interchange and relatively thin medium dense to very dense granular soil over rock within the south area of the interchange. Consequently, slope stability analyses were performed at the embankment locations with the critical soil and loading conditions. The critical sections were selected at Stations 404+36 (SCI 823 Mainline), 403+00 (Ramp A), 372+20 (Ramp B), 380+60 (Ramp C), and 404+95 (Ramp D). However, other locations indicated relatively higher embankment fills over thin hard native soil over rock or over rock only such as Station 374+70 (Ramp B) and Station 376+60 (Ramp C). The foundation soils at these sections were not considered critical and hence the sections were not considered for further slope stability analysis.

At the time the analysis was performed, the existing and proposed grade elevations were used to establish the embankment locations and height. Soil parameters used for the analyses were based on laboratory test results, visual examination of the preserved samples, hand penetrometer readings, and typical values. The soil parameters were selected based on the most critical soil conditions that were encountered by the borings and tested in the lab. In addition, the soil parameters were selected to address the instability of the highest (most critical loading condition) embankment with the relatively weak foundation soils. Due to the variation of the soil parameters within each layer/deposit, those that address the most critical instability were selected from the testing data. However, soil parameters for few other layers (such as granular deposits) were selected based on common values/correlations for such soils and common engineering practice. The selected strengths are shown on the exhibits in Appendix C.

It is anticipated that the embankment fill will consist of cohesionless material ranging in size from fine granular material to rock but will generally be rockfill from adjacent cuts. The friction angles of the anticipated backfill materials will likely range from approximately 28 degrees to over 40 degrees. We would anticipate that more of the rockfill would exhibit friction angles in excess of 40 degrees, but we conservatively selected a friction angle of 35 degrees for the embankment fill with no cohesion.

The stability analyses were performed using the computer program STABL developed at Purdue University. The program is capable of analyzing circular as well as non-circular failure surfaces. Four procedures are available in the program to compute the factors of safety: the Modified Bishop procedure, Spencer's procedure, Janbu's procedure, and Block analysis procedure. All of the procedures use an iterative approach to investigate many failure surfaces until a critical surface is found. The Modified Bishop's method was used for all of the analyses and only circular failure surfaces were considered. The results of the stability analyses are presented in Appendix C and summarized in the following paragraphs.

5.4.2 Slope/Embankment Stability–State Route 823 Bypass at Station 404+36

5.4.2.1 General

A preliminary slope stability analysis was performed for the proposed State Route 823 bypass at Station 404+36 using the existing and proposed grade elevations provided by TranSystems Inc. The developed cross section was characterized by 2H:1V side slopes. Based on the borings information, the embankment foundation at this location was assumed to consist of 25 feet of soft clay (A-7-6) underlain by medium stiff overlying weathered sandstone. The critical factor of safety assuming end-of-construction (undrained) conditions was found to be 0.73. This critical factor of safety is less than the generally recommended minimum factor of safety of 1.25 for highway embankments. Based on these findings, it is assumed that remedial treatment of the existing foundation soils will be necessary. Remediation efforts which could be considered include staged construction, pre-loading, and wick drains.

The embankments in this region could be constructed to approximate grade and allowed to pre-load the soft foundation soils for as long as possible. However, settlement calculations indicate that the time needed for 80 percent consolidation of the foundation soils could be as long as 394 months (32.8 years). Therefore, pre-loading is not practical for the construction of the embankment at the site and should not be used in the construction of the embankment. Alternatively, wick drains can be used to accelerate the dissipation of the pore water pressure and hence the consolidation of the foundation soil. Recommendations regarding wick drains are presented in Section 5.4.9, "Additional Settlement Recommendation."

5.4.2.2 Staged Construction

Another option that can be considered to remediate this area is staged construction. Slope stability analyses were performed for the proposed State Route 823 bypass at Station 404+36 in order to determine the height of embankment which could be initially constructed assuming no significant removal of existing poor soils. Undrained analysis were performed for a 25-foot high embankment (initial staged construction) assuming a cross section characterized by 2H:1V side slopes. The critical factor of safety assuming end-of-construction (undrained) conditions was found to be 1.29. This critical factor of safety meets the generally recommended minimum factor of safety of 1.25 for highway embankments.

Drained analyses were then performed for the 25-foot staged embankment assuming excess pore pressures in the soft foundation soils. This analysis

would reflect the conditions during construction if excess pore pressures occur in the foundation soils. These excess pore pressures should be monitored during construction with instrumentation to verify the subsurface conditions.

The pore water pressure head during Stage 1 construction should not exceed 19 feet above the ground surface. On the other hand, the pore water pressure head during Stage 2 construction should not be higher than 10 feet below the existing ground surface.

The waiting time between Stage 1 (25 feet high embankment) and Stage 2 (57 feet high embankment) should be more than 60 days (with wick drains) to allow adequate dissipation of the excess pore water pressure.

The excess pore pressures will dissipate near the toe of the new embankment due to the decreasing embankment load. In the analyses, it was assumed that the excess pore pressures dissipated along the outside slope of the new embankment. The assumed excess pore pressure distribution is shown on the stability analyses results in Appendix C. Based on the findings of these analyses, it is recommended that at least 70 percent of the excess pore pressures be allowed to dissipate before the remainder of the embankment is constructed. Instrumentation equipment should be installed and monitored as discussed in Section 5.4.11, "Instrumentation," to ensure that the excess pore pressures have dissipated. As discussed in the subsequent sections, 80 percent of primary consolidation should occur in less than 394 months (32.8 years). However, this time period can be shortened to less than 120 days provided wick drains are installed as indicated on the instrumentation plans in the Appendix E and Section 5.4.9, "Additional Settlement Recommendation." Once the excess pore pressures have dissipated, construction of the remainder of the embankment can proceed provided that instrumentation equipment is installed and monitored as discussed in Section 5.4.11, "Instrumentation." The staged construction recommendation and analysis assumed the installation of wick drains before the staged construction.

5.4.3 Slope/Embankment Stability – Proposed Ramps A/B

Based on the provided existing and proposed grade elevations, the embankment fill along Ramp A is anticipated to range between 5 and 51 feet in height. The encountered embankment foundation layers are characterized by thin to thick stiff to hard cohesive soil overlying medium dense granular soil over rock. Based on the analysis at Station 404+36 and the similarity between the foundation soils at Station 403+00 (critical section along Ramp A-51 ft high) and Station 404+36, Ramp A embankment can be constructed utilizing 2H:1V slopes and using staged construction as discussed in Section 5.4.2.2.

On the other hand, based on the provided existing and proposed grade elevations, the embankment fill along Ramp B is anticipated to range between 5 and 66 feet in height. The encountered embankment foundation layers transits from relatively thin stiff to hard cohesive soil underlain by medium dense to very dense granular soil over sandstone to sandstone exposed at the ground surface level. At Station 374+70, the embankment height over the exposed rock was approximately 66 feet. Therefore, the stability of the embankment section at Station 374+70 is mainly controlled by the degree of compaction of the embankment granular fill and not by the foundation soil which is assumed to have a friction angle of 35 degrees resulting in a factor of safety in the order of 1.3. On the other hand, the maximum height of the embankment above cohesive soils was approximately at station 372+20 where 22.5 feet of fill are proposed over the existing ground surface. The embankment foundation soils at Station 372+20 consist primarily of stiff to very stiff cohesive soil underlain by loose to medium dense granular soil over rock. Based on the analysis at Station 404+36 and the similarity between the foundation soils at Station 372+20 (critical section along Ramp B-22.5 ft high) and Station 404+36, Ramp B embankment can be constructed utilizing 2H:1 slopes and using staged construction as discussed in Section 5.4.2.2.

5.4.4 Slope/Embankment Stability – Proposed Ramps C/D

Based on the provided existing and proposed grade elevations, the embankment fill along Ramp C is anticipated to range between 5 and 40 feet in height. Approximately half of the ramp alignment will be cut and the other half will be fill. The encountered embankment foundation layers transits from relatively thin stiff to hard cohesive soil underlain by medium dense to very dense granular soil over sandstone to sandstone exposed at the ground surface level. At Station 376+60, the embankment height over the exposed rock was approximately 39.3 feet. Therefore, the stability of the embankment section at Station 376+60 is mainly controlled by the degree of compaction of the embankment granular fill and not by the foundation soil which is assumed to have a friction angle of 35 degrees resulting in a factor of safety in the order of 1.3. On the other hand, the maximum height of the embankment above cohesive soils was approximately at station 380+00 where 9 feet of fill are proposed over the existing ground surface. The embankment foundation soils at Station 380+00 consist primarily of very stiff to hard cohesive soil underlain by loose to medium dense granular soil over rock. Based on the analysis at Station 404+36 and the similarity between the foundation soils at Station 380+00 (critical section along Ramp C-9 ft high) and Station 404+36, Ramp C embankment can be constructed utilizing 2H:1V slopes and using staged construction as discussed in Section 5.4.2.2.

On the other hand, based on the provided existing and proposed grade elevations, the embankment fill along Ramp D is anticipated to range between 7 and 51 feet in height. The encountered embankment foundation layers are characterized by stiff to

hard cohesive soil overlying medium dense to dense granular soil over rock. Based on the analysis at Station 404+36 and the similarity between the foundation soils at Station 404+95 (critical section along Ramp D-51 ft high) and Station 404+36, Ramp D embankment can be constructed utilizing 2H:1V slopes and using staged construction as discussed in Section 5.4.2.2.

5.4.5 Settlement – General Information

Embankment settlement is not considered to be a significant concern for most areas of the State Route 823 interchange intersection with Shumway Hollow Road. However, a 56.5-foot high embankment is to be constructed for State Route 823 main alignment within the interchange footprint area. In addition, embankments of 5 to 51 feet, 5 to 66 feet, 5 feet to 40 feet, and 7 to 51 feet in height are to be constructed for Ramps A, B, C, and D, respectively. The area of the embankments is characterized by relatively deep soft to medium stiff cohesive soils with relatively high moisture contents within the north area of the interchange and relatively thin medium dense to very dense granular soil over rock within the south area of the interchange. The critical sections were selected at Stations 404+36 (SCI 823 Mainline), 403+00 (Ramp A), 372+20 (Ramp B), 380+60 (Ramp C), and 404+95 (Ramp D). However, other locations indicated relatively higher embankment fills over thin hard native soil underlain by rock or over rock only such as Station 374+70 (Ramp B) and Station 376+60 (Ramp C). The foundation soils at these sections were not considered critical and hence the sections were not considered for further settlement analysis.

Settlement analyses were performed for the proposed embankments. Soil parameters used for the analyses were based on laboratory test results, visual examination of the preserved samples, hand penetrometer readings, and typical values. Settlement analysis calculations are presented in Appendix D.

If wick drains are used, it is recommended that the initial embankment construction consist of at least 2 to 3 feet of free-draining granular material placed over the entire fill foundation area. This material will serve to accelerate the time of consolidation of the embankment foundation soils and will provide a stable surface upon which normal fill operations can begin. Groundwater seepage, overexcavation, and removal of unsuitable soils should be anticipated within the embankment areas. Consequently, it may be necessary to utilize additional granular material or end-dumped rock in order to establish a dry and stable fill foundation.

5.4.6 Settlement – State Route 823 Bypass at Station 404+36

Settlement due to primary consolidation within the embankment foundation is expected to be approximately 25 inches. In addition, the time needed to reach 80 percent of primary consolidation is expected to take up to 394 months (32.8 years). However, this time period can be shortened to less than 120 days provided wick drains are installed as indicated in Section 5.4.9. It should be emphasized that these

time of consolidation estimates are based on the assumption that the initial embankment construction will consist of at least 2 to 3 feet of free-draining granular material placed over the entire fill foundation as previously discussed.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well-compacted fill, approximately 7 inches of settlement can be expected for a 56.5-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

5.4.7 Settlement – Proposed Ramps A/B

Settlement due to primary consolidation within the embankment foundation at Station 403+00 (Ramp A) is expected to be approximately 24 inches. In addition, the time needed to reach 80 percent of primary consolidation at this location is expected to take up to 394 months (32.8 years). However, this time period can be shortened to less than 120 days provided wick drains are installed as indicated in Section 5.4.9. It should be emphasized that these time of consolidation estimates are based on the assumption that the initial embankment construction will consist of at least 2 to 3 feet of free-draining granular material placed over the entire fill foundation as previously discussed.

Settlement due to primary consolidation within the embankment foundation at Station 372+20 (Ramp B) is expected to be approximately 8.4 inches. In addition, the time needed to reach 80 percent of primary consolidation at this location is expected to take up to 293 days (9.8 months). However, this time period can be shortened to less than 80 days provided wick drains are installed as indicated in Section 5.4.9. It should be emphasized that these time of consolidation estimates are based on the assumption that the initial embankment construction will consist of at least 2 to 3 feet of free-draining granular material placed over the entire fill foundation as previously discussed. On the other hand, approximately 1.7 inches of settlement is anticipated in the granular soil layer below the embankment foundation. The granular soil layer settlement is anticipated to be immediate before the end of the construction.

Settlement due to consolidation of the fill material itself was also considered. Assuming one percent consolidation for a well-compacted fill, approximately 6 and 8 inches of settlement can be expected for a 51-foot and 66-foot high embankments, along Ramps A and B, respectively. However, it is anticipated that much of this settlement will occur during construction.

5.4.8 Settlement – Proposed Ramps C/D

More than half the alignment length of Ramps C and D will be cut while the remaining length of the ramps will be fill with a height ranging between 5 feet and 51 feet. The foundation soil along the ramps alignment changes from relatively thin stiff to hard soils overlying medium dense to dense granular soil over rock at the north to thin medium dense to dense granular soil over rock at the south.

Settlement due to primary consolidation within the embankment foundation at Station 380+00 (Ramp C) is expected to be approximately 5.2 inches. In addition, the time needed to reach 80 percent of primary consolidation at this location is expected to take up to 563 days (18.8 months). However, this time period can be shortened to less than 95 days provided wick drains are installed as indicated in Section 5.4.9. It should be emphasized that these time of consolidation estimates are based on the assumption that the initial embankment construction will consist of at least 2 to 3 feet of free-draining granular material placed over the entire fill foundation as previously discussed. On the other hand, approximately 1 inch of settlement is anticipated in the granular soil layer below the embankment foundation. The granular soil layer settlement is anticipated to be immediate before the end of the construction.

Settlement due to primary consolidation within the embankment foundation at Station 404+00 (Ramp D) is expected to be approximately 24 inches. In addition, the time needed to reach 80 percent of primary consolidation at this location is expected to take up to 394 months (32.8 years). However, this time period can be shortened to less than 120 days provided wick drains are installed as indicated in Section 5.4.9. It should be emphasized that these time of consolidation estimates are based on the assumption that the initial embankment construction will consist of at least 2 to 3 feet of free-draining granular material placed over the entire fill foundation as previously discussed.

Settlement due to consolidation of the fill material itself was also considered. Assuming one percent consolidation for a well-compacted fill, approximately 5 and 7 inches of settlement can be expected for a 40-foot and 51-foot high embankments, along Ramps C and D, respectively. However, it is anticipated that much of this settlement will occur during construction.

5.4.9 Additional Settlement Recommendations

The most cost effective method for dealing with the potentially excessive settlement anticipated at the previously mentioned roadway sections would be to surcharge the embankment foundations prior to construction. Instrumentation should be installed to measure the rate/amount of settlement and normal fill operations should begin when an acceptable degree of consolidation is achieved. However, given the anticipated construction schedule, it will likely be necessary or desirable to either

reduce the amount of settlement in these areas or to accelerate the time of consolidation within the embankment foundation. One option that exists to reduce the amount of settlement would be to consider additional overexcavation and replacement of the existing soft and/or organic soils. However, given depth to which these soils were encountered and the high groundwater conditions encountered at the site, this option will likely not be practical or possible. Alternately, wick drains could be considered in order to accelerate the time of consolidation of the embankment foundation. Settlement calculations indicate that in order to achieve 80 percent of primary consolidation in approximately 120 days, wick drains would need to be installed in a triangular grid-like pattern at 3 foot center-to-center spacing. If wick drains are to be utilized in these areas, it is recommended that they be installed within and to 15 feet beyond the limits of the proposed roadway embankments. Additional recommendations for the wick drains and instrumentation are shown on the plans in Appendix E.

If wick drains are used, it is recommended that the initial embankment construction consist of at least 2 to 3 feet of free-draining granular material placed over the entire fill foundation area. This material will serve to accelerate the time of consolidation of the embankment foundation soils and will provide a stable surface upon which normal fill operations can begin. Groundwater seepage, overexcavation, and removal of unsuitable soils should be anticipated within the embankment areas. Consequently, it may be necessary to utilize additional granular material or end-dumped rock in order to establish a dry and stable fill foundation.

5.4.10 Rock/Soil Cuts

Rock cuts are anticipated along Shumway Hollow Roadway and along Ramp D only. Anticipated areas of rock cut are presented in Table 1. Rock cut slopes recommendations are presented in a separate submission.

Table 1 Areas of Anticipated Rock Cuts

Alignment	Locations
Shumway Hollow Road (TWP 234)	Sta. 10+90 to Sta. 26+50
SR 823 Ramp D	Sta. 385+00 to Sta. 387+00

Soil cuts are anticipated within the Shumway Hollow interchange area. Cuts in soil should be at 2H:1V slopes. The soil cuts are summarized in Table 2.

Table 2 Soil Cut Areas

Alignment	Locations
Shumway Hollow Road	Sta. 13+50 to 16+50 Sta. 17+00 to 26+00
SR 823 Ramp A	Sta. 385+50 to Sta. 387+00
SR 823 Ramp C	Sta. 367+00 to 373+00
SR 823 Ramp D	Sta. 388+00 to 396+00

The depths of cuts were generally between 20 and 45 feet but anticipated to be as deep as 60 feet. Two embankment heights were analyzed: 30 feet and 60 feet, and both with 2H:1V slopes. The calculated factors of safety are shown in Table 3.

Table 3 Soil Cut Analysis Results

Cut Height (ft)	FS	Condition
30	2.86	Undrained
30	1.25	Drained
60	1.50	Undrained
60	1.25	Drained

In all cases, the soil cuts should be sloped and/or benched in conformance with the ODOT Office of Geotechnical Engineering (OGE) recommendations as outlined in OGE Bulletin GB2 and as recommended in Section 5.5.5 of this report.

5.4.11 Instrumentation

Regardless of construction methods used to construct the embankments, instrumentation should be installed to monitor the condition of the new embankment fill and foundation during construction. It is recommended that the instrumentation include vibrating wire piezometers, settlement plates, and, if necessary, settlement points.

The purpose of the vibrating wire piezometers would be to monitor any excess pore pressures in the foundation soils. If at any time the excess pore pressure head is above the level of the new embankment fill, fill placement should stop until the excess pore pressures dissipate. Settlement plates should be installed to measure the actual consolidation of the foundation soils beneath the new embankment load. If the settlement plates indicate excessive settlement, fill placement should be stopped and the condition investigated. Settlement points could be installed in the embankment surface to measure horizontal and vertical movement of the embankment fill.

During construction it is recommended that the vibrating wire piezometers be read a minimum of two times each day during fill placement. More frequent readings

should be taken if excess pore pressures exist in the foundation soils. Settlement plates should also be read at least twice each day unless excessive settlements occur and additional readings are warranted. During the consolidation period, both the piezometers and settlement plates should be read at least once daily. Subsequent embankment stages should be constructed only if there are no excessive pore pressures in the foundation soils.

5.5 Construction Considerations

5.5.1 General

All work should be performed in accordance with ODOT CMS, dated January 1, 2005. Special care should be taken to ensure that specific items are followed to ensure that stable embankments are constructed. The following is a brief outline of items that should be considered.

5.5.2 New Embankment Construction

It is understood that a portion of the roadway will be constructed over areas that are heavily vegetated with grass, cattails, and dense shrubs. These areas should be drained prior to construction and any soft "muck" in the bottom removed prior to beginning the fill placement. Two feet of durable Type D riprap should be placed within any abandoned stream channels, if any, being relocated from underneath the embankment. If soil fill is placed above the riprap, geotextile fabric should be placed between the soil and the rock to separate the layers.

ODOT CMS Item 201 "Clearing and Grubbing" should be completed across the entire portion of the embankment construction. The foundation base of the embankment needs to be compacted to at least 95% of the Standard Proctor value as outlined in ODOT CMS section 203.05. Also, it is recommended that the foundation soils be proof rolled (ODOT Item 204.06) prior to placement of any embankment materials. Any soft, yielding areas should be undercut to firm material and replaced with controlled, engineered fill. If seeps are encountered, drains should be installed to prevent the fill from becoming saturated. If seepage is noted within areas where benching is needed, sand blanket or finger drains may be required to remove the accumulated water.

Locations of borrow areas are not known at this time. However, if glacial tills are utilized as the fill materials, any large durable cobbles or boulders greater than 8 inches in any dimension that cannot be broken down should be segregated and not be incorporated into the lift. In addition, any soil classified as silt (A-4b) should not be used as fill.

5.5.3 Subgrade Preparation

Silt (A-4b) and clay (A-7-5) were encountered at subgrade elevations at different individual borings. These soils should be undercut and replaced by controlled, engineered fill as outlined by ODOT CMS Item 204.07.

5.5.4 Rock Excavation

It is anticipated that rock excavation will be required for the interchange construction as indicated in Section 5.4.10. In addition, sandstone bedrock was encountered at the subgrade as indicated in Section 5.2. Due to the hardness of the rock and the length of the proposed alignment, blasting may be needed to excavate the rock. Rock encountered at these and any other locations at the subgrade elevation should be undercut and replaced by controlled, engineered fill as outlined by ODOT CMS Item 204.05.

5.5.5 Special Benching

The roadway cross-sections were analyzed in accordance with Ohio Department of Transportation's Office of Geotechnical Engineering Geotechnical Bulletin 2 (GB-2), released February 7, 2006. ODOT specifications require that any sidehill fill on an existing slope steeper than 8:1 should be benched according to the ODOT Construction and Material Specifications, Item 203.05 (2005). The ODOT Office of Geotechnical Engineering recommends special benching on existing slopes 4:1 or steeper. Special benching is used to improve the constructability and stability of the proposed embankment. Special benching is always shown on the cross-sections in the project plans and never on a typical cross-section. Whenever special benching is used, Plan Note G110 from the ODOT Location and Design Manual, Volume 3, needs to be included in the general notes.

Construction along the proposed alignment will consist of sidehill fills ranging from less than 2 feet to more than 60 feet. The existing slopes range from nearly flat to steeper than 3:1. In some cases, the existing ground surface is steeper than 4:1 and relatively thin, sliver fills will be placed. The bedrock and overburden interface is a common avenue for water during the wet winter months. If relatively thin fills will be placed in areas that will likely experience seepage and ground water infiltration from this interface, special benching and drainage is recommended.

All embankment fill should be placed in accordance with ODOT CMS Items 203.6: Spreading and Compacting and 203.7: Compaction and Moisture Requirements. The majority of the material to be excavated from the benching operation should be acceptable material for embankment fill. However, the material may have excessive moisture contents and may require moisture adjustments prior to compaction.

5.5.6 Drainage

Water seepage and final water levels were generally encountered at depths below 3.5 feet in the borings. Excavation for the new roadway is expected to be limited to 4 feet or less. Consequently, little if any seepage is anticipated for the roadway excavation. However, significant seepage could be encountered in deeper excavations, such as for culvert replacement. Consequently, the Contractor should be prepared to keep excavations reasonably dry, such as with sumping and pumping. The Contractor should also be prepared to deal with unexpected seepage and precipitation that enters any excavations.

5.6 Excavation and Groundwater Considerations

Excavations deeper than 4 feet must be laid back or braced to protect workers entering the excavations. All excavations should be constructed in accordance with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards (29 CFR Part 1926). Slopes or bracing for excavations 20 feet or more in depth must be designed by a registered professional engineer.

5.7 Geotechnical Design Lists

The geotechnical design checklists applicable to this report are included in Appendix F.

6.0 CLOSING REMARKS

You are encouraged to discuss with us any questions you may have concerning the findings, conclusions, and recommendations presented in this report. Please do not hesitate to call if we can be of further assistance.

Sincerely,

DLZ OHIO, INC.

Wael Alkasawneh, P.E.
Geotechnical Engineer

Pete Nix, P.E.
Geotechnical Division Manager

APPENDIX A

General Information - Drilling Procedures and Logs of Borings
Legend - Boring Log Terminology
Boring Location Plan
Boring Logs - 107 Borings

GENERAL INFORMATION
DRILLING PROCEDURES AND LOGS OF BORINGS

Drilling and sampling were conducted in accordance with procedures generally recognized and accepted as standardized methods of investigation of subsurface conditions concerning geotechnical engineering considerations. Borings were drilled with either a truck-mounted or ATV-mounted drill rig.

Drive split-barrel sampling was performed in 1.5 foot increments at intervals not exceeding 5 feet. In the event the sampler encountered resistance to penetration of 6 inches or less after 50 blows of the drop hammer, the sampling increment was discontinued. Standard penetration data were recorded and one or more representative samples were preserved from each sampling increment.

In borings where rock was cored, NXM or NQ size diamond coring tools were used.

In the laboratory all samples were visually classified by a geotechnical engineer. Moisture contents of representative fine-grained soil samples were determined. A limited number of samples, considered representative of foundation materials present, were selected for performance of grain-size analyses and plasticity characteristics tests. The results of these tests are shown on the boring logs.

The boring logs included in the Appendix have been prepared on the basis of the field record of drilling and sampling, and the results of the laboratory examination and testing of samples. Stratification lines on the boring logs indicating changes in soil stratigraphy represent depths of changes approximated by the driller, by sampling effort and recovery, and by laboratory test results. Actual depths to changes may differ somewhat from the estimated depths, or transitions may occur gradually and not be sharply defined. The boring logs presented in this report therefore contain both factual and interpretative information and are not an exact copy of the field log.

Although it is considered that the borings have disclosed information generally representative of site conditions, it should be expected that between borings conditions may occur which are not precisely represented by any one of the borings. Soil deposition processes and natural geologic forces are such that soil and rock types and conditions may change in short vertical intervals and horizontal distances.

Soil/rock samples will be stored at our laboratory for a period of six months. After this period of time, they will be discarded, unless notified to the contrary by the client.

LEGEND – BORING LOG TERMINOLOGY

Explanation of each column, progressing from left to right

1. Depth (in feet) – refers to distance below the ground surface.

2. Elevation (in feet) – is referenced to mean sea level, unless otherwise noted.

3. Standard Penetration (N) – the number of blows required to drive a 2-inch O.D., 1-3/8 inch I.D., split-barrel sampler, using a 140-pound hammer with a 30-inch free fall. The blows are recorded in 6-inch drive increments. Standard penetration resistance is determined from the total number of blows required for one foot of penetration by summing the second and third 6-inch increments of an 18-inch drive.

   50/n – indicates number of blows (50) to drive a split-barrel sampler a certain number of inches (n) other than the normal 6-inch increment.

4. The length of the sampler drive is indicated graphically by horizontal lines across the "Standard Penetration" and "Recovery" columns.

5. Sample recovery from each drive is indicated numerically in the column headed "Recovery".

6. The drive sample location is designated by the heavy vertical bar in the "Sample No., Drive" column.

7. The length of hydraulically pressed "Undisturbed" samples is indicated graphically by horizontal lines across the "Press" column.

8. Sample numbers are designated consecutively, increasing in depth.

9. Soil Description

   a. The following terms are used to describe the relative compactness and consistency of soils:

   Granular Soils – Compactness

Term	Blows/Foot Standard Penetration
Very Loose	0 – 4
Loose	4 – 10
Medium Dense	10 – 30
Dense	30 – 50
Very Dense	over 50

   Cohesive Soils – Consistency

Term	Unconfined Compression tons/sq.ft.	Blows/Foot Standard Penetration	Hand Manipulation
Very Soft	less than 0.25	below 2	Easily penetrated by fist
Soft	0.25 – 0.50	2 – 4	Easily penetrated by thumb
Medium Stiff	0.50 – 1.0	4 – 8	Penetrated by thumb with moderate pressure
Stiff	1.0 – 2.0	8 – 15	Readily indented by thumb but not penetrated
Very Stiff	2.0 – 4.0	15 – 30	Readily indented by thumb nail
Hard	over 4.0	over 30	Indented with difficulty by thumb nail

   b. Color – If a soil is a uniform color throughout, the term is single, modified by such adjective as light and dark. If the predominant color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled throughout the soil, the colors are modified by the term "mottled".

   c. Texture is based on the Ohio Department of Transportation Classification System. Soil particle size definitions are as follows:

Description		Size	Description		Size
Boulders		Larger than 8"	Sand	– Coarse	2.0 mm to 0.42 mm
Cobbles		8" to 3"		– Fine	0.42 mm to 0.074 mm
Gravel	– Coarse	3" to ¾"	Silt		0.074 mm to 0.005 mm
	– Fine	¾" to 2.0 mm	Clay		smaller than 0.005 mm

d. The main soil component is listed first. The minor components are listed in order of decreasing percentage of particle size.

e. Modifiers to main soil descriptions are indicated as a percentage by weight of particle sizes.

trace	0 to 10%
little	10 to 20%
some	20 to 35%
"and"	35 to 50%

f. Moisture content of **cohesionless soils** (sands and gravels) is described as follows:

Term	Relative Moisture or Appearance
Dry	No moisture present
Damp	Internal moisture, but none to little surface moisture
Moist	Free water on surface
Wet	Voids filled with free water

g. The moisture content of **cohesive soils** (silts and clays) is expressed relative to plastic properties.

Term	Relative Moisture or Appearance
Dry	Powdery
Damp	Moisture content slightly below plastic limit
Moist	Moisture content above plastic limit but below liquid limit
Wet	Moisture content above liquid limit

10. Rock Hardness and Rock Quality Designation

a. The following terms are used to describe the relative hardness of the **bedrock.**

Term	Description
Very Soft	Permits denting by moderate pressure of the fingers. Resembles hard soil but has rock structure. (Crushes under pressure of fingers and/or thumb)
Soft	Resists denting by fingers, but can be abraded and pierced to shallow depth by a pencil point. (Crushes under pressure of pressed hammer)
Medium Hard	Resists pencil point, but can be scratched with a knife blade. (Breaks easily under single hammer blow, but with crumbly edges.)
Hard	Can be deformed or broken by light to moderate hammer blows. (Breaks under one or two strong hammer blow, but with resistant sharp edges.)
Very Hard	Can be broken only by heavy and in some rocks repeated hammer blows.

b. Rock Quality Designation, RQD – This value is expressed in percent and is an indirect measure of rock soundness. It is obtained by summing the total length of all core pieces which are at least four inches long, and then dividing this sum by the total length of the core run.

11. Gradation – when tests are performed, the percentage of each particle size is listed in the appropriate column (defined in Item 9c).

12. When a test is performed to determine the natural moisture content, liquid limit moisture content, or plastic limit moisture content, the moisture content is indicated graphically.

13. The standard penetration (N) value in blows per foot is indicated graphically.

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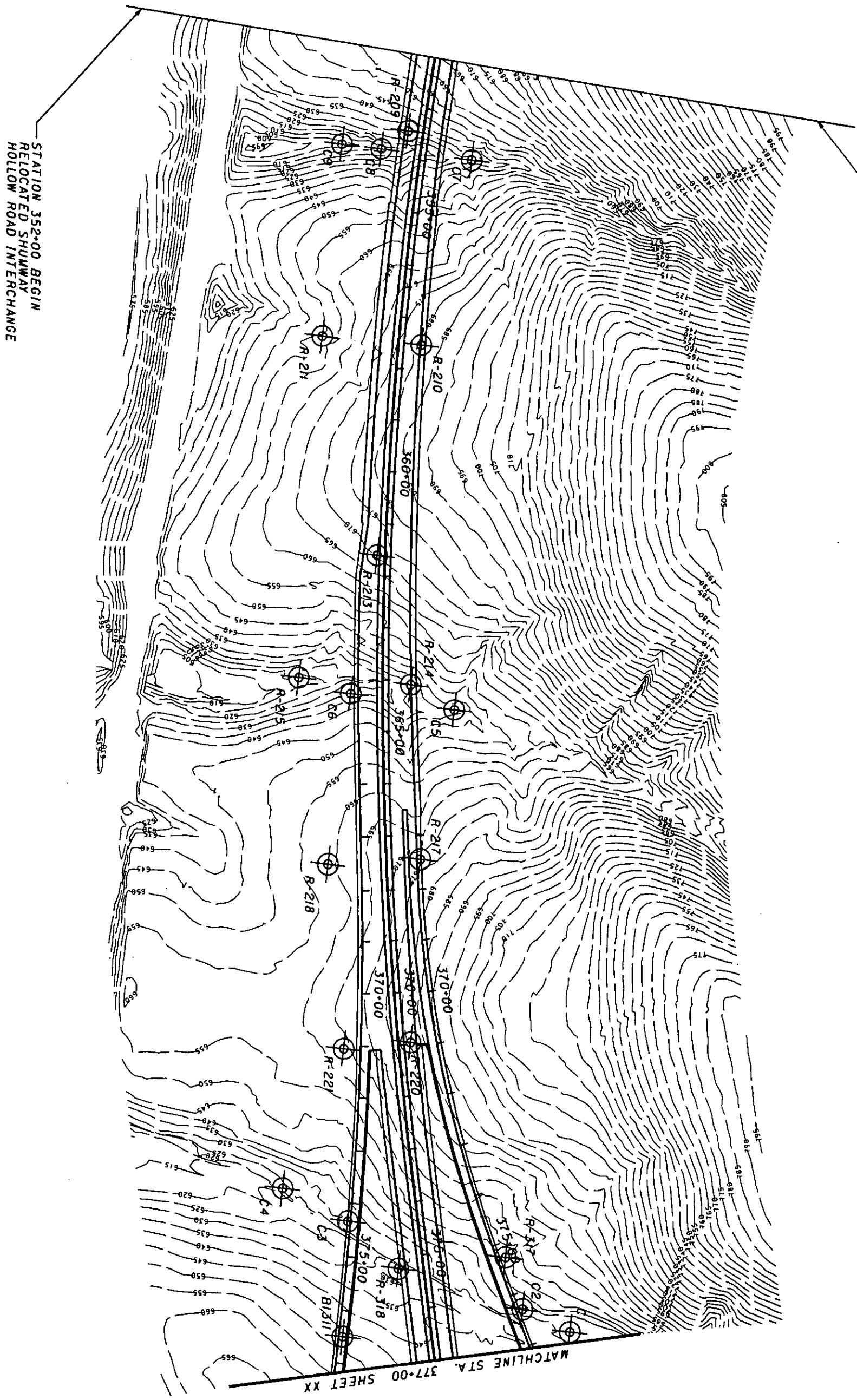

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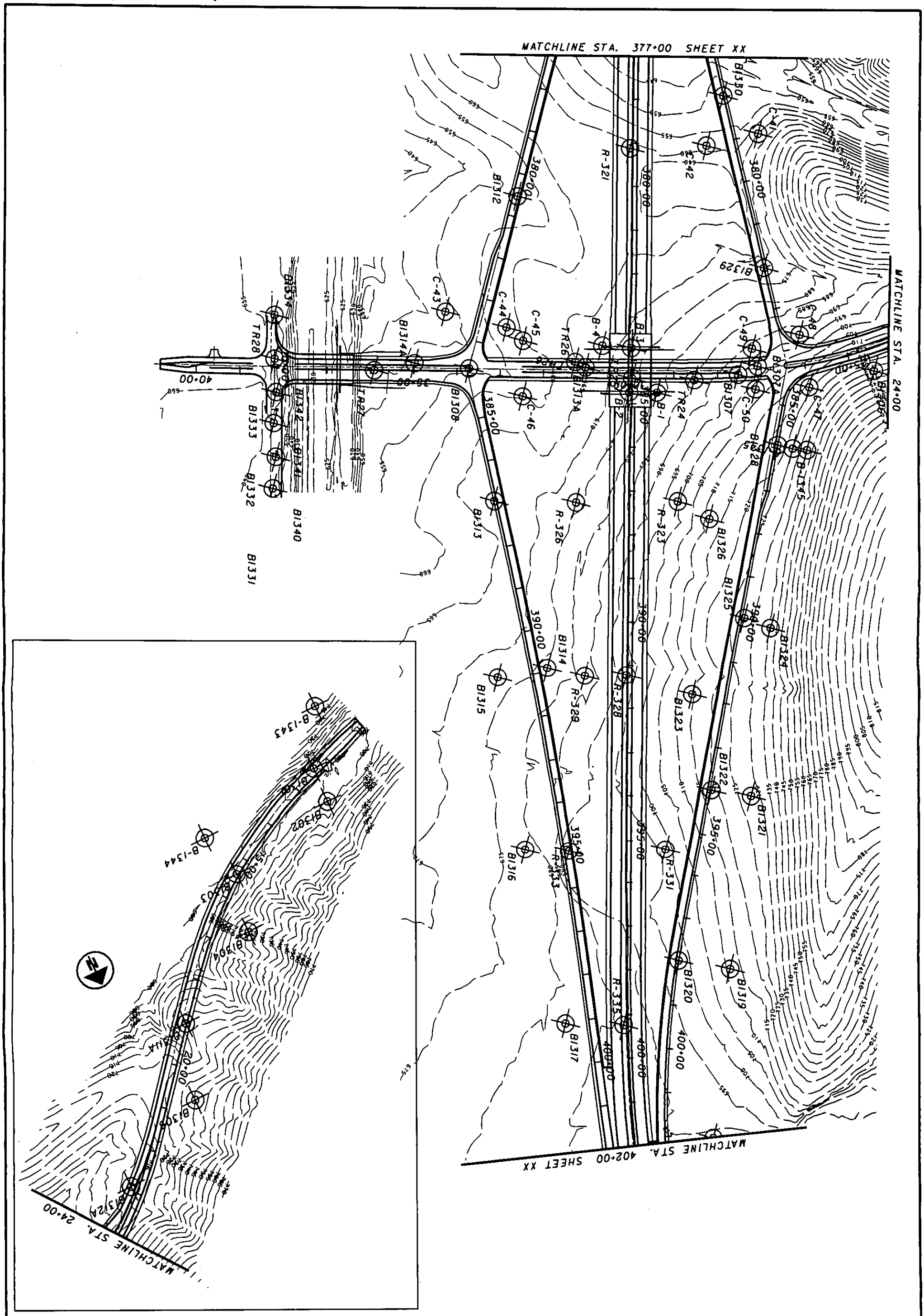

	2/3	SCI-823-6.81	BORING PLAN SR 823 STA. 377+00 TO STA. 402+00	DRAWN RLS CHECKED XXX	0 100 50 200 HORIZONTAL SCALE IN FEET

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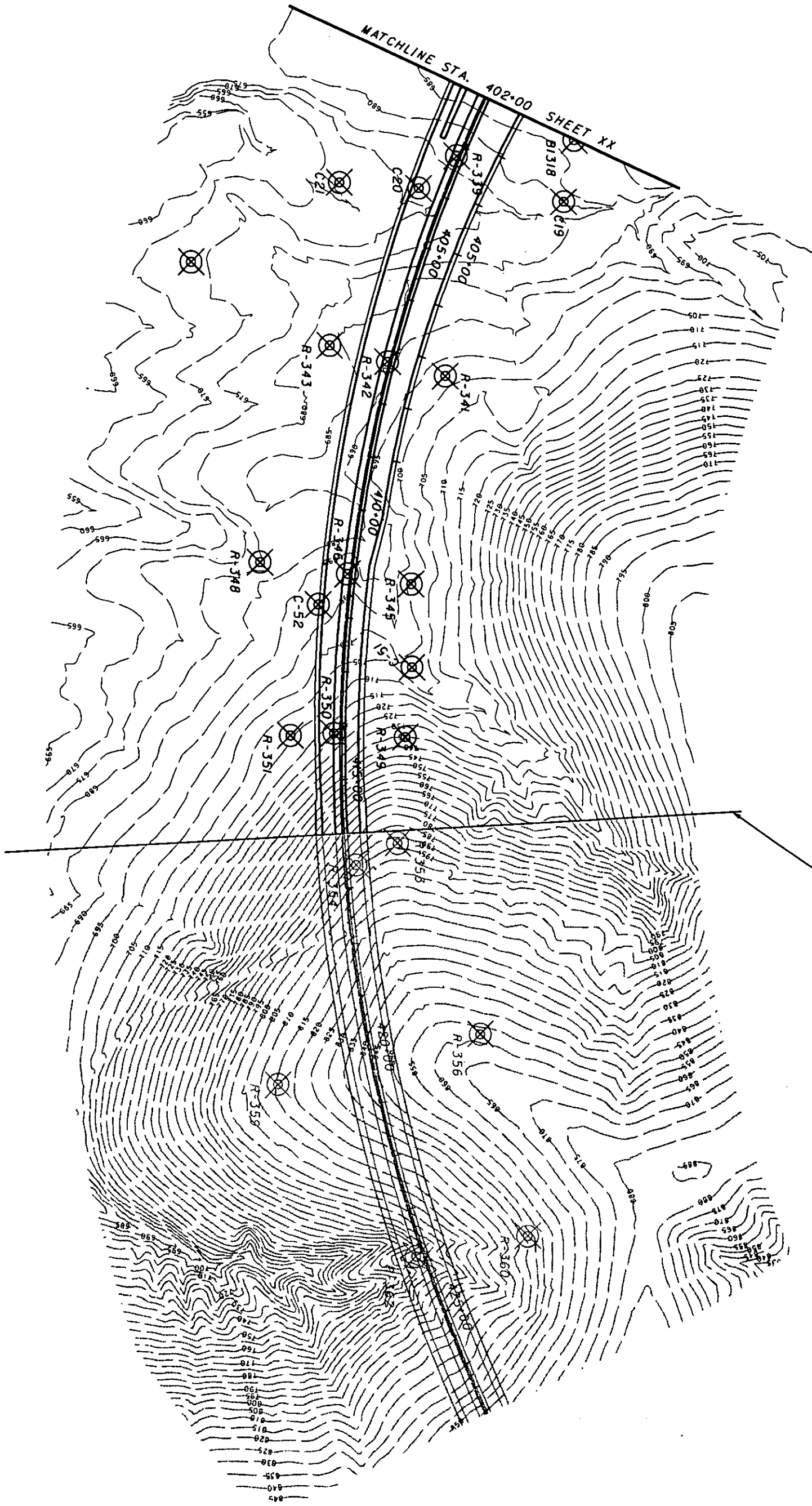

3/3	SCI-823-6.81	BORING PLAN SR 823 STA. 402+00 TO STA. 427+00	DRAWN RLS CHECKED XXX	0 100 50 200 HORIZONTAL SCALE IN FEET	

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

LOG OF: Boring B-1 | Location: Sta. 384+73.4, 61.7 ft. LT of SR 823 CL | Date Drilled: 06/13/06

WATER OBSERVATIONS: Water seepage at: 34.0' - 35.0'; Water level at completion: 31.0' (inside hollowstem augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	680.0												
0.4	679.6						Topsoil - 5"						
		5 7 11	12	1		2.5	Very stiff brown SILT (A-4b), trace to little clay, trace fine sand; damp.						
4.0	676.0	6 6 11	13	2		4.5+	Very stiff to hard brown CLAY (A-7-6), little to some silt, trace fine to coarse sand, trace gravel; moist.	2	0	--	1	30	67
5		3 4 6	16	3		2.0		5	0	--	0	4	91
					P-1	3.25		0	0	--	1	13	86
10		4 5 6	18	5		2.5							
					P-2	2.75		0	0	--	2	19	79
15		4 4 6	18	7		1.5	@ 16.0'-17.5', stiff.						
					P-3	2.5		0	0	--	1	24	75
20								0	0	--	1	21	78
21.5	658.5	5 9 10	16	9			Medium dense light brown COARSE AND FINE SAND (A-3a), little to some silty clay; dry to damp.						
		4 5 7	17	10				0	0	--	80	20	
25							@ 25.0', wet.						
		4 5 6	15	11									
28.5	651.5						@ 28.0', moist.						
		5 5		12			Loose to medium dense brown GRAVEL WITH SAND (A-1-b)						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢ LL
Blows per foot - ○
10 20 30 40

59
70
52
52
59
Non-Plastic

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

LOG OF: Boring B-1 | Location: Sta. 384+73.4, 61.7 ft. LT of SR 823 CL | Date Drilled: 06/13/06

WATER OBSERVATIONS: Water seepage at: 34.0' - 35.0'
Water level at completion: 31.0' (inside hollowstem augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	650.1	5	13				Loose to medium dense brown GRAVEL WITH SAND (A-1-b), trace silty clay; moist.						
		5											
35		6	14	13									
		5					@ 37.5', auger refusal.						
37.5	642.5						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic (halos), massived bedding, slightly fractured, contains few argillaceous laminations.						
40		Core 60"	Rec 54"	RQD 62%	R-1								
42.5	637.5						Bottom of Boring - 42.5'						
45													
50													
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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

LOG OF: Boring B-2 | Location: Sta. 384+73.7, 2.2 ft. RT of SR 823 CL | Date Drilled: 06/13/06 to 06/14/06

WATER OBSERVATIONS: Water seepage at: 26.0' - 30.0'
Water level at completion: 28.0' (prior to coring)
20.0' (inside hollowster augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	675.0												
0.3	674.7						Topsoil - 4"						
		3 4 5	15	1		3.5	Very stiff brown SILT AND CLAY (A-6a), trace fine sand; damp.						
3.0	672.0												
		6 7 8	14	2		3.5	Very stiff brown CLAY (A-7-6), little silt, trace fine to coarse sand, trace gravel; damp to moist.	2	1	--	3	11	83
5					P-1	4.0		1	0	--	0	14	85
8.5	666.5												
		3 4 6	17	4		2.75	Very stiff brown ELASTIC CLAY (A-7-5), trace fine to coarse sand, trace gravel; moist.	4	2	--	2	9	83
10													
11.0	664.0				P-2	2.75	Very stiff brown CLAY (A-7-6), little to some silt, trace fine to coarse sand, trace gravel; moist.	0	2	--	4	24	70
						2.50		5	1	--	2	12	80
		3 3 4	18	6		2.0							
15													
16.2	658.8	5 7 10	18	7			Loose to medium dense brown COARSE AND FINE SAND (A-3a), little silty clay; damp to wet.						
		5 7 7	17	8				0	0	--	85	15	
20		6 6 4	16	9									
		4 4 3	13	10									
25		6 4 4	15	11									
		6 13		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

60
67
61
52
Non-Plastic

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

LOG OF: Boring B-2 | Location: Sta. 384+73.7, 2.2 ft. RT of SR 823 CL | Date Drilled: 06/13/06 to 06/14/06

WATER OBSERVATIONS:
Water seepage at: 26.0' - 30.0'
Water level at completion: 28.0' (prior to coring)
20.0' (inside hollowster augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
30	645.1	11	15											
							@ 32.0', auger refusal.							
32.0	643.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, laminated to thinly bedded, moderately fractured.							
35		Core 60"	Rec 57"	RQD 52%	R-1		@ 32.0'-34.5', highly fractured.							
37.0	638.0						Bottom of Boring - 37.0'							
40														
45														
50														
55														

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

LOG OF: Boring B-3 | Location: Sta. 383+71.2, 1.7 ft. LT of SR 823 CL | Date Drilled: 06/14/06

WATER OBSERVATIONS:
Water seepage at: 23.0' - 28.0'
Water level at completion: 23.0' (prior to coring)
16.5' (inside hollowstem augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	672.3												
0.4	671.9	6 6 10	13	1		2.5	Topsoil - 5" Very stiff brown SANDY SILT (A-4a), "and" clay, trace gravel; damp.						
4.5	667.8	8 12 11	14	2		4.0		2	5	--	9	48	36
5		5 7 10	10	3		3.5	Stiff to very stiff brown CLAY (A-7-6), trace fine to coarse sand; damp to moist.	0	1	--	2	11	86
					P-1	1.75		0	0	--	1	9	90
10					P-2	2.25		0	0	--	3	26	71
14.0	658.3	4 6 8	16	6									
15		7 8 9	18	7			Medium dense to dense brown COARSE AND FINE SAND (A-3a), little silty clay, trace coarse sand; damp to moist.	0	1	--	80	19	
		6 7 7	16	8									
20		9 12 18	16	9									
		6 6 6	15	10									
25		2 3 1	12	11									
		8 21		12			@ 30.0', auger refusal.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

63
60
Non-Plastic

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

LOG OF: Boring B-3 | Location: Sta. 383+71.2, 1.7 ft. LT of SR 823 CL | Date Drilled: 06/14/06

WATER OBSERVATIONS:
Water seepage at: 23.0' - 28.0'
Water level at completion: 23.0' (prior to coring)
16.5' (inside hollowstem augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	642.5	50/2	12											Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40 50+
30.0	642.3	Core 60"	Rec 56"	RQD 63%	R-1		Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, laminated to thinly bedded, moderately fractured.							
35.0	637.3						Bottom of Boring - 35.0'							
40														
45														
50														
55														

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DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-4 | Location: Sta. 383+66.6, 64.9 ft. RT of SR 823 CL | Date Drilled: 06/14/06

WATER OBSERVATIONS:
Water seepage at: 18.0' - 24.0'
Water level at completion: 22.5' (prior to coring)
15.0' (inside hollowstem augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	668.7												
0.3	668.4						Topsoil - 4"						
		5 7 8	12	1		2.5	Very stiff to hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.						
		9 14 15	17	2		4.5+		3	6	--	8	44	39
5.0	663.7						Hard brown CLAY (A-7-6), some silt, trace fine to coarse sand, trace gravel; moist.						
		6 7 9	15	3		4.5+		3	2	--	4	27	64
7.5	661.2												
8.2	660.5						Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.	2	5	--	8	43	42
					P-1	2.25		0	8	--	89	3	
10							Medium dense brown FINE SAND (A-3), trace silty clay; damp.						
		4 6 5	16	5									
13.5	655.2												
		4 5 4	18	6			Loose to medium dense brown COARSE AND FINE SAND (A-3a), little silty clay; moist to wet.	0	0	--	83	17	
15													
		3 4 3	14	7									
		4 6 7	12	8									
20													
		3 3 3	17	9									
22.5	646.2												
		4 8 21	18	10			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), little to some silt; moist.						
25													
25.5	643.2						@ 25.5', auger refusal.						
		Core 60"	Rec 52"	RQD 62%	R-1		Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, laminated to thinly bedded, moderately fractured.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring B-4 | Location: Sta. 383+66.6, 64.9 ft. RT of SR 823 CL | Date Drilled: 06/14/06

WATER OBSERVATIONS:
Water seepage at: 18.0' - 24.0'
Water level at completion: 22.5' (prior to coring)
15.0' (inside hollowstem augers, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	638.9													
30.5	638.2						Bottom of Boring - 30.5'							
35														
40														
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1301 | Location: Sta. 12+37.8, 2.4 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 1/26/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: 6.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
^	699.5												
0.3	699.2						Asphalt Concrete Pavement - 3"						
		11 10 8 7	18	1		4.5+	Hard brown SILT (A-4b), some fine to coarse sand, trace gravel; damp.	2	14	--	14	51	19
2.5	697.0	4 6 9 10	20	2		4.5+	Hard brown SANDY SILT (A-4a), "and" fine to coarse sand, trace gravel; contains sandstone fragments; damp.	9	28	--	13	31	19
4.5	695.0	23 50/3	9	3			Severely weathered brown SANDSTONE fragments.						
5.5	694.0	Core 60"	Rec 47"	RQD 12%	R-1	*412	Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured to broken. @ 7.1', 9.1', 9.4', low angle fractures. @ 6.6'-7.5',7.6'-7.7',8.0'-8.7', broken zones.						
10.5	689.0						Bottom of Boring - 10.5'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring B-1302 | Location: Sta. 12+70.7, 73.6 ft. LT of Rel Shumway Hollow CL | Date Drilled: 10/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
31.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - PL — LL; Blows per foot - 10 20 30 40
0.1	704.2 / 704.1						Topsoil - 1"							
		8 5 6	15	1		3.0	Very stiff brown SANDY SILT (A-4a), little fine to coarse sand, trace gravel; damp.							
		9 8 9	16	2		4.0	@ 3.5'-5.0', contains rust stains.							
5														
6.0	698.2	13 15 50/5	17	3A 3B		3.5	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; contains rock fragments; damp.							50+"
7.0	697.2	50/2	2	4			Severely weathered brown and gray SANDSTONE fragments.							50+"
10.0	694.2	Core 78"	Rec 78"	RQD 74%	R-1	*553	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, massively bedded, slightly to moderately fractured. @ 10.0'-10.7', broken and discolored; moderately to highly weathered. @ 12.5'-12.6', argillaceous bands.							
15														
20		Core 120"	Rec 120"	RQD 100%	R-2	*513								
25														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring B-1302 | Location: Sta. 12+70.7, 73.6 ft. LT of Rel Shumway Hollow CL | Date Drilled: 10/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
31.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
30	674.4	Core 120"	Rec 120"	RQD 100%	R-3	*762	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massively bedded, unfractured to slightly fractured. @ 31.7'-39.3', pyritic.							
35														
40		Core 120"	Rec 120"	RQD 100%	R-4	*485	@ 40.0'-50.0', trace pyritic.							
45														
50		Core 120"	Rec 120"	RQD 100%	R-5	*334								
55														
		Core 42"	Rec 42"	RQD 100%	R-6	*473								

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1302 | Location: Sta. 12+70.7, 73.6 ft. LT of Rel Shumway Hollow CL | Date Drilled: 10/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
31.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
60.0	644.5 644.2						Bottom of Boring - 60.0'							

65
70
75
80
85

FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1303 | Location: Sta. 15+40.1, 6.5 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 10/05/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.6' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	687.5 / 687.3	4 5 7 8	20	1		--	Topsoil - 2" Hard brown SANDY SILT (A-4a), some gravel; contains rock fragments; damp.	18	17	--	19	35	11
		14 18 18 20	18	2		--	@ 0.2'-2.0', stiff.	20	18	--	14	35	13
5		5 6 31 50/5	23	3		--							
6.0	681.5	50/4	2	4			Severely weathered gray SANDSTONE fragments, argillaceous.						
7.0	680.5						Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, massively bedded, moderately to highly fractured.						
10		Core 96"	Rec 96"	RQD 66%	R-1	*386	@ 7.0'-9.0', rust stained. @ 7.9', 8.0', 9.1', 9.6', 9.7', 9.8', 10.0', low angle, rust stained fractures. @ 10.0', slightly to moderately fractured. @ 12.1', 12.3', 12.5', low angle fractures. @ 13.0' to 13.1', shale lamination.						
15.0	672.5						Bottom of Boring - 15.0'						
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/25/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1304 | Location: Sta. 16+53.4, 87.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 10/05/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (Prior to coring); 12.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	720.5													
0.3	720.2						Topsoil - 4"							
		13 15 16	18	1		4.5+	Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace to little gravel; contains rock fragments; damp.							
		12 18 20	18	2		4.5+								
5		10 23 28	18	3		4.5+								51
		22 28 36	18	4		4.5+								
10		12 23 26	18	5		3.5								64
		13 20 34	18	6		4.5								
15		28 50/3	9	7		4.5	@ 16.0'-16.8', contains rust stains.							54
18.5	702.0	45 50/3	2	8			Gray SANDSTONE fragments							50+
20		50/2	2	9										50+
22.0	698.5													50+
		Core 108"	Rec 108"	RQD 66%	R-1	*400	Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, medium bedded to thickly bedded, highly fractured, fractures along bedding planes with infilling of clayey silt.							
25							@ 25.8'-26.5', discoloration and highly fractured.							
							@ 29.0', becomes slightly fractured.							

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1304 | Location: Sta. 16+53.4, 87.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 10/05/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
12.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	690.7												
30							Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly to moderately fractured.						
35		Core 120"	Rec 120"	RQD 96%	R-2	*459							
40		Core 48"	Rec 48"	RQD 100%	R-3	*434	@ 42.3', high angle fracture.						
45.0	675.5						Bottom of Boring - 45.0'						
50													
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 (11/28/2006 1:25 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1305 | Location: Sta. 20+64.9, 72.0 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 10/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.2' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	735.0												
0.3	734.7						Topsoil - 4"						
		10 13 14	18	1		4.5+	Hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp.						
		11 16 23	18	2		4.5+							
5													
6.0	729.0	11 13 18	14	3		4.5+	Hard brown CLAY (A-7-6), some fine to coarse sand, trace gravel; damp.	2	13	--	22	26	37
		9 11 16	18	4		4.0							
10													
11.0	724.0	8 12 15	18	5		3.0	Very stiff brown SANDY SILT (A-4a), some fine to coarse sand, little gravel; damp to moist.						
13.5	721.5	8 10 8	18	6		3.25	Very stiff brown CLAY (A-7-6), little fine to coarse sand, trace gravel; contains interbedded sand seams; moist.						
15													
16.0	719.0	6 11 16	18	7		--	Hard brown SANDY SILT (A-4a), some fine to coarse sand, trace gravel; damp.						
		12 12 20	18	8		--	@ 18.5'-20.0', "and" fine sand.	2	13	--	46	21	18
20													
		5 14 31	18	9		4.0							
		16 23 29	18	10		4.25							
25													
		10 15 44	18	11		4.5+							
		21 30		12		4.5+							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

52
59

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1305 | Location: Sta. 20+64.9, 72.0 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 10/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.2' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	705.2	35	18										
30.0	705.0						Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains rock fragments; damp.						
		50/5	5	13		4.5+							
35													
37.5	697.5						Hard gray SANDSTONE; fine grained, slightly to moderately weathered, micaceous, medium bedded to thinly bedded, moderately fractured, few argillaceous laminations. @ 37.9', 38.1', 38.2', 38.4', 38.7', 38.8', 39.1', 41.3', 41.7', 43.2', 44.1', 50.2', and 50.3', low angle fractures. @ 38.0' to 38.9', 43.6' to 45.1', highly weathered, rust stained.						
40		Core 108"	Rec 108"	RQD 84%	R-1	*329							
45							@ 47.0', 48.0', 48.1', 50.2', 50.3', low angle fractures.						
50		Core 102"	Rec 102"	RQD 96%	R-2	*302	@ 51.6'-51.7', contains medium grained sand. @ 51.7', pyritic.						
55.0	680.0						Bottom of Boring - 55.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
65
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1306 | Location: Sta. 24+54.9, 58.5 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 10/06/2005 to 10/07/2005

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
19.8' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
0	734.0													
0.3	733.7						Topsoil - 4" / 12" soil removed before drilling							
2.0	732.0	28 26 45	18	1		4.5+	Hard brown SANDY SILT (A-4a), little fine to coarse sand, trace gravel; damp.							○ 71
		25 42 50/5	17	2			Grayish brown SANDSTONE fragments with brown SANDY SILT (A-4a).							○ 50+
5		25 50/4	9	3										○ 50+
9.0	725.0	50/3	3	4										○ 50+
10		Core 84"	Rec 84"	RQD 67%	R-1	*348	Hard to very hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, medium bedded, moderately fractured. @ 9.5', 12.8', low angle, iron stained fractures. @ 11.5'-11.7', 14.4'-15.3', 15.7'-16.1', high angle, iron stained fractures.							
15														
16.1	717.9						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, laminated to medium bedded, highly fractured, contains few to moderate argillaceous laminations. @ 16.8'-16.9', 19.0'-19.2', high angle fractures.							
20		Core 120"	Rec 120"	RQD 67%	R-2	*407	@ 21.8'-30.0', contains abundant argillaceous laminations. @ 23.0'-23.1', 23.2'-23.5', high angle fractures. @ 23.7'-24.7', 26.9'-27.6', very hard, whitish gray, fine to coarse grained, calcareous.							
25							@ 27.9', 28.0', 28.3', 28.4', 28.7', 29.1', 29.5', 29.7', low angle fractures.							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring B-1306 | Location: Sta. 24+54.9, 58.5 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 10/06/2005 to 10/07/2005

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
19.8' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	704.2	Core 120"	Rec 120"	RQD 88%	R-3	*452	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, contains few argillaceous laminations.							
35							@ 32.2', 35.3', 37.0', 40.5', 41.1', 41.2', 41.3', 43.9', low angle fractures.							
40		Core 120"	Rec 120"	RQD 92%	R-4	*347	@ 40.0'-40.4', high angle fracture. @ 40.6', becomes pyritic.							
45														
50		Core 108"	Rec 108"	RQD 100%	R-5	*548								
55.0	679.0						Bottom of Boring - 55.0'							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring B-1307 | Location: Sta. 27+52.9, 10.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 08/18/05

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported — DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	695.5												
0.7	694.8	7 6 7 7	10	1		4.5+	Topsoil - 8" Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.						
		3 5 4 5	9	2		4.5+							
5													
6.0	689.5	2 3 5	8	3		2.5	Stiff to very stiff brown CLAY (A-7-6), trace to little fine sand; damp to moist.						
		2 2 5	9	4		2.5							
10		2 4 5	9	5		2.25							
		2 5 6	16	6		2.75							
15		3 2 3	18	7		2.5							
					P1								
20		5 7 8	10	9		1.75	@ 21.0', becomes gray.	0	0	--	0	13	87
		4 7 9	9	10		2.0		0	0	--	0	12	88
25		4 6 5	6	11		1.25		0	0	--	1	21	78
		3 5		12		1.0							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

60
57
54

FILE: 0121-3070-03 [11/26/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1307 | Location: Sta. 27+52.9, 10.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 08/18/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	665.6	5	10				Very stiff brown CLAY (A-7-6), little fine sand; damp.						
30													
		8 8 9	7	13		4.0							
35													
		5 5 17	12	14		2.25	@ 40.0', 1/2" thick gravel seam.						
40													
42.0	653.5						Stiff gray SILT AND CLAY (A-6a), little fine to coarse sand; moist.						
		5 4 5	10	15		1.5							
45													
47.0	648.5						Stiff gray SILTY CLAY (A-6b), little fine to coarse sand; moist.						
		20 23 20	10	16A 16B		1.0							
49.5	646.0						Dense brown SANDY SILT (A-4a), some fine to coarse sand, little gravel; moist.						
50													
51.0	644.5	50/2	1	17		--	Hard gray SILTY CLAY (A-6b), some fine to coarse sand, trace gravel; moist.						
52.0	643.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous , massively bedded, unfractured.						
55		Core 82"	Rec 70"	RQD 82%	R-1	*510							
58.8	636.7						Bottom of Boring - 58.8'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+"

FILE: 0121-3070-03 | 11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1307A | Location: 27+08.1, 4.9 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 07/21/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	696.6												
0.5	696.1						Topsoil - 6"						
		5 8 17	16	1		--	Medium dense reddish brown SILT AND CLAY (A-6a), little to some gravel, trace clay; contains decomposed sandstone fragments; damp.						
		8 12 15	14	2		--	@ 3.0', little clay, little gravel.	5	11	--	7	47	30
5													
6.0	690.6	3 4 6	12	3		2.75	Very stiff mottled red and brown SILTY CLAY (A-6b), trace fine sand; damp.						
8.5	688.1	4 6 7	18	4		2.0	Stiff to very stiff brown CLAY (A-7-6) (Varved), trace to little silt, trace fine sand; damp to moist.						
10					P-1								
					P-2								
15													
17.0	679.6	3 6 8	18	5A 5B		1.25 0.75	Medium stiff gray CLAY (A-7-6) (Varved), trace to little silt, trace fine sand; moist.						
					P-3								
20		2 3 3 6	24	6		0.75		0	0	--	0	8	92
		2 4 6 7		7		0.5	@ 21.5', encountered 1/4" gray silt seam. @ 22.0', soft to medium stiff.	0	0	--	0	12	88
25		2 3 3 4	24	8		0.5		0	0	--	1	12	87
		4 4 5 6	24	9		0.5	@ 26.0', brownish-gray.	0	0	--	0	20	80
		2 5 7		10A 10B		0.5 1.5	@ 28.5', little gravel. @ 29.0', Stiff, brown.						
30.0	666.6												

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

57
60
58

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1307A | Location: 27+08.1, 4.9 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 07/21/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - PL — LL; Blows per foot - 10 20 30 40
30	666.8	11	24				Bottom of Boring - 30.0'							
35														
40														
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

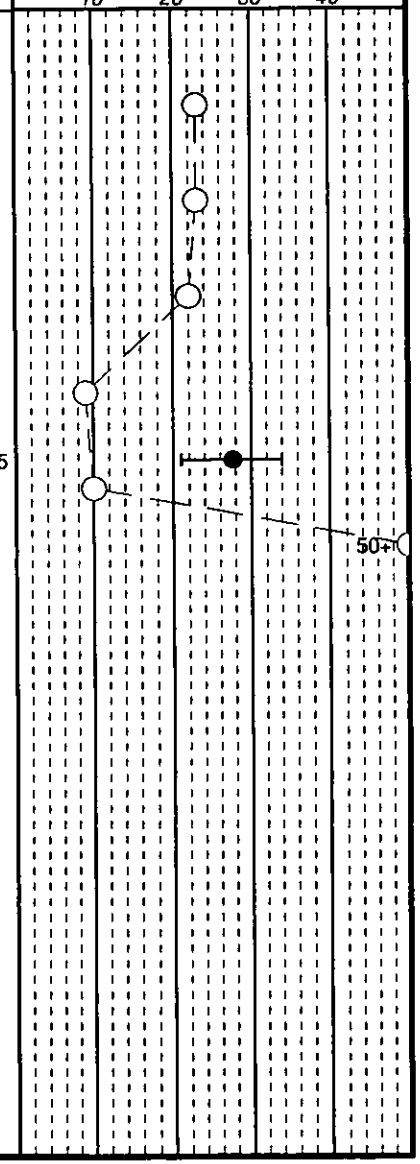
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1308 | Location: Sta. 33+72.3, 1.1 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 08/24/05 to 08/25/05

WATER OBSERVATIONS: Water seepage at: 7.0'; Water level at completion: 5.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	654.9												
0.2	654.7						Topsoil - 2"						
		6 10 13	4	1		--	Very stiff brown SANDY SILT (A-4a), little fine to coarse sand; contains roots; damp.						
3.5	651.4												
		6 11 12	12	2			Medium dense brown COARSE AND FINE SAND (A-3a), little to some silt; moist.						
5													
		7 10 12	14	3									
8.5	646.4												
		3 4 5	16	4		1.5	Medium stiff to stiff brown and gray SILT AND CLAY (A-6a), trace to little fine to coarse sand; moist.						
10													
		1 2 8		5		0.5		0	1	--	3	51	45
12.5	642.4												
		50/4	4	6			Very dense gray COARSE AND FINE SAND (A-3a), little silt, little gravel; contains sandstone fragments; wet.						
14.5	640.4												
15		Core 66"	Rec 66"	RQD 86%	R-1	*319	Hard gray SANDSTONE ; very fine to fine grained, slightly weathered, argillaceous, micaceous, massively bedded, unfractured.						
20.0	634.9						Bottom of Boring - 20.0'						
25													

STANDARD PENETRATION (N) — Natural Moisture Content, % - ● — PL ⊢—⊣ LL — Blows per foot - ○ — 10 20 30 40



FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1311 | Location: Sta. 376+49.6, 7.8 ft. LT of TR 234 Ramp B BL | Date Drilled: 08/11/05

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	646.5												
0.3	646.2						Topsoil - 6"						
		2 2 2	16	1		1.25	Medium stiff to stiff brown SANDY SILT (A-4a), trace gravel; damp to moist.						
		10 50/4		2		1.0							
5													
6.0	640.5	50/3	3	3			Very dense brown COARSE AND FINE SAND (A-3a), trace gravel; damp.						
8.7	637.8	50/2	0	4			Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 9.1', 9.6', low angle fractures.						
10		Core 64"	Rec 57"	RQD 78%	R-1	*392	@ 11.8'-13.3', lost recovery.						
14.0	632.5						Bottom of Boring - 14.0'						
15													
20													
25													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

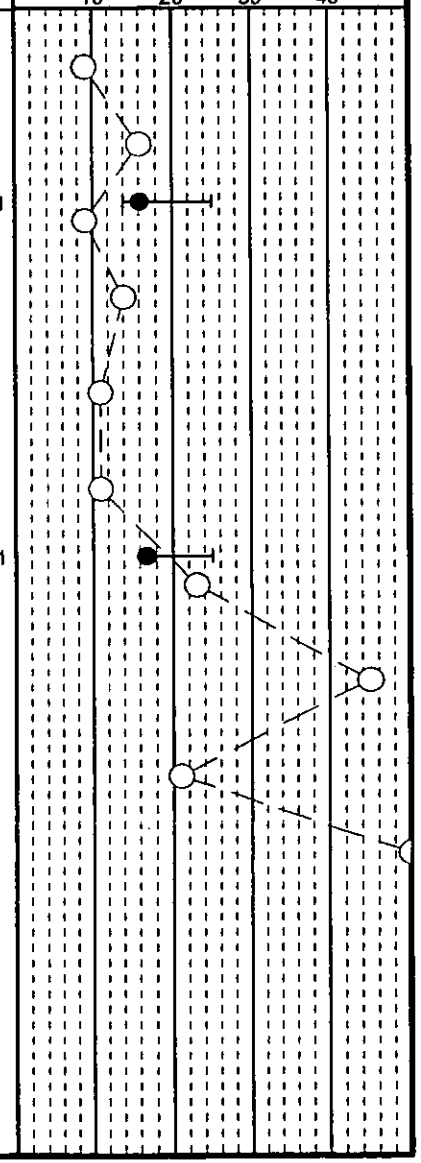
LOG OF: Boring B-1311A | Location: Sta. 19+01.9, 9.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 07/21/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring), 4.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	718.1												
0.3	717.8	1 4 5 7	13	1		4.5+	Topsoil - 3"						
2.0	716.1	4 7 9 10	18	2		--	Hard brown SILT AND CLAY (A-6a), trace fine sand; contains organic material; damp.						
4.0	714.1	2 4 5 9	20	3		2.0	Medium dense brown SANDY SILT (A-4a), trace to little clay; damp. @ 3.5'; encountered organic debris.						
5		4 5 9 12	24	4A		2.0	Stiff to very stiff mottled brown and gray SILT AND CLAY (A-6a) (Varved, very thin alternating silt/sand/clay layers), little fine sand; damp to moist.	0	0	--	17	52	31
10		3 5 6	18	4		2.0							
11.0	707.1	3 5 6	18	5		2.0	Stiff brown SILT AND CLAY (A-6a), trace fine sand; damp.						
13.5	704.6	7 10 13	18	6		4.0	Medium dense brown SILT (A-4b), some clay, trace fine sand; contains sandstone fragments; damp.	0	1	--	9	59	31
15		12 21 24	13	7		--							
20		6 10 11	16	8		4.5+	@ 18.5'-20.0', Encountered organic material.						
21.0	697.1	40 50/3	6	9		--	Very dense brown GRAVEL WITH SAND (A-1-b); contains sandstone fragments; damp.						
		50/3		10		--							
24.0	694.1						Hard yellowish brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, highly fractured to moderately fractured, exhibits cross bedding.						
25													
28.0	690.1	Core 120"	Rec 117"	RQD 64%	R-1		Medium hard to hard gray SANDSTONE; fine to very fine grained, argillaceous, micaceous, massive, moderately						

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1311A | Location: Sta. 19+01.9, 9.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 07/21/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
30	688.3						fractured, contains clay filled fractures. @ 29.2' -29.3', 31.0'-31.2', 32.7'-32.8', 33.8'-34.0', 31.4'-31.8', shaley zones. @ 32.0', low angle fractures. @ 33.6'-33.8', possible core loss.							
34.0	684.1						Bottom of Boring - 34.0'							
35														
40														
45														
50														
55														

PL ⊢——⊣ LL

10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1312 | Location: STa. 380+53.0, 10.8 ft. LT of TR 234 Ramp B BL | Date Drilled: 08/12/05

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	651.4												
0.5	650.9						Topsoil - 6"						
		1 2 3	10	1		1.25	Stiff brown SANDY SILT (A-4a), some fine to coarse sand, trace gravel; damp to moist.	0	3	--	27	42	28
							@ 3.5'-5.0', hard.						
		3 4 8	16	2		4.5+							
5													
6.0	645.4												
		4 8 8	8	3		3.25	Very stiff gray SILTY CLAY (A-6b), little fine sand; damp.						
8.5	642.9	50/4	3	4			Gray SANDSTONE fragments.						
10.0	641.4						@ 9.5'-9.6', 11.0'-11.1', argillaceous bands with fractures.						
		Core 66"	Rec 66"	RQD 74%	R-1	*428	Very hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, thickly bedded, slightly fractured. @ 10.6', 11.4', 11.5', low angle fractures.						
15													
15.5	635.9						Bottom of Boring - 15.5'						
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

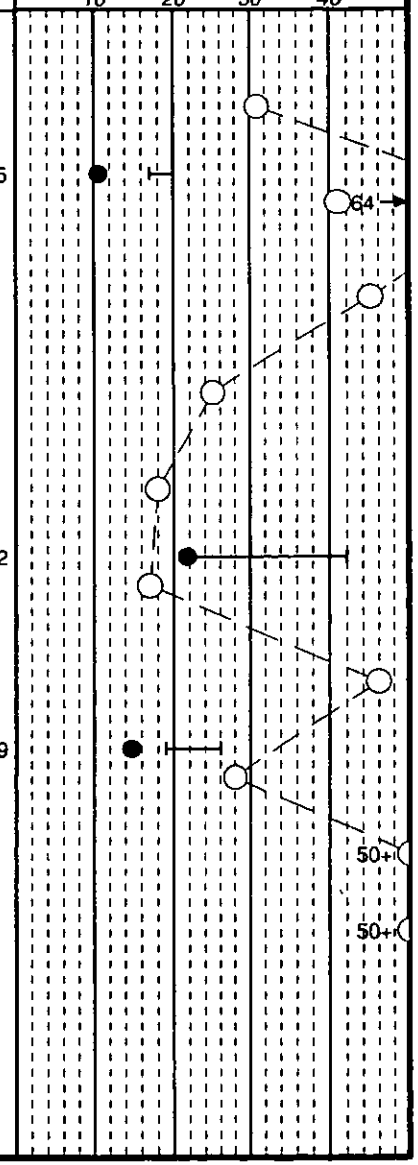
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1312A | Location: Sta. 22+91.1, 12.3 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 07/20/06 to 07/21/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	714.0												
0.3	713.7						Topsoil - 4"						
		8 11 20	15	1		--	Medium dense to dense brown SILT (A-4b), little gravel, trace clay; contains decomposed sandstone fragments; damp. @ 3.0', little clay.						
5		17 28 36	16	2		--		5	13	--	15	52	15
		9 21 24	17	3		--	@ 8.0'; medium dense, reddish-brown, damp-moist.						
10		4 13 12	14	4		--	@ 10.5'; little to some clay.						
		10 7 11	5	5		--							
13.0	701.0												
15		4 5 12	15	6		3.25	Very stiff mottled light brown and gray CLAY (A-7-6), trace fine sand; damp.	0	0	--	1	37	62
		6 15 31	18	7		4.0	@ 16.5'; little gravel, encountered 0.3" gray silt seams.						
18.0	696.0												
20		9 14 14	16	8		--	Medium dense to dense mottled light brown and gray SILT (A-4b), little fine sand, little clay, little gravel; damp. @ 20.5'; trace fine to coarse sand, trace gravel.	2	6	--	9	64	19
21.5	692.5	27 50/3	9	9A 9B		--	Brown decomposed SANDSTONE.						
23.5	690.5	50/0	0	10			Hard to very hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, siliceous, argillaceous, massive, moderately to highly fractured. @ 25.4'-26.7', possible core loss or broken zone. @ 26.7'-33.7', slightly fractured. @ 27.4', gray. @ 30.0', low angle fracture.						
25		Core 120"	Rec 105"	RQD 47%	R-1								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1312A | Location: Sta. 22+91.1, 12.3 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 07/20/06 to 07/21/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % ● PL — LL Blows per foot ○ 10 20 30 40
30	684.1						Hard to very hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, siliceous, argillaceous, massive, moderately to highly fractured.							
33.7	680.3						Bottom of Boring - 33.7'							
35														
40														
45														
50														
55														

FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1313 | Location: Sta. 386+92.6, 5.0 ft. RT of TR 234 Ramp A BL | Date Drilled: 08/25/05

WATER OBSERVATIONS: Water seepage at: 14.0'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	667.1												
0.3	666.8	4 7 9 12	9	1		--	Topsoil - 3"						
2.0	665.1	12 12 17 24	17	2			Very stiff brown SILT (A-4b), little fine to coarse sand, trace clay; damp.	1	4	--	14	52	29
5		6 11 18 24	12	3			Medium dense brown SANDY SILT (A-4a), some fine to coarse sand, trace gravel; damp.	1	4	--	29	26	40
6.0	661.1	6 9 7	16	4			Loose to medium dense brown COARSE AND FINE SAND (A-3a), little silt; moist.						
10		4 7 8	16	5									
		4 3 3	16	6									
		2 2 3	16	7									
15.0	652.1						Bottom of Boring - 15.0'						
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

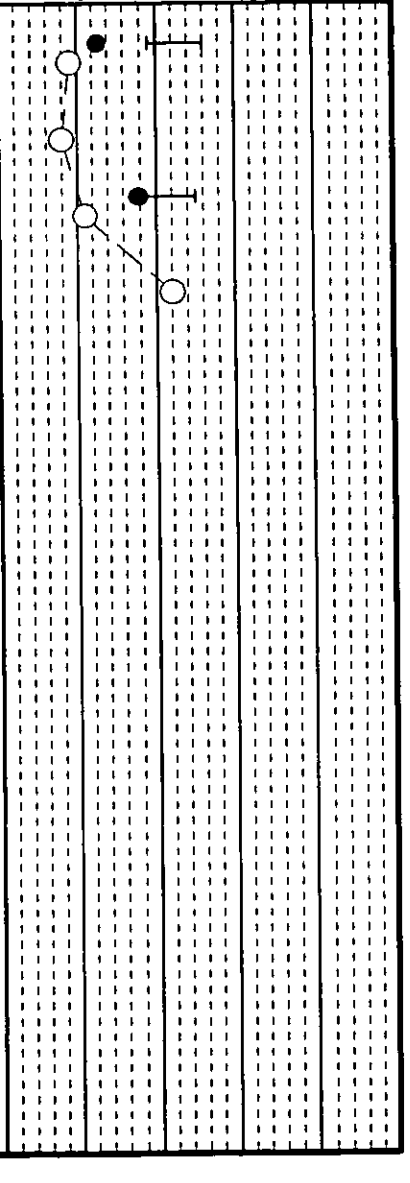
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1313A | Location: Sta. 31+03.5, 6.1 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 07/21/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	666.4												
0.7	665.7	3 4 5 3	20	1		--	Topsoil - 8"						
							Stiff to very stiff brown SILT (A-4b), trace fine to coarse sand, trace coarse sand; contains organic material; damp to moist.	0	2	--	5	73	20
		3 4 4 4	24	2		2.0							
5		4 4 7 11	24	3		2.25		3	6	--	8	59	24
		7 10 12 13	22	4		1.5	@ 6.5'; some fine sand, moist.						
8.0	658.4						Bottom of Boring - 8.0'						
10													
15													
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [illegible]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1314 | Location: Sta. 390+91.6, 35.9 ft. LT of TR 234 Ramp A BL | Date Drilled: 08/25/05

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	676.4						Topsoil - 12"						
1.0	675.4	5 9 11	12	1		4.5+	Very stiff to hard brown SILTY CLAY (A-6b), little fine to coarse sand; damp.						
		4 7 10	10	2		2.0							
5													
6.0	670.4	4 4 6	15	3		3.0	Very stiff brown CLAY (A-7-6), trace to little fine to coarse sand; moist.						
		3 3 6	17	4		2.5	@ 8.5'-12.5', brown and gray.						
10													
		2 3 5	17	5		3.0							
					P-1	3.0		1	2	--	4	21	72
15													
16.0	660.4	7 6 10	14	7			Loose to medium dense brown COARSE AND FINE SAND (A-3a), little silt; damp to moist.						
		8 9 12	16	8									
20													
		5 7 8	18	9				0	0	--	88	12	
		4 7 9	18	10									
25													
		3 2 2	18	11			@ 26.0', becomes wet.						
		3 6		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

51

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1314 | Location: Sta. 390+91.6, 35.9 ft. LT of TR 234 Ramp A BL | Date Drilled: 08/25/05

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30.0	646.5	6	17				Medium stiff to stiff gray SILT AND CLAY (A-6a), little fine sand; moist.							Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ 10 20 30 40
	646.4	2 2 50/2	18	13		1.0								
35.0	641.4						Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, slightly weathered, massively bedded, slightly fractured.							50+
		Core 75"	Rec 75"	RQD 93%	R-1	*19	@ 38.0'-38.1', interbedded shale.							
40														
41.3	635.1						Bottom of Boring - 41.3'							
45														
50														
55														

FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD; [redacted]MBUS, OHIO 43229 * (614)888-0040

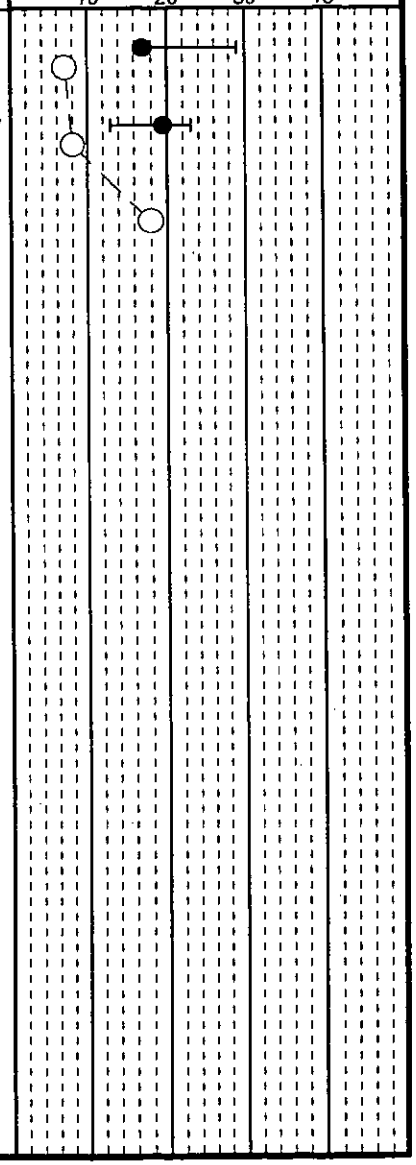
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1314A | Location: Sta. 34+98.1, 11.4 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 07/21/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	651.5						Topsoil - 9"						
0.8	650.7	1 3 4 4 3	18	1		2.0	Stiff to very stiff brown SILT AND CLAY (A-6a), little fine sand; damp to moist.	0	2	--	14	53	31
2.0	649.5	3 4 4 5	24	2		1.0	Medium stiff to stiff mottled brown and gray SANDY SILT (A-4a), some fine sand; moist.	1	1	--	29	42	27
4.0	647.5	6 9 9 9	22	3		--	Medium dense brown COARSE AND FINE SAND (A-3a), trace to little silt, trace clay; damp to moist.						
6.0	645.5						Bottom of Boring - 6.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

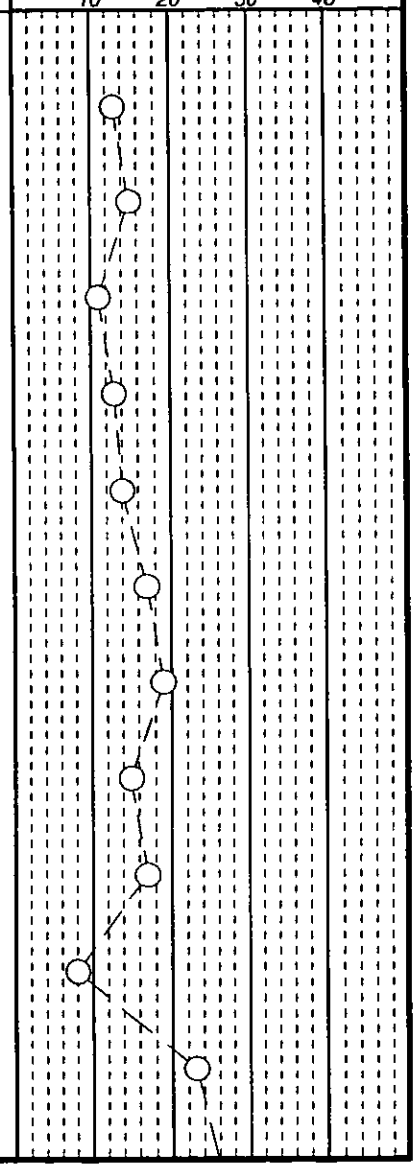
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1315 | Location: Sta. 390+91.9, 81.3 ft. RT of TR 234 Ramp A BL | Date Drilled: 08/25/05

WATER OBSERVATIONS: Water seepage at: 24.0'
Water level at completion: 15.6' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	673.2						Topsoil - 4"						
1.0	672.2	4 6 7	11	1		4.5+	Hard brown SANDY SILT (A-4a), little fine to coarse sand; damp.						
3.5	669.7	3 6 9	6	2		--	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
6.0	667.2	2 5 6	15	3		3.25	Very stiff to hard brown CLAY (A-7-6), little fine sand; damp.						
		2 4 9	17	4		4.5							
11.0	662.2	5 7 7	9	5			Loose to medium dense brown FINE SAND (A-3); damp to moist.						
		6 8 9	16	6									
		6 8 11	16	7									
		6 7 8	17	8									
		6 8 9	14	9									
		4 4 4		10			@ 23.5', becomes wet.						
		16 12 11	8	11			@ 26.0'-27.5', trace silt, rust-stained.						
28.5	644.7	12 11		12		0.5	Soft to medium stiff gray SILT AND CLAY (A-6a), little fine to						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1315 | Location: Sta. 390+91.9, 81.3 ft. RT of TR 234 Ramp A BL | Date Drilled: 08/25/05

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	WATER OBSERVATIONS / DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	643.3	15	18				WATER OBSERVATIONS: Water seepage at: 24.0' Water level at completion: 15.6' (Includes drilling water)							Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
30							coarse sand; moist. Soft to medium stiff gray SILT AND CLAY (A-6a), little fine to coarse sand; moist.							
33.0	640.2													
35		Core 61"	Rec 61"	RQD 100%	R-1	*298	Medium hard to hard gray SANDSTONE; fine to very fine grained, moderately weathered, argillaceous, micaceous, massively bedded, slightly fractured. @ 36.2', low angle fracture.							
38.1	635.1						Bottom of Boring - 38.1'							
40														
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1316 | Location: Sta. 394+92.4, 88.2 ft. RT of TR 234 Ramp A BL | Date Drilled: 09/07/05 to 09/08/05

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 15.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	678.5												
0.8	677.7	3 2 4	12	1		2.0	Topsoil - 9" Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
5		4 5 6	6	2		4.5+							
6.0	672.5	3 4 4	18	3		2.25	Very stiff to hard brown CLAY (A-7-6), little fine sand; damp.						
10		1 3 6	18	4		4.25							
		4 6 6	18	5		3.75							
15		4 5 7	18	6		3.5	@ 11.0'-12.5', contains interbedded sand seams.						
16.0	662.5	10 10 11	18	7			Medium dense brown FINE SAND (A-3); damp.						
18.5	660.0	6 7 10	18	8			Medium dense brown COARSE AND FINE SAND (A-3a), little silt; contains numerous interbedded silt seams; moist.						
20		5 10 10	18	9									
25		6 6 6	18	10									
26.0	652.5	4 3 5	12	11			Loose brown FINE SAND (A-3); moist to wet.						
		4 4		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1316 | Location: Sta. 394+92.4, 88.2 ft. RT of TR 234 Ramp A BL | Date Drilled: 09/07/05 to 09/08/05

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 15.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
	648.6													
30.0	648.5	2 3	18				Hard gray SILT AND CLAY (A-6a), little fine sand; damp.							
		2 50/5	18	13		4.0								50+
35														
38.5	640.0	50/2	4	14		--	Hard gray SANDY SILT (A-4a), some fine to coarse sand, little gravel; contains rock fragments; moist.							50+
40														
41.0	637.5						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured.							
45		Core 108"	Rec 108"	RQD 74%	R-1	*276	@ 49.2'-49.6', highly weathered, contains argillaceous laminations. @ 48.8'-48.9', clay filled fracture. @ 48.1'-48.7', thin shale bed. @ 49.3'-49.6', high angle, calcareous, fracture.							
50.0	628.5						Bottom of Boring - 50.0'							
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS. OHIO 43229 * (614)888-0040

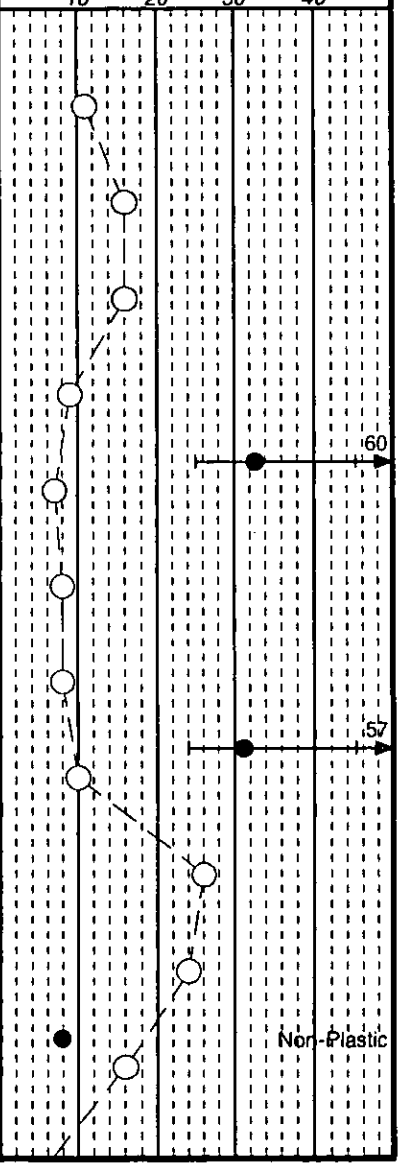
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1317 | Location: Sta. 399+02.0, 54.0 ft. RT of TR 234 Ramp A BL | Date Drilled: 09/07/05

WATER OBSERVATIONS: Water seepage at: 33.5'
Water level at completion: 6.0' (Includes drilling water, hole collapsed at 36.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	681.9												
0.8	681.1	2 4 7	14	1		3.5	Topsoil - 9" Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
		5 8 8	18	2		4.5							
5		3 5 11	18	3		4.5+							
8.5	673.4	3 4 5	16	4		4.5	Very stiff to hard brown CLAY (A-7-6), trace to little fine sand; damp to moist.						
10		3 3 4	18	5		2.25		1	0	--	1	23	75
		2 3 5	18	6		2.75							
15		4 4 4	14	7		2.25							
		4 5 5	18	8		2.25		0	1	--	1	17	81
20		6 13 13	18	9		3.25							
22.5	659.4						Loose to medium dense brown COARSE AND FINE SAND (A-3a) little silt; contains occasional sandy silt seams; damp to moist.						
		9 10 14		10									
25		9 7 9	18	11				0	2	--	79	19	
		8 3		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1317 | Location: Sta. 399+02.0, 54.0 ft. RT of TR 234 Ramp A BL | Date Drilled: 09/07/05

WATER OBSERVATIONS: Water seepage at: 33.5'
Water level at completion: 6.0' (Includes drilling water, hole collapsed at 36.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	652.1	2	18				Medium dense brown COARSE AND FINE SAND (A-3a), little silt; wet.							
		15 12 15	18	13										
35														
37.0	644.9						Very dense gray GRAVEL WITH SAND (A-1-b), "and" fine to coarse sand, little silt; wet.							
		45 50/1	10	14										50+
40.0	641.9						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massively bedded, slightly to moderately fractured. @ 40.0'-40.8', 47.5'-47.7', lost recovery.							
45		Core 120"	Rec 105"	RQD 70%	R-1	*403	@ 41.2'-41.5', broken zone. @ 44.5', low angle fracture.							
50.0	631.9						Bottom of Boring - 50.0'							
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

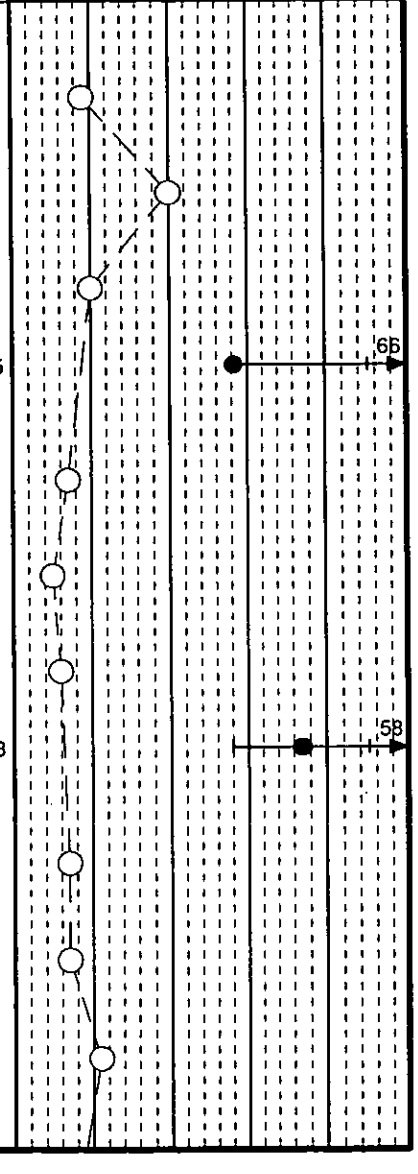
LOG OF: Boring B-1318 | Location: Sta. 402+06.6, 111.0 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/01/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 21.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	687.6												
1.0	686.6	2 3 6	14	1		2.0	Topsoil - 12" Very stiff brown SILT AND CLAY (A-6a), little to some fine to coarse sand, trace to little gravel; damp.						
5		11 12 8	13	2		--	@ 3.5'-5.0', contains numerous rock fragments.						
6.0	681.6	4 4 6	13	3		4.25	Stiff to very stiff brown CLAY (A-7-6), trace fine sand, trace gravel; damp to moist. @ 6.0'-7.5', hard.						
10					P-1	2.0		7	0	--	1	7	85
		3 3 4	22	5		1.75							
		2 2 3	18	6		2.75							
15		3 3 3	18	7		1.25							
					P-2	1.5		0	0	--	0	12	88
20		2 3 4	20	9		1.5							
		2 3 4	27	10		3.0							
25		4 5 6	18	11		3.5							
28.5	659.1	3 4		12			Loose brown FINE SAND (A-3); moist.						

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1318 | Location: Sta. 402+06.6, 111.0 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/01/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 21.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	657.7													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
30.0	657.6	5 5 10	15				Stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; contains rock fragments; damp.							
		6 10 9	16	13		1.0								
35														
38.5	649.1	50/4	4	14			Severely weathered gray SILTSTONE, contains few sandstone fragments.							50+
40														
42.0	645.6						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, massively bedded, slightly fractured, turbidity, bedding.							
45		Core 60"	Rec 53"	RQD 66%	R-1	*422	@ 47.0', broken zone.							
47.0	640.6						Bottom of Boring - 47.0'							
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1319 | Location: Sta. 397+99.0, 124.9 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/06/05

WATER OBSERVATIONS: Water seepage at: 45.0'
Water level at completion: 26.0' (hole collapsed at 52.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	711.4												
0.5	710.9						Topsoil - 6"						
		2 2 3	6	1		3.0	Very stiff to hard brown SILTY CLAY (A-6b), little fine to coarse sand; contains roots; damp.	1	1	--	2	54	42
3.5	707.9												
		4 6 9	12	2		4.5+	Very stiff to hard brown CLAY (A-7-6), trace to little fine sand; damp to moist.	0	0	--	1	15	84
5		3 3 6	18	3		3.5							
		3 4 6	18	4		4.25							
10		4 4 5	18	4		4.25							
					P-1								
15		3 5 7	18	7		4.5							
		3 4 5		8		3.5							
20		3 4 4		9		1.75	@ 21.0'-22.5',28.5'-30.0', stiff. @ 21.0', becomes gray.						
					P-2								
25		4 4 4	18	11		3.5							
		3 4		12		1.25							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1319 | Location: Sta. 397+99.0, 124.9 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/06/05

WATER OBSERVATIONS: Water seepage at: 45.0'
Water level at completion: 26.0' (hole collapsed at 52.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	681.5												
30.0	681.4	5	18				Stiff gray CLAY (A-7-6), little fine sand; moist.						
		3 4 5	18	13		1.5							
35													
		3 5 9	18	14		1.25							
40													
		9 6 25	0	15									
45													
47.0	664.4						Stiff brown SANDY SILT (A-4a), some fine to coarse sand, little gravel; contains sandstone fragments; moist.						
		10 20 50/3	18	16		--							
50													
		50/2	0	17									
55.0	656.4						Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massively bedded, moderately fractured. @ 55.0' to 56.0', highly weathered and highly fractured.						
		Core 60"	Rec 59"	RQD 63%	R-1	*382							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1319 | Location: Sta. 397+99.0, 124.9 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/06/05

WATER OBSERVATIONS: Water seepage at: 45.0'
Water level at completion: 26.0' (hole collapsed at 52.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
	651.7													
60.0	651.4			■			Bottom of Boring - 60.0'							
65														
70														
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1320 | Location: Sta. 397+98.2, 5.3 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/02/05

WATER OBSERVATIONS: Water seepage at: 49.0'
Water level at completion: 19.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	697.1												
1.0	696.1	2 3 5	10	1		3.75	Topsoil - 12" Very stiff brown SILTY CLAY (A-6b), little fine to coarse sand; moist.						
3.5	693.6	5 8 11	6	2		4.25	Very stiff to hard brown CLAY (A-7-6), trace fine to coarse sand; damp to moist.						
5		4 4 6	18	3		4.25							
		3 3 6	18	4		4.25							
10		4 6 8	18	5		3.5							
		3 5 7	18	6		3.75							
15		3 3 5	18	7		2.0							
					P-1	1.5	@ 18.5'-30.0', stiff, gray.	0	1	--	1	3	95
20		3 3 5	18	9		1.75							
		2 3 5	18	10		1.5							
25		2 3 5	18	11		2.0							
		3 4		12		1.5							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

63

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1320 | Location: Sta. 397+98.2, 5.3 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/02/05

WATER OBSERVATIONS: Water seepage at: 49.0'; Water level at completion: 19.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	667.2	4	18										
30							Stiff brown CLAY (A-7-6), trace fine to coarse sand; damp to moist.						
					P-2	1.5		0	0	--	0	5	95
35													
		4 5 7	18	14		4.5	@ 38.5'-40.0', hard.						
40													
42.0	655.1						Medium dense brown COARSE AND FINE SAND (A-3a), little silt; moist.						
		7 8 10	18	15									
45													
47.0	650.1						Very stiff gray SILT AND CLAY (A-6a), little fine sand; moist.						
		3 4 18	18	16		2.5							
50													
53.5	643.6	40 50/3		17			Severely weathered light gray SANDSTONE.						
55.0	642.1						Hard gray SANDSTONE; fine to very fine grained, slightly to moderately weathered, micaceous, thickly bedded to massive, slightly fractured. @ 55.5'; low angle fractures. @ 59.6' - 60.0'; very fine grained sandstone.						
		Core 60"	Rec 59"	RQD 90%	R-1	*5							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
54
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1320 | Location: Sta. 397+98.2, 5.3 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/02/05

WATER OBSERVATIONS: Water seepage at: 49.0'
Water level at completion: 19.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
	637.4													
60.0	637.1			■			Bottom of Boring - 60.0'							
65														
70														
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1321 | Location: Sta. 393+97.0, 100.8 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/24/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 17.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	727.8												
0.6	727.2	5 8 16	13	1		4.5+	Topsoil - 7" Hard brown SANDY SILT (A-4a), little fine to coarse sand, trace gravel; contains occasional rust stains; damp.						
		16 32 33	15	2		4.5							
5		19 24 32	19	3		4.5							
		7 11 17	12	4		4.5+							
10		11 13 14	18	5		4.5+							
13.5	714.3	2 4 8	15	6		2.0	Stiff to very stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand; moist.						
15													
16.0	711.8	3 2 5	22	7		1.75	Stiff gray CLAY (A-7-6), trace fine sand; moist.						
					P-1								
20		3 4 5	27	9		1.5							
		3 4 5	27	10		1.25							
25		3 3 4	27	11		1.25		0	0	--	0	23	77
					P-2								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
65
56
54

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1321 | Location: Sta. 393+97.0, 100.8 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/24/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 17.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	697.9												
30.0	697.8						Stiff gray SILTY CLAY (A-6b), trace fine sand; moist.						
		3 4 6		13		1.5		0	0	--	3	43	54
35													
					P-3								
40													
42.0	685.8						Hard gray SILT AND CLAY (A-6a), some fine to coarse sand, little gravel; contains rock fragments; damp.						
		50/5	5	15		--							
45													
47.0	680.8						Brown and gray SANDSTONE fragments, argillaceous.						
		50/4	3	16									
50													
		50/2	2	17									
55.0	672.8						Hard gray SANDSTONE; fine to very fine grained, slightly weathered, argillaceous, micaceous, pyritic, massively bedded, unfractured.						
		Core 60"	Rec 54"	RQD 90%	R-1	*329							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

50+ 50+ 50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1321 | Location: Sta. 393+97.0, 100.8 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 17.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60.0	668.1 667.8			■			Bottom of Boring - 60.0'							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

65
70
75
80
85

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1322 | Location: Sta. 393+99.8, 9.4 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/22/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 25.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	718.4												
1.0	717.4	12 16 17	6	1		--	Topsoil - 12" Hard brown SANDY SILT (A-4a), little fine to coarse sand, trace gravel; contains rootlets; damp.						
3.0	715.4	4 5 7	9	2		3.0	Stiff to very stiff brown and gray CLAY (A-7-6), trace to little fine sand; moist.						
5		2 3 5	12	3		2.75							
10					P-1	2.5		0	0	--	1	17	82
		2 4 5	18	5		2.0							
		2 4 5	18	6		1.75							
15		3 4 6	18	7		1.5		0	0	--	0	11	89
18.5	699.9				P-2	2.25	Very stiff brown ELASTIC CLAY (A-7-5); damp to moist.	0	0	--	0	10	90
20													
21.0	697.4	3 3 4	18	9		0.5	Medium stiff to stiff gray CLAY (A-7-6), trace fine sand; moist.	0	0	--	0	8	92
		2 3 4	18	10		1.25							
25		3 4 5	18	11		1.25							
					P-3	2.0		0	0	--	0	6	94

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

54 61 56 52 63

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1322 | Location: Sta. 393+99.8, 9.4 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/22/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 25.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	688.5						Stiff gray CLAY (A-7-6), trace fine sand; moist.						
		2 4 5	18	13		1.0							
35													
		4 6 9	18	14		1.5							
40													
		4 5 6	18	15		2.0							
45													
		4 6 7	18	16		1.0							
50													
		7 10 12	18	17		4.5+	@ 53.5'-55.0', hard, contains interbedded seams of shale fragments; damp.						
55													
57.0	661.4						Very soft brown SILTY CLAY (A-6b), trace fine sand; moist to wet.						
		3 4		18		<0.25							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1322 | Location: Sta. 393+99.8, 9.4 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/22/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 25.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	658.7													Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ 10 20 30 40
60.0	658.4	6	18				Hard brown SANDY SILT (A-4a), some fine to coarse sand, little gravel; contains rock fragments; damp.							
		16 50/6	18	19		--								50+
65														
67.0	651.4						Severely weathered SHALE (driller's description)							
		50/2	0	20										50+
70.0	648.4						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured.							
		Core 24"	Rec 20"	RQD 54%	R-1	*350								
72.0	646.4						Bottom of Boring - 72.0'							
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1323 | Location: Sta. 391+91.7, 74.0 ft. RT of TR 234 Ramp D BL | Date Drilled: 08/18/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 29.5'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	714.6												
0.6	714.0						Topsoil - 7"						
		8 13 15	6	1		--	Hard brown and gray SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains occasional rust stains; damp. @ 1.0'-2.5', contains roots.						
		8 12 14	11	2		4.5+							
5		4 5 8	8	3		4.25							
8.5	706.1												
		3 7 9	11	4		4.5	Very stiff to hard brown and gray CLAY (A-7-6), trace fine to coarse sand; moist.						
10		2 4 7	12	5		3.5							
					P-1	2.75		0	0	--	0	15	85
15		4 5 7	18	7		3.0							
		4 5 6	18	8		3.75		0	0	--	1	7	92
20.0	694.6						Very stiff gray ELASTIC CLAY (A-7-5); moist.						
					P-2	2.25		0	0	--	0	6	94
23.5	691.1												
		2 5 9	18	10		1.5	Stiff gray CLAY (A-7-6), trace fine to coarse sand; moist.	0	0	--	1	16	83
25		3 4 5	18	11		1.5		0	0	--	0	4	96
		3 4		12		1.25							

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

55
57
61
55
60

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1323 | Location: Sta. 391+91.7, 74.0 ft. RT of TR 234 Ramp D BL | Date Drilled: 08/18/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 29.5'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	684.8	6	18				Stiff gray CLAY (A-7-6), trace fine to coarse sand; moist.						
30					P-3								
		2 3 5	18	14		1.75							
35													
		4 5 7	18	15		1.25							
40													
44.0	670.6	16 7 8	18	16		4.5+	Hard gray SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp.						
45													
47.0	667.6						Stiff gray CLAY (A-7-6), little fine sand; moist.						
		5 7 9	18	17		1.0							
50													
		7 4 8	18	18		1.75							
55													
57.0	657.6						Dense brown FINE SAND (A-3); damp.						
		10 17		19									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1323 | Location: Sta. 391+91.7, 74.0 ft. RT of TR 234 Ramp D BL | Date Drilled: 08/18/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 29.5'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	654.9													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
60.0	654.6	21	10				Hard brown SANDY SILT (A-4a), some fine to coarse sand, little gravel; contains rock fragments; damp.							
		10 47 50/4	10	20		--								97
65														
68.5	646.1	32 50/3	9	21			Gray SANDSTONE and SHALE fragments.							50+
70														
74.0	640.6	50/2	1	22			Medium hard gray SANDSTONE, very fine to fine grained, argillaceous, micaceous, massively bedded, unfractured, slightly to moderately weathered. @ 76.8', silt lens.							50+
75		Core 66"	Rec 65"	RQD 99%	R-1	*489								
79.5	635.1						Bottom of Boring - 79.5'							
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1324 | Location: Sta. 390+07.1, 74.5 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/08/05 to 09/09/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported (hole collapsed at 30.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	734.5													Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ 10 20 30 40
0.3	734.2						Topsoil - 3"							
		7 7 11	12	1		4.5+	Very stiff to hard brown SILTY CLAY (A-6b), trace to little fine to coarse sand, trace gravel; damp.							
		18 32 30	12	2		3.75								62
5														
6.0	728.5	13 27 31	12	3		4.5+	Hard brown SANDY SILT (A-4a), some fine to coarse sand, trace to little gravel; damp.							58
		14 13 9	18	4		4.5+								
10														
		26 25 24	18	5		--								
		9 20 33	18	6		--								53
15														
		13 19 29	18	7		--	@ 16.0'-23.9', contains rock fragments.							
		17 18 35	18	8		--								53
20														
		15 17 32	18	9		4.5								
		50/5	5	10		4.5+								50+
25														
26.0	708.5	50/4	4	11			Severely weathered gray SHALE, arenaceous.							50+
		48 50/3	9	12										50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1324 | Location: Sta. 390+07.1, 74.5 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/08/05 to 09/09/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported (hole collapsed at 30.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
30.0	704.7 704.5						Gray SANDSTONE fragments.							
		50/4	4	13										50+
35.0	699.5						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, slightly pyritic, massive, unfractured to slightly fractured. @ 36.7',39.9',41.7',44.1', low angle fractures.							
40		Core 120"	Rec 118.5"	RQD 87%	R-1	*366								
							@ 42.5'-42.6', 44.6'-50.0', moderately to highly weathered; broken.							
45														
50		Core 120"	Rec 116.5"	RQD 88%	R-2	*337								
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1324 | Location: Sta. 390+07.1, 74.5 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/08/05 to 09/09/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported (hole collapsed at 30.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60	674.8	Core 120"	Rec 116.5"	RQD 84%	R-3	*329	Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, slightly pyritic, massive, unfractured to slightly fractured.							
65.0	669.5						Bottom of Boring - 65.0'							
70														
75														
80														
85														

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

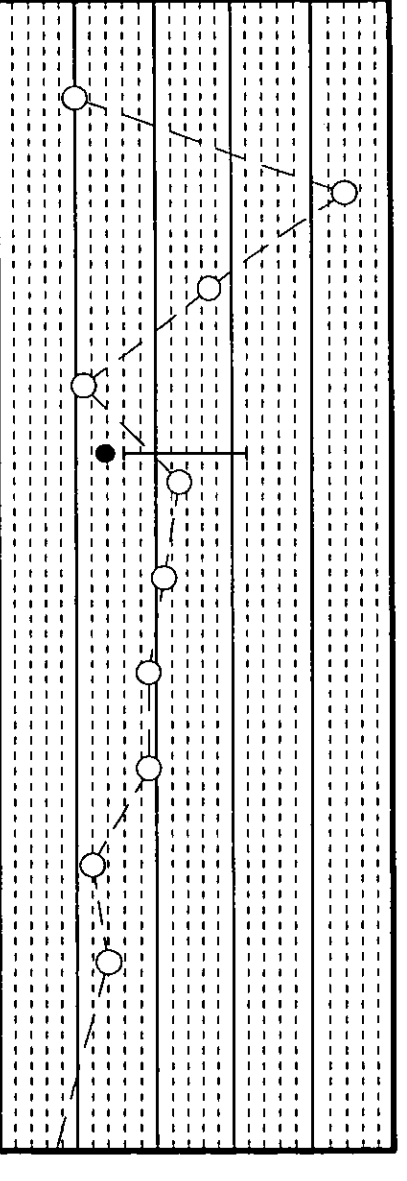
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1325 | Location: Sta. 389+95.6, 10.9 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/16/05 to 08/17/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 23.3' (includes drilling water, hole collapsed at 59.3')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	727.8												
1.0	726.8	5 5 5	10	1		4.5+	Topsoil - 12" Very stiff to hard brown SILTY CLAY (A-6b), trace fine to coarse sand; contains rust stains and dark nodules; damp to moist.						
		12 20 24	12	2		4.5+							
5		10 15 12	15	3		4.5+							
		4 5 6	16	4		4.25							
10		5 10 13	13	5		4.5+		6	7	--	8	44	35
		6 8 13	14	6		4.5+							
15		10 9 10	16	7		3.75							
		7 8 11	18	8		3.5							
20													
21.0	706.8	5 0 12	16	9		4.25	Hard brown CLAY (A-7-6), trace fine to coarse sand, trace gravel; damp to moist.						
		4 6 8	4	10		--	@ 23.5'-30.0', stiff.						
25					P-1								
		3 3		12		1.5	@ 28.5', becomes gray.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROA[illegible]OMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1325 | Location: Sta. 389+95.6, 10.9 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/16/05 to 08/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 23.3' (includes drilling water, hole collapsed at 59.3')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	698.0	4	18				Medium stiff to stiff gray CLAY (A-7-6), trace fine to coarse sand; moist.						
		4 4 5	18	13		1.5	@ 33.5'-35.0', contains few interbedded silt seams.	0	0	--	1	26	73
35													
					P-2								
40													
		20 24 18	16	15		0.75	@ 43.5'-44.5', silt and clay (A-6a) seam.						
45													
		7 7 14	18	16		2.0							
50													
52.0	675.8						Hard brown SANDY SILT (A-4a), some fine to coarse sand, little gravel; moist.						
		39 44 50/5	10	17									
55													
58.5	669.3	22 23		18			Gray SANDSTONE fragments, argillaceous.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROA[illegible]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1325 | Location: Sta. 389+95.6, 10.9 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/16/05 to 08/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 23.3' (includes drilling water, hole collapsed at 59.3')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
60	668.1	20	18				Severely weathered gray SANDSTONE, argillaceous.							
64.5	663.3	50/4	4	19			Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured.							50+
65		Core 60"	Rec 60"	RQD 78%	R-1	*193	@ 67.8', 68.4', low angle fractures, iron staining.							
69.5	658.3						Bottom of Boring - 69.5'							
70														
75														
80														
85														

STANDARD PENETRATION (N) — Natural Moisture Content, % - ● — PL ⊢—⊣ LL — Blows per foot - ○ — 10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1326 | Location: Sta. 387+86.2, 110.0 ft. RT of TR 234 Ramp D BL | Date Drilled: 08/31/05 to 09/01/05

WATER OBSERVATIONS: Water seepage at: 60.0'; Water level at completion: 23.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	711.7												
1.0	710.7	1 2 5	12	1		2.5	Topsoil - 12" Stiff to very stiff brown and gray SANDY SILT (A-4a), little fine to coarse sand, trace to little gravel; contains rust staining and dark nodules; damp.						
5		5 6 7	4	2		--							
6.0	705.7	3 4 6	9	3		3.75	Stiff to very stiff mottled brown and gray CLAY (A-7-6), trace fine sand; moist.						
10		3 4 5	9	4		3.75							
		3 3 15	14	5		2.75							
15		3 4 7	16	6		2.75							
					P-1								
20		3 4 6	18	8		1.75	@ 18.5', becomes gray.						
		2 3 5	18	9		1.75							
25		4 5 7	18	10		1.75							
					P-2	2.0		0	0	--	0	5	95
		3 3		12		1.75							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

69

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1326 | Location: Sta. 387+86.2, 110.0 ft. RT of TR 234 Ramp D BL | Date Drilled: 08/31/05 to 09/01/05

WATER OBSERVATIONS: Water seepage at: 60.0'
Water level at completion: 23.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	681.9	5	18				Stiff gray CLAY (A-7-6), trace fine sand; moist.						
		9 6 7	18	13		2.0							
35													
					P-3								
40													
		3 4 5	18	15		1.75	@ 43.5'-45.0', little fine to coarse sand, contains interbedded sand seams.						
45													
		3 4 5	18	16		1.5							
50													
52.0	659.7						Medium dense to dense brown FINE SAND (A-3), trace gravel; contains few pieces of silty clay; damp to moist.						
		7 14 12	12	17									
55													
		9 11		18									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1326 | Location: Sta. 387+86.2, 110.0 ft. RT of TR 234 Ramp D BL | Date Drilled: 08/31/05 to 09/01/05

WATER OBSERVATIONS: Water seepage at: 60.0'
Water level at completion: 23.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60	652.0	21	10				Medium dense to dense brown FINE SAND (A-3); damp.							
63.5	648.2	2 11 43	18	19			Severely weathered gray SANDSTONE with very dense gray SANDY SILT (A-4a); damp.							54
69.0	642.7	50/2	2	20			Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured.							50+
		Core 60"	Rec 60"	RQD 91%	R-1	*336								
74.0	637.7						Bottom of Boring - 74.0'							

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1327 | Location: Sta. 385+91.55, 81.48 ft. LT of TR 823 Ramp D BL | Date Drilled: 10/10/2005 to 10/11/2005

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
0	735.5													
0.3	735.2						Topsoil - 4" / 2.6' soil removed before drilling							
		6 12 25	18	1		--	Hard brown SANDY SILT (A-4a), some gravel, little fine to coarse sand; contains sandstone fragments; damp.							
		50/5	5	2		--								50+
5														
6.0	729.5	Core 60"	Rec 51"	RQD 58%	R-1	*227	Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massively bedded, highly fractured. @ 6.6' to 7.4', lost recovery likely due to fracture. @ 6.0'-6.6', 7.4'-7.9', 8.9'- 9.1', 11.3'-11.5', broken.							
10							@ 10.3', low angle fracture.							
		Core 120"	Rec 120"	RQD 95%	R-2	*540	@ 11.7', 13.6', 16.4', low angle fractures.							
15														
16.7	718.8						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured.							
20							@ 21.9'-41.0', lost water return during drilling. @ 22.0'-22.4', iron stained high angle fracture.							
25		Core 120"	Rec 120"	RQD 95%	R-3	*505								

STANDARD PENETRATION (N): Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1327 | Location: Sta. 385+91.55, 81.48 ft. LT of TR 823 Ramp D BL | Date Drilled: 10/10/2005 to 10/11/2005

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
30	705.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured.							10 20 30 40
							@ 32.7',33.0',33.9',34.1',34.8', low angle fractures in argillaceous laminations.							
35		Core 120"	Rec 120"	RQD 69%	R-4	*384	@ 35.1' to 35.3', broken zones with argillaceous laminations. @ 35.5', calcareous. @ 35.8'-37.3', broken to highly fractured, contains moderate argillaceous laminations, highly weathered to decomposed. @ 37.3'-38.4', very hard, whitish gray. @ 38.4'-40.7', very thinly bedded to laminated, highly fractured, contains moderate to abundant argillaceous laminations.							
40														
40.7	694.8						@ 40.7',40.9', thin, whitish gray, fine to coarse sandstone beds.							
							Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured. @ 41.4'-41.5', whitish gray, fine to coarse sandstone bed.							
45		Core 120"	Rec 120"	RQD 100%	R-5	*569								
50							@ 50.5', becomes pyritic.							
55		Core 108"	Rec 108"	RQD 100%	R-6	*798								
							@ 58.5'-58.6', calcareous.							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1327 | Location: Sta. 385+91.55, 81.48 ft. LT of TR 823 Ramp D BL | Date Drilled: 10/10/2005 to 10/11/2005

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring)

GRADATION

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60.0	675.8 675.5						Bottom of Boring - 60.0'							

STANDARD PENETRATION (N): Natural Moisture Content, % - ●; PL ⊢—⊣ LL; Blows per foot - ○; 10 20 30 40

65 70 75 80 85

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

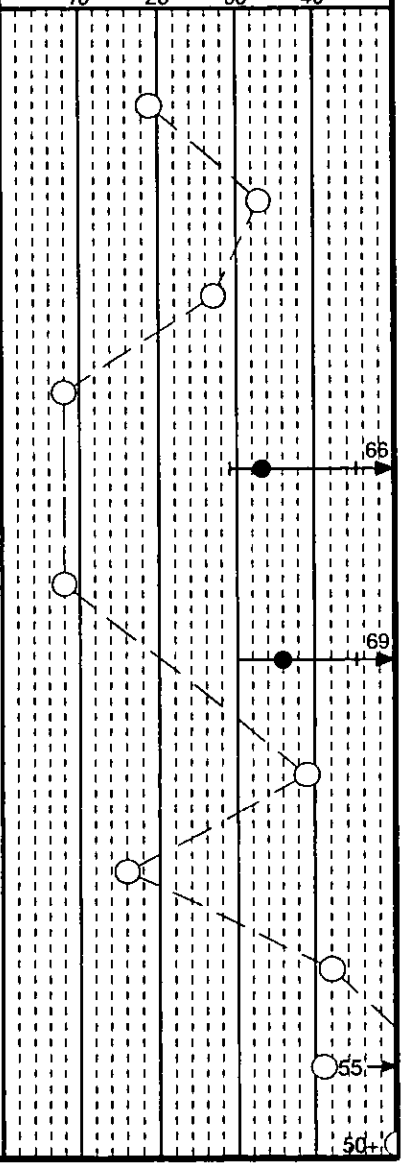
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1328 | Location: Sta. 385+92.3, 13.3 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/16/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: 29.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	718.1												
0.5	717.6						Topsoil - 6"						
		6 8 11	11	1		4.5+	Hard brown SANDY SILT (A-4a), little fine to coarse sand, trace gravel; damp.						
		12 16 17	16.5	2		4.5+							
5		7 12 15	18	3		4.5+							
8.5	709.6	1 3 5	14.5	4		2.75	Very stiff brown CLAY (A-7-6), trace fine sand; contains little gray mottling; damp to moist.						
10					P-1	2.0		0	0	--	1	3	96
		2 4 4	19	6									
15													
16.0	702.1				P-2	2.0	Stiff to very stiff brown ELASTIC CLAY (A-7-5), trace fine sand; moist.	0	0	--	1	12	87
18.5	699.6	14 15 24	16	8		2.75	Very stiff to hard brown CLAY (A-7-6), trace fine sand; damp to moist.						
20		14 8 8	15	9		4.5+							
23.5	694.6	12 17 25	8	10		3.0	Very stiff to hard brown SANDY SILT (A-4a), some fine to coarse sand, trace gravel; contains rock fragments; damp.						
25		18 25 30	18	11		4.5+							
		28 50/5	16	12		4.5+							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1328 | Location: Sta. 385+92.3, 13.3 ft. LT of TR 234 Ramp D BL | Date Drilled: 08/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 29.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
	688.3													
30.0	688.1						Severely weathered brown SANDSTONE, argillaceous.							
		32 50/2	10	13										50+
34.5	683.6													
35		Core 66"	Rec 64"	RQD 34%	R-1	*285	Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to medium bedded, highly fractured, contains few decomposed argillaceous laminations. @ 35.0'-35.5', 36.0'-36.3', broken zones. @ 35.5'-35.8', high angle fracture.							
40.0	678.1						@ 39.7'-40.0', high angle fracture with rust staining. Bottom of Boring - 40.0'							
45														
50														
55														

STANDARD PENETRATION (N): Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ (10, 20, 30, 40)

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

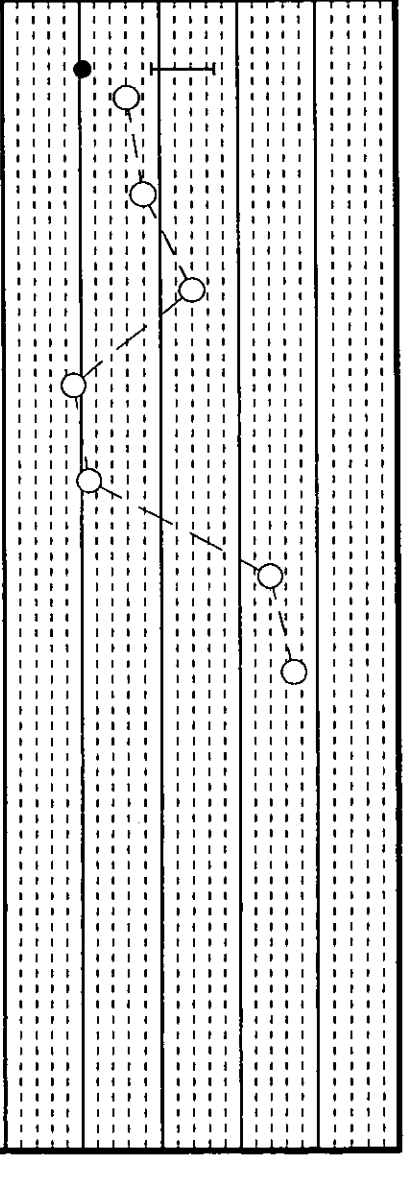
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1329 | Location: Sta. 382+02.1, 0.8 ft. RT of TR 234 Ramp C BL | Date Drilled: 08/16/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	672.5												
1.0	671.5	4 7 9	16	1		3.5	Topsoil - 12" Very stiff to hard brown and gray SANDY SILT (A-4a), trace to little fine to coarse sand, trace gravel; damp.	8	10	--	9	48	25
5		5 6 12	10	2		4.5+	@ 3.5'-5.0', contains rust stains.						
		8 11 13	16	3		4.5+							
10		3 3 6	10	4		3.5							
11.0	661.5	3 4 7	12	5		4.5+	Very stiff to hard brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.						
15		8 14 20	6	6		3.75							
		11 15 22	10	7		3.75							
18.5	654.0	50/4	3	8			Severely weathered gray SHALE.						
20													
20.5	652.0	Core 66"	Rec 66"	RQD 36%	R-1	*352	Very hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, medium bedded, slightly fractured, contains few argillaceous laminations. @ 21.4', 23.2', 24.0', 24.5', 24.6', low angle fractures.						
25													
26.0	646.5						Bottom of Boring - 26.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1330 | Location: Sta. 377+97.38, 0.29 ft. Rt. on BL TR 234 Ramp C | Date Drilled: 08/11/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	651.5						Topsoil - 12"						
1.0	650.5	4 4 6	18	1		4.5	Very stiff to hard brown SANDY SILT (A-4a), litte fine to coarse sand, trace gravel; contains rust staining and black nodules; damp.						
5		4 6 8	16	2		2.75							
6.0	645.5	50/4	3	3			Gray SANDSTONE fragments, argillaceous.						
9.5	642.0	50/2	2	4									
10		Core 66"	Rec 56"	RQD 85%	R-1	*437	Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massively bedded, slightly fractured. @ 14.2', 14.6', low angle fractures, iron staining.						
15.0	636.5						Bottom of Boring - 15.0'						
20													
25													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 | 11/28/2006 1:39 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1331 | Location: Sta. 14+29.4, 5.6 ft. LT of SR 335 CL | Date Drilled: 09/14/05

WATER OBSERVATIONS: Water seepage at: 7.5'
Water level at completion: 2.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
0	658.2													
0.4	657.8	7 7 5 7	2	1			Topsoil - 5"							
2.0	656.2	1 1 1 3	18	2		0.5	Medium dense brown SANDY SILT (A-4a), some fine sand, little coarse sand, trace gravel, little to some clay; damp to moist.	7	15	--	26	52		Non-Plastic
5.0	653.2	1 2 1 3	18	3		0.75	Soft to medium stiff brown SANDY SILT (A-4a), some to "and" fine sand, some clay, trace coarse sand; moist.	0	3	--	36	34	27	
6.5	651.7	4 6 6	18	4			Medium stiff brown SILT AND CLAY (A-6a), "and" fine sand, trace coarse sand; moist.	0	3	--	43	25	29	
							Medium dense brown COARSE AND FINE SAND (A-3a), trace to little silty clay; moist to wet.	0	20	--	69	11		Non-Plastic
		3 2 5	18	5			@ 8.5-10.0', loose to medium dense; moist.							
10		1 6 5	18	6										
		7 9 50/2	12	7			@ 13.5-16.1', dense to very dense.							50+
15		50/1	0	8										50+
18.0	640.2													
		Core 84"	Rec 84"	RQD 98%	R-1	*504	Hard gray SANDSTONE interbedded with SILTSTONE (turbidites); very fine to fine grained, slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured.							
25		Core 60"	Rec 59"	RQD 78%	R-2	*304	@ 25.0'-25.4', 25.8'-26.3', broken.							
30.0	628.2						Bottom of Boring - 30.0'							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1331 | Location: Sta. 14+29.4, 5.6 ft. LT of SR 335 CL | Date Drilled: 09/14/05

WATER OBSERVATIONS: Water seepage at: 7.5'
Water level at completion: 2.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	628.4													
35														
40														
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [illegible]US, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1332 | Location: Sta. 12+80.2, 5.5 ft. LT of SR 335 CL | Date Drilled: 09/14/05

WATER OBSERVATIONS: Water seepage at: 13.5'
Water level at completion: 3.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
0	657.5													
1.0	656.5	8 9	6	1			Asphalt Concrete Pavement - 8" Aggregate Base - 4"	22	14	--	17	40	7	Non-Plastic
2.5	655.0	4 2 1 2	6	2			Medium dense brown SANDY SILT (A-4a), trace clay, little fine sand, little coarse sand, little to some gravel; damp.	49	19	--	13	19		Non-Plastic
4.5	653.0	2 1 1 2	6	3			Loose brown GRAVEL WITH SAND (A-1-b), little to some silty clay; damp.	0	6	--	42	36	16	Non-Plastic
6.0	651.5	2 3 3	18	4			Loose brown SANDY SILT (A-4a), little clay, "and" fine sand, trace coarse sand; moist.	0	25	--	59	16		Non-Plastic
		3 2 2	18	5			Loose brown COARSE AND FINE SAND (A-3a), trace to little silty clay; damp to moist.							
10														
10.5	647.0	1 1 6	18	6		0.25	Very soft to soft mottled brown and gray SILT AND CLAY (A-6a), trace fine sand, trace coarse sand; contains very fine sand seams; moist.	0	1	--	3	48	48	
14.0	643.5	4 50/2	5	7		0.25	@ 13.5'-14.0', little to some fine sand.							50+
15		50/2	0	8			Dense to very dense brown FINE SAND (A-3), trace silty clay; moist.							50+
18.0	639.5													
20		Core 60"	Rec 60"	RQD 89%	R-1	*351	Medium hard to hard SANDSTONE (turbidites); very fine to fine grained, slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured.							
23.0	634.5						Bottom of Boring - 23.0'							
25														

STANDARD PENETRATION (N) / Natural Moisture Content, % - PL — LL / Blows per foot - 10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1333 | Location: Sta. 11+30.6, 6.3 ft. LT of SR 335 CL | Date Drilled: 09/13/05

WATER OBSERVATIONS: Water seepage at: 12.0'
Water level at completion: 2.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Atterberg Limits
0	660.1													
0.3	659.8	3 3 4 6	8	1			Topsoil - 4"							
							Loose brown GRAVEL WITH SAND AND SILT (A-2-4), little to some clay, little to some silt; trace to some gravel gravel; damp.	32	18	--	21	22	7	Non-Plastic
		3 2 4 6	18	2				0	7	--	61	10	22	
4.0	656.1						Loose brown COARSE AND FINE SAND (A-3a), trace to little silt, little to some clay; damp to moist.							
5		3 4 5 6	18	3				0	2	--	69	9	20	Non-Plastic
		3 2 2	16	4				0	15	--	68	17		Non-Plastic
8.0	652.1													
		2 3 3	17	5			Loose brown FINE SAND (A-3), some coarse sand, trace silty clay; moist.							
10														
		1 1 8	13	6			@ 11.0'-12.5', wet.	0	24	--	72	4		Non-Plastic
13.0	647.1													
		1 1 1	18	7		<0.25	Very soft brown SILT AND CLAY (A-6a), trace fine sand; moist.	0	0	--	1	60	39	
15														
16.0	644.1	50/4		8			Dense to very dense brown COARSE AND FINE SAND (A-3a) trace silty clay; damp to moist.							50+
18.0	642.1													
20		Core 72"	Rec 63"	RQD 72%	R-1	*376	Medium hard to hard gray SANDSTONE ; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, medium bedded to thickly bedded, slightly to moderately fractured. @ 19.6'-19.8', 20.2'-20.5', broken zones.							
25		Core 72"	Rec 72"	RQD 80%	R-2	*323	@ 25.0'-25.5', lost recovery.							
30.0	630.1						Bottom of Boring - 30.0'							

STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢——⊣ LL / Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1333 | Location: Sta. 11+30.6, 6.3 ft. LT of SR 335 CL | Date Drilled: 09/13/05

WATER OBSERVATIONS: Water seepage at: 12.0'
Water level at completion: 2.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	630.2													
35														
40														
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1334 | Location: Sta. 8+81.4, 6.3 ft. LT of SR 335 CL | Date Drilled: 09/13/05

WATER OBSERVATIONS: Water seepage at: 7.5'
Water level at completion: 4.3' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	655.5												
1.1	654.4	6 8	6	1		2.0	Asphalt Concrete Pavement - 9" Aggregate Base - 4"	13	10	--	23	41	13
2.0	653.5	4 5 6 6		2			Very stiff dark brown SANDY SILT (A-4a), some fine sand, little clay, trace to little coarse sand, little gravel; damp.	0	14	--	70	16	
5		4 6 4 7	18	3			Loose to medium dense brown COARSE AND FINE SAND (A-3a), little silty clay; damp.	0	13	--	76	11	
6.0	649.5	3 4 4	18	4			Loose brown FINE SAND (A-3), trace silty clay; damp to moist.	0	20	--	74	7	
8.0	647.5	4 3 3	13	5		3.5	Very stiff brown ELASTIC CLAY (A-7-5), trace fine sand, trace coarse sand, trace gravel; damp to moist.	2	3	--	4	56	35
10.5	645.0	6 12 15	10	6			Medium dense grayish brown COARSE AND FINE SAND (A-3a), trace to little silty clay, trace gravel ; damp to moist.						
14.0	641.5	50/3		7			Medium hard to hard gray SANDSTONE; fine to very fine grained, slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured to unfractured.						
		Core 60"	Rec 59"	RQD 91%	R-1	"302							
19.0	636.5						Bottom of Boring - 19.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic
Non-Plastic
Non-Plastic
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1340 | Location: Sta. 13+51.5, 11.6 ft. LT of SR 335 CL | Date Drilled: 06/27/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
11.0' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	657.0												
0.3	656.7						Asphalt Concrete Pavement - 3"						
		5 4 3	14	1		1.5	POSSIBLE FILL: Stiff brown SILT AND CLAY (A-6a), little fine sand, trace coarse sand, little gravel; damp to moist.						
4.0	653.0	3 3 2	11	2		0.75	Medium stiff brown SANDY SILT (A-4a), little clay, trace to little gravel; damp to moist.	10	7	--	29	37	17
5		2 2 1	18	3		0.5	@ 5.5', soft to medium stiff, grayish brown, moist to wet.						
9.0	648.0	2 2 1	15	4		0.25-0.5	Very soft to soft mottled brown and gray SILT AND CLAY (A-6a), some to "and" fine sand, trace coarse sand; moist.	0	3	--	35	27	35
10													
11.0	646.0	4 6 5	17	5		-	Loose to medium dense gray COARSE AND FINE SAND (A-3a), some silty clay; damp to moist.	0	8	--	68	24	
		2 13 50/4	14	6		-	@ 14.0', thin clay layer.						
15.0	642.0						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, laminated to thinly bedded, broken.						
16.0	641.0						@ 15.0' to 15.3', possible core loss.						
20		Core 120"	Rec 116"	RQD 82%	R-1		Medium hard to hard light gray SANDSTONE; fine to medium grained, moderately weathered, medium bedded to thickly bedded, moderately fractured. @ 17.5', qu= 11,643 psi, Er= 2,226,192 psi.						
21.7	635.3						Hard gray SANDSTONE; fine grained, slightly weathered, medium bedded to thickly bedded, moderately fractured.						
25							@ 25.4', slightly fractured. @ 26.3', qu= 13,315 psi, Er= 2,415,099 psi.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]US, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1340 | Location: Sta. 13+51.5, 11.6 ft. LT of SR 335 CL | Date Drilled: 06/27/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
11.0' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	627.2	Core 120"	Rec 120"	RQD 98%	R-2		Hard gray SANDSTONE; fine grained, slightly weathered, medium bedded to thickly bedded, moderately fractured.							
35														
40		Core 120"	Rec 120"	RQD 85%	R-3		@ 42.6' to 42.9', broken, argillaceous fractures. @ 42.9', highly to moderately fractured.							
45.0	612.0						Bottom of Boring - 45.0'							
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1341 | Location: Sta. 12+08.0, 11.6 ft. LT of SR 335 CL | Date Drilled: 6/23/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.0' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
^	658.0												
0.3	657.7						Topsoil - 3"						
		3 4 6	15	1		-	Loose to medium dense dark brown GRAVEL WITH SAND AND SILT (A-2-4), trace to little silty clay; damp to moist.						
3.0	655.0												
		3 5 6	13	2		-	Medium dense reddish brown SANDY SILT (A-4a), some clay; moist.	0	7	--	48	15	30
5													
5.5	652.5												
		3 4 6	15	3		-	Medium dense reddish brown COARSE AND FINE SAND (A-3a), little silty clay; damp to moist.	0	8	--	78	14	
							@ 8.5', moist to wet.						
		3 6 8	14	4		-							
10													
11.0	647.0												
		4 4 3	16	5		0.25	Very soft to soft brown SILT AND CLAY (A-6a), trace fine to coarse sand; moist to wet.	0	1	--	1	62	36
14.0	644.0												
		4 27 50/2	12	6		-	Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, laminated to thinly bedded.						
15													
16.0	642.0						Medium hard to hard light gray SANDSTONE; fine to medium grained, slightly to moderately weathered, medium bedded to thickly bedded, highly fractured.						
							@ 17.1', moderately fractured.						
20		Core 120"	Rec 120"	RQD 88%	R-1								
							@ 23.1', highly fractured.						
24.1	633.9						Hard gray SANDSTONE; fine grained, slightly to moderately weathered, pyritic, thickly bedded, slightly fractured.						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % -
PL — LL
Blows per foot -
10 20 30 40

Non-Plastic

50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]US, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1341 | Location: Sta. 12+08.0, 11.6 ft. LT of SR 335 CL | Date Drilled: 6/23/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.0' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	628.1	Core 120"	Rec 120"	RQD 90%	R-2		Hard gray SANDSTONE; fine grained, slightly to moderately weathered, pyritic, thickly bedded, slightly fractured.							
35														
40		Core 120"	Rec 120"	RQD 100%	R-3		@ 43.7' to 45.0', argillaceous fractures, highly fractured.							
45														
46.0	612.0						Bottom of Boring - 46.0'							
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1342 | Location: Sta. 10+59.4, 11.7 ft. LT of SR 335 CL | Date Drilled: 6/21/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring); 13.0' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	660.8												
		4 4 5	15	1		1.5	Stiff brown SILT AND CLAY (A-6a), trace coarse sand, trace gravel, some fine sand; moist.	1	2	--	26	30	42
		6 6 6	16	2		-	@ 4.0', "and" fine sand.	0	4	--	56	14	26
6.5	654.3	3 6 7	18	3		-	Medium dense brown COARSE AND FINE SAND (A-3a), little silty clay; damp.	0	8	--	79	14	
		3 7 8	16	4		-							
		3 5 4	18	5		-	@ 11.5', moist to wet.						
14.0	646.8	5 4 4	18	6		1.0	Medium stiff to stiff brown SILTY CLAY (A-6b), trace fine to coarse sand, trace organic clay, trace gravel; moist.	1	1	--	2	63	34
15.5	645.3	7 35 50/3	14	7			Dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace organic clay; damp to moist.						
		50/3	3	8									
19.5	641.3						Medium hard to hard light gray SANDSTONE; fine to medium grained, moderately weathered, thinly bedded to medium bedded, highly to moderately fractured. @ 19.5' to 21.7', possible core loss (coring in dense sand and gravel).						
		Core 120"	Rec 88"	RQD 56%	R-1		@ 25.0', qu= 13,229 psi, Er= 2,759,623 psi.						
							@ 27.0' to 27.4', possible core loss. @ 27.5' lost water return.						
							@ 29.0' to 29.5', high angle fracture, broken.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

50+

50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1342 | Location: Sta. 10+59.4, 11.7 ft. LT of SR 335 CL | Date Drilled: 6/21/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
13.0' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	631.0												
30							@ 29.5' to 30.9', possible core loss.						
30.9	629.9						Hard gray SANDSTONE; fine grained, slightly to moderately weathered, medium bedded to thickly bedded, moderately fractured.						
		Core 120"	Rec 104"	RQD 83%	R-2		@ 32.0', qu= 13,226 psi, Er= 2,493,963 psi.						
35													
40													
		Core 120"	Rec 120"	RQD 100%	R-3		@ 44.5', dark gray, moderately to slightly fractured.						
49.5	611.3												
50							Bottom of Boring - 49.5'						
55													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1343 | Location: Sta. 11+38.3, 100.0 ft. Rt of Rel. Shumway Hollow | Date Drilled: 09/25/06 to 09/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
26.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - PL — LL; Blows per foot - 10 20 30 40
0	754.8													
0.7	754.1	4 4 8	10	1			Topsoil - 8" Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.							
5		13 19 9	15	2										
6.0	748.8	50/0	0	3			Medium hard brown SANDSTONE; fine to medium grained, slightly weathered, very thinly bedded, moderately fractured.							50+
10		Core 90"	Rec 85"	RQD 60%	R-1		@ 9.3'-11.0', qu = 8,482 psi, SDI = 95.9%.							
11.5	743.3						Medium hard gray and brown SANDSTONE interbedded wtih SILTSTONE; fine grained, slightly weathered, very thinly bedded, slightly fractured.							
15														
		Core 120"	Rec 120"	RQD 89%	R-2		@ 17.5' - 18.0', iron inclusion. @ 18.5'-20.0', qu = 12,337 psi, SDI = 98.3%.							
20														
25		Core 120"	Rec 120"	RQD 96%	R-3									

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1343 | Location: Sta. 11+38.3, 100.0 ft. Rt of Rel. Shumway Hollow | Date Drilled: 09/25/06 to 09/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
26.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
30	725.0						Medium hard gray SILTSTONE interbedded with SANDSTONE; fine grained, slightly weathered, very thinly bedded, slightly fractured.							
							@ 32.8' - 33.0', clay seam.							
35		Core 120"	Rec 120"	RQD 100%	R-4		@ 38.0'-39.7', qu = 12,078 psi, SDI = 98.7%.							
40														
45														
50		Core 120"	Rec 120"	RQD 100%	R-5									
55							@ 56.6' - 57.5', vertical fracture.							
		Core 120"	Rec 120"	RQD 50%	R-6		@ 58.5'-59.9', qu = 10,818 psi, SDI = 98.0%.							

STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1343 | Location: Sta. 11+38.3, 100.0 ft. Rt of Rel. Shumway Hollow | Date Drilled: 09/25/06 to 09/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
26.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
60	695.1						Medium hard gray SILTSTONE interbedded with SANDSTONE; fine grained, slightly weathered, very thinly bedded, slightly fractured. @ 61.8' - 62.0', clay seam.							
65							@ 62.5'-62.9', 65.6'-65.9'; calcareous gray SANDSTONE; coarse grained.							
68.7	686.1	Core 120"	Rec 120"	RQD 83%	R-7		Hard gray SANDSTONE interbedded with SILTSTONE; fine grained, unweathered, laminated, unfractured. @ 68.9'-70.4', qu = 11,691 psi, SDI = 98.3%.							
70														
75							@ 76.7'-78.3', qu = 9,932 psi, SDI = 98.7%.							
80		Core 120"	Rec 120"	RQD 100%	R-8									
85.0	669.8	Core 18"	Rec 15"	RQD 83%	R-9		Bottom of Boring - 85.0'							

STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢⊣ LL / Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]IBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1344 | Location: Sta. 15+03.9, 100.0 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 09/20/06 to 09/21/06

WATER OBSERVATIONS: Water seepage at: Not reported
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0	732.8						Medium dense to dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.							
		4 12 15	10	1										
		8 9 16	15	2										
5		20 14 19	12	3										
8.5	724.3	50/3	3	4			Severely weathered gray SANDSTONE.							50+
10														
10.7	722.1	Core 60"	Rec 52"	RQD 42%	R-1		Medium hard brown and gray SANDSTONE; very fine grained, highly weathered to decomposed, laminated to thin bedded, moderately to highly fractured. @ 11.1', low angle fracture.							
15		Core 60"	Rec 59"	RQD 93%	R-2		@ 14.5'-24.1', slightly weathered, micaceous.							
20		Core 60"	Rec 60"	RQD 93%	R-3		@ 23.5'-23.7', high angle fracture. @ 24.1'-25.0', slightly weathered, argillaceous.							
25.0	707.8	Core 60"	Rec 60"	RQD 95%	R-4		Hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, slightly weathered, laminated to medium bedded, moderately fractured.							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1344 | Location: Sta. 15+03.9, 100.0 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 09/20/06 to 09/21/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
	703.0													
30		Core 60"	Rec 60"	RQD 85%	R-5		Hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, slightly weathered, laminated to medium bedded, moderately fractured. @ 31.9'-32.7', near vertical fracture.							
35		Core 60"	Rec 60"	RQD 100%	R-6									
40							@ 40.6'-40.8', high angle fracture. @ 40.8', thin clay seam.							
40.8	692.0	Core 60"	Rec 60"	RQD 88%	R-7		Medium hard gray SILTSTONE; slightly weathered, laminated to thinly bedded, highly fractured. @ 42.4'-42.9', decomposed and broken zone.							
42.9	689.9						Medium hard gray SANDSTONE interbedded with SILTSTONE; very fine grained, slightly weathered, laminated to thinly bedded, moderately fractured. @ 42.9'-43.8', 45.9'-46.1' , 46.6'-46.8', light gray calcareous SANDSTONE; coarse grained.							
45														
46.8	686.0	Core 60"	Rec 60"	RQD 68%	R-8		Medium hard to hard gray SANDSTONE; very fine grained, slightly weathered, micaceous, laminated to medium bedded, moderately fractured. @ 47.4', 47.9'-48.0', 48.6'-50.0', light gray calcareous SANDSTONE; coarse grained.							
50		Core 60"	Rec 58"	RQD 87%	R-9									
55.0	677.8						Bottom of Boring - 55.0'							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1345 | Location: Sta. 385+95.4, 48.8 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/27/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring); 35.9' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - PL — LL / Blows per foot - 10 20 30 40
0	724.9													
0.8	724.1	3 3 4	18	1			Topsoil - 10" Medium dense reddish brown SANDY SILT (A-4a), little gravel; contains roots; damp.							
3.5	721.4	11 23 24	18	2			Dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.							
5														
7.0	717.9	11 50/5	10	3										50+
10		Core 84"	Rec 81"	RQD 37%	R-1		Medium hard brown SANDSTONE; fine grained, moderately weathered, thin to medium bedded, modrately fractrured, contains iron inclusions.							
13.8	711.1													
15							Medium hard gray and brown SILTSTONE interbedded with SANDSTONE; fine grained, moderately weathered, thin to medium bedded, slightly fractured. @ 14.8'-14.9', 15.5'-15.6', 15,8'-15.9', clay seams.							
20		Core 120"	Rec 120"	RQD 72%	R-2		@ 20.3'-20.4', 20.6'-20.7', 22.3'-24.3', clay seams.							
25							@ 24.4'-24.8', coarse grained, calcareous SANDSTONE.							
25.8	699.1	Core 120"	Rec 117"	RQD 67%	R-3		Medium hard to hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, slightly weathered, argillaceous, very thinly bedded, moderately fractured. @ 28.5'-28.9',29.4'-29.5', coarse grained, calcareous SANDSTONE							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1345 | Location: Sta. 385+95.4, 48.8 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/27/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
35.9' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
30	695.1						Medium hard to hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, slightly weathered, argillaceous, very thinly bedded, moderately fractured.							
35		Core 120"	Rec 118"	RQD 90%	R-4		@ 36.9'-37.0',37.8'-38.0', calcareous zones.							
40														
45		Core 120"	Rec 120"	RQD 97%	R-5									
50							@ 53.8'-54.0', calcareous zone.							
55		Core 120"	Rec 120"	RQD 100%	R-6		@ 59.6'-60.2', calcareous zones. @ 59.2', pyritic.							

PL ⊢——⊣ LL; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring B-1345 | Location: Sta. 385+95.4, 48.8 ft. LT of TR 234 Ramp D BL | Date Drilled: 09/27/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
35.9' (includes drilling water, inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
60	665.2						Medium hard to hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, slightly weathered, argillaceous, very thinly bedded, moderately fractured.							
		Core 12"	Rec 12"	RQD 100%	R-7									
65.0	659.9						Bottom of Boring - 65.0'							
70														
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-1 | Location: Sta. 376+79.2, 265.1 ft. LT of SR 823 CL | Date Drilled: 06/07/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring); 2.0'(includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	646.7													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
0.5	646.2	4 6 5	11	1		--	Topsoil - 6" Stiff to very stiff mottled brown and gray SANDY SILT (A-4a), little clay, little gravel; contains roots and sandstone fragments; damp.	14	16	--	14	45	11	
4.5	642.2	6 50/3	7	2		--								50+
5		Core 60"	Rec 49"	RQD 85%	R-1		Medium hard to hard gray SANDSTONE; very fine grained, unweathered to slightly weathered, thinly bedded to medium bedded, moderately fractured.							
9.5	637.2						Bottom of Boring - 9.5'							
10														
15														
20														
25														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-2 | Location: Sta. 376+25.4, 180.0 ft. LT of SR 823 CL | Date Drilled: 06/07/06

WATER OBSERVATIONS: Water seepage at: Not reported
Water level at completion: 9.0'(with augers removed, includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	650.0												
0.4	649.6						Topsoil - 5"						
		7 7 14	13	1		--	Very stiff to hard brown SANDY SILT (A-4a), little to some clay, trace to little gravel; damp. @ 1.0'-5.0', contains sandstone fragments and roots.	15	15	--	16	35	19
		9 18 19	9	2		--		5	9	--	18	48	20
5		11 10 11	5	3		--		2	6	--	16	47	29
		5 12 49	13	4		--		1	8	--	29	45	17
10.0	640.0												
10.3	639.7						Medium hard brown SANDSTONE; fine grained, slightly weathered, thinly bedded, highly fractured.						
		Core 60"	Rec 50"	RQD 80%	R-1		Hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, thinly bedded to thickly bedded, moderately fractured. @ 10.5', 11.5', rust stained fractures.						
15		Core 60"	Rec 59"	RQD 88%	R-2								
20.0	630.0						Bottom of Boring - 20.0'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
61

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

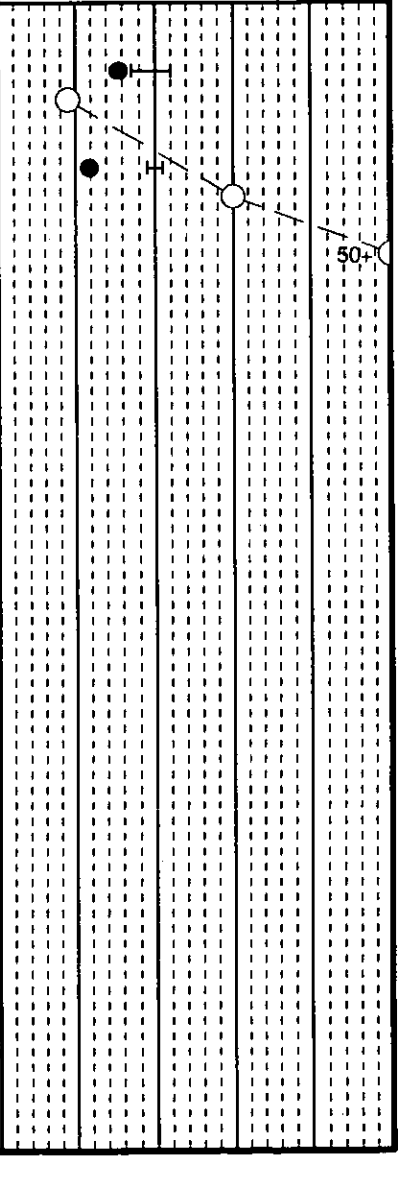
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring C-3 | Location: Sta. 374+20.2, 134.7 ft. RT of SR 823 CL | Date Drilled: 06/08/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	631.8						Topsoil - 5"						
1.0	630.8	5 4 5	12	1		--	Stiff brown SILT (A-4b), little to some clay, little fine to coarse sand; damp.	0	3	--	12	65	20
3.5	628.3	8 11 19	12	2		--	Very stiff to hard brown SANDY SILT (A-4a), little clay, trace gravel; damp.	9	25	--	19	32	15
5													
6.5	625.3	50/4	4	3		--	Medium hard brown and gray SANDSTONE; very fine grained, slightly to moderately weathered, laminated to medium bedded, moderately fractured.						
8.6	623.2						Medium hard to hard gray SANDSTONE; very fine grained, unweathered, thinly bedded to thickly bedded, moderately fractured.						
10		Core 102"	Rec 96"	RQD 76%	R-1		@ 9.5', rust stained fracture.						
							@ 13.2'-13.5', high angle rust stained fracture.						
15							@ 15.0'-16.0', highly fractured zone.						
		Core 60"	Rec 49"	RQD 43%	R-2		@ 17.8'-18.9', highly fractured zone.						
20.0	611.8						Bottom of Boring - 20.0'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

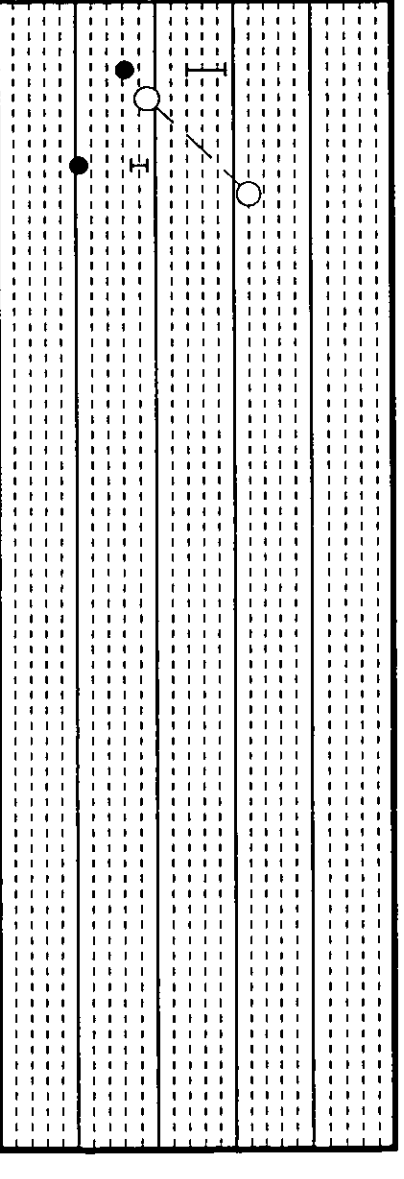
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring C-4 | Location: Sta. 373+44.7, 252.0 ft. RT of SR 823 CL | Date Drilled: 06/08/06

WATER OBSERVATIONS: Water seepage at: Not reported
Water level at completion: 4.5' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	621.6												
0.5	621.1	9 10 9	9	1		--	Topsoil - 6" Very stiff dark gray SILT (A-4b), little clay, trace gravel; contains roots; damp.	5	11	--	11	58	15
3.5	618.1	8 15 17	8	2		--	Hard mottled brown and gray SANDY SILT (A-4a), little clay, little gravel; contains roots; damp.	15	15	--	22	35	13
5													
5.5	616.1	Core 60"	Rec 45"	RQD 33%	R-1		Medium hard brown SANDSTONE; very fine to fine grained, moderately weathered, laminated to medium bedded, highly fractured.						
10													
10.5	611.1						Bottom of Boring - 10.5'						
15													
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-5 | Location: Sta. 364+58.5, 138.8 ft. RT of SR 823 CL | Date Drilled: 06/09/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	635.7													Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
0.2	635.5						Topsoil - 2"							
		2 7 21		1			Loose to medium dense brown SANDY SILT (A-4a), some to "and" gravel, trace clay; contains sandstone fragments; damp.							
3.0	632.7						Severely weathered brown SANDSTONE. (augered through rock)							
5.0	630.7	Core 60"	Rec 57"	RQD 88%	R-1		Medium hard gray SANDSTONE; fine grained, slightly weathered, laminated to thinly bedded, moderately fractured.							
10.0	625.7						Bottom of Boring - 10.0'							
15														
20														
25														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-6 | Location: Sta. 364+25.7, 61.6 ft. RT of SR 823 CL | Date Drilled: 06/08/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: 3.0'

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	631.4												
0.3	631.1	9 5 50/2	7	1			Topsoil - 4" Very dense brown SANDY SILT (A-4a), trace clay, trace gravel; contains roots; moist.	5	22	--	19	46	8
4.0	627.4						Medium hard brown and gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, thinly laminated to thinly bedded, highly fractured.						
8.0	623.4	Core 120"	Rec 113"	RQD 66%	R-1		Medium hard to hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, thinly laminated to medium bedded, moderately fractured. @ 11.6'-12.1', highly fractured.						
15.0	616.4	Core 12"	Rec 12"	RQD 75%	R-2		Bottom of Boring - 15.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-7 | Location: Sta. 353+85.2, 100.6 ft. LT of SR 823 CL | Date Drilled: 06/12/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0.2	629.1 / 628.9						Topsoil - 2"							
		50/3	2	1			Hard brown SILT AND CLAY (A-6a), little to some coarse sand, little fine sand; some gravel; damp to moist.							50/3
2.0	627.1						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, thinly bedded to medium bedded, slightly fractured.							
5		Core 60"	Rec 59"	RQD 95%	R-1									
7.0	622.1						Bottom of Boring - 7.0'							

STANDARD PENETRATION (N): Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-8 | Location: Sta. 353+88.2, 75.5 ft. RT of SR 823 CL | Date Drilled: 06/12/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	609.4													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
0.2	609.2						Topsoil - 2"							
		24 9 50/4		1			Hard brown SILT AND CLAY (A-6a), little coarse sand, little gravel, trace to little fine sand; moist.							50+
2.0	607.4						Very soft to soft brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous.							
3.0	606.4						Medium hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, laminated to thinly bedded, highly fractured.							
5		Core 60"	Rec 59"	RQD 93%	R-1									
							@ 7.8', Clay seam.							
8.0	601.4						Bottom of Boring - 8.0'							
10														
15														
20														
25														

GRADATION

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-9 | Location: Sta. 353+89.5, 152.3 ft. RT of SR 823 CL | Date Drilled: 06/12/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	603.4						
0.3	603.1						Topsoil - 3"
		7 14 34		1			Dense brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp.
3.0	600.4						Very soft to soft brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous.
4.4	599.0						Medium hard gray SANDSTONE; very fine grained, slightly weathered, thinly bedded to medium bedded, highly fractured.
5		Core 60"	Rec 48"	RQD 47%	R-1		
8.0	595.4						Bottom of Boring - 8.0'
10							
15							
20							
25							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-19 | Location: Sta. 403+22.2, 213.0 ft. LT of SR 823 CL | Date Drilled: 06/15/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	679.2												
0.6	678.6	10 11 15	18	1		4.5+	Topsoil - 7" Hard brown SANDY SILT (A-4a), little clay, little gravel; damp.	13	23	--	20	31	13
3.0	676.2	3 3 4	18	2		1.5	Stiff to very stiff brown and gray CLAY (A-7-6), trace to some silt, trace to little fine to coarse sand, trace gravel; (Varved); moist.						
5		2 3 5	18	3		1.75		5	0	--	0	7	88
		1 2 3	18	4		1.0							
10		1 2 2	18	5		1.0	@ 12.0', encountered thin layer of rock fragments.						
		2 3 3	18	6		1.5		2	0	--	0	12	86
15				P-1b	P-1	2.25		1 1	5 3	-- --	8 4	31 20	55 72
18.5	660.7	7 6 4	18	8		0.5	Soft to medium stiff brown SILT AND CLAY (A-6a), trace fine sand; moist.	0	0	--	1	63	36
20					P-2		@ 21.8', 4-inch thick fine sand layer; moist to wet .	0	0	--	1	62	37
22.5	656.7						Soft to medium stiff brown SILT (A-4b), trace to some fine sand, some clay; wet.	0	0	--	1	71	28
24.5	654.7	1 2 12	22	10		0.5	Medium dense brown SANDY SILT (A-4a); contains sandstone fragments; damp to moist.	1	9	--	24	45	21
25													
27.0	652.2	12 27 50/0	12	11			Soft to medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, laminated to very thinly bedded, moderately fractured, contains rust stains.						
		Core	Rec	RQD	R-1								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

65
57
66
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-19 | Location: Sta. 403+22.2, 213.0 ft. LT of SR 823 CL | Date Drilled: 06/15/06

WATER OBSERVATIONS: Water seepage at: Not reported; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	649.4	60"	60"	36%									
32.0	647.2						Bottom of Boring - 32.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-20 | Location: Sta. 404+01.2, 45.8 ft. RT of SR 823 CL | Date Drilled: 06/14/06

WATER OBSERVATIONS: Water seepage at: 20.0' - 27.5'
Water level at completion: 22.5' (prior to coring)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	671.2												
		7 8 8	9	1			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); damp.						
3.0	668.2												
5		7 11 8	16	2		4.5+	Hard brown SANDY SILT (A-4a), little clay, little fine gravel; damp.	12	25	--	15	32	16
		8 8 5	12	3		4.5+							
8.0	663.2				P-1		Stiff brown ELASTIC CLAY (A-7-5), little silt, trace fine sand; (Varved); damp to moist.	0	0	--	5	18	77
10													
10.5	660.7												
		2 3 6	23	5		0.25	Soft brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; moist.	3	3	--	16	30	48
14.0	657.2												
15		4 10 16	16	6			Medium dense brown FINE SAND (A-3), trace silty clay; damp.						
		7 9 9	21	7			@ 17.0', thin silty clay layer, encountered rock fragments.						
19.0	652.2												
20		9 4 3	17	8			Very loose to loose brown COARSE AND FINE SAND (A-3a), little silty clay, trace gravel; moist to wet.	0	2	--	81	17	
		20 24 17	19.5	9			@ 21.0'-22.5', dense. @ 21.0', encountered rock fragments.						
							@ 23.0', trace silty clay, wet.						
		1 1 1	16.5	10									
25							@ 26.0'-27.5', medium dense.						
		7 8 11	24	11									
28.0	643.2						Severely weathered gray SANDSTONE.						
29.0	642.2	50/3	4	12			Soft to medium hard gray SANDSTONE.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

51

Non-Plastic

50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-20 | Location: Sta. 404+01.2, 45.8 ft. RT of SR 823 CL | Date Drilled: 06/14/06

WATER OBSERVATIONS:
Water seepage at: 20.0' - 27.5'
Water level at completion: 22.5' (prior to coring)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	641.4	Core 60"	Rec 60"	RQD 85%	R-1		Soft to medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, laminated to very thinly bedded, moderately fractured, contains rust stains.						
34.0	637.2						Bottom of Boring - 34.0'						
35													
40													
45													
50													
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-21 | Location: Sta. 404+41.6, 187.4 ft. RT of SR 823 CL | Date Drilled: 06/15/06

WATER OBSERVATIONS: Water seepage at: 13.5' - 24.0'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	666.1												
0.7	665.4	6 6 10	15	1		4.5+	Topsoil - 8" Hard brown SANDY SILT (A-4a), little clay, trace to little gravel, contains organic material; damp.						
5		6 7 8	18	2		4.5+	@ 4.5', trace to little gravel.	9	25	--	21	30	15
5.5	660.6	5 10 10	18	3	P-1		Medium dense brown COARSE AND FINE SAND (A-3a), little to some silty clay; damp.	0	0	--	81	19	
10		3 4 7	18	5									
		3 4 11	18	6									
15.0	651.1	3 5 2	15	7			Very loose to loose brown COARSE AND FINE SAND (A-3a), little to some silty clay; moist to wet. @ 16.0', moist to wet. @ 18.0', wet.						
20		W O H	13	8									
20.5	645.6						Very soft to soft gray SILT AND CLAY (A-6a), trace fine sand; wet.	0	0	--	1	62	37
22.7	643.4				P-2	0.25							
		WOH 50/0	9	10			Very soft to soft gray SILT (A-4b), some clay, trace fine sand; wet.	0	0	--	1	71	28
24.3	641.8						Soft to medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, laminated to very thinly bedded, moderately fractured, contains rust stains.						
25		Core 60"	Rec 59"	RQD 86%	R-1								
29.3	636.8												

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-21 | Location: Sta. 404+41.6, 187.4 ft. RT of SR 823 CL | Date Drilled: 06/15/06

WATER OBSERVATIONS: Water seepage at: 13.5' - 24.0'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	636.2						Bottom of Boring - 29.3'							

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

30 35 40 45 50 55

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-41 | Location: Sta. 378+99.8, 57.4 ft. LT of TR 234 Ramp C BL | Date Drilled: 09/07/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring), 3.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	664.9												
0.3	664.6						Topsoil - 4"						
		7 9 10	13	1		4.5+	Hard brown SANDY SILT (A-4a), trace clay, trace gravel, dry to damp.						
3.0	661.9						Soft to medium hard brown SILTSTONE; arenacous, highly weathered to decomposed.						
		15 44 50/5	8	2		--	@ 4.5', encountered possible sandstone cobble.						
5													
		7 16 20	12	3		--							
8.5	656.4	50/5	5	4		--	Severely weathered brown SANDSTONE.						
10.0	654.9						Soft to medium hard brown SANDSTONE; fine grained to very fine grained argillaceous, highly weathered to decomposed, broken.						
12.3	652.6	Core 60"	Rec 56"	RQD 58%	R-1		Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, thinly bedded to medium bedded, highly fractured.						
15.0	649.9						@ 12.8', 13.0', 13.4', 13.5', clay seams.						
							Bottom of Boring - 15.0'						
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-42 | Location: Sta. 378+99.5, 63.7 ft. RT of TR 234 Ramp C BL | Date Drilled: 09/08/06

WATER OBSERVATIONS: Water seepage at: 12.0' - 15.0'
Water level at completion: 14.5' (prior to coring)
6.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	658.5						Topsoil - 11"						
0.9	657.6	12 10 8	18	1		4.5+	Very stiff to hard brown SANDY SILT (A-4a), trace to little clay, contains trace organic material, damp to moist. @ 3.5'-5.0', little to some clay, trace gravel.						
5		4 5 4	16	2		3.5							
		4 6 7	10	3		2.0							
8.0	650.5	5 6 34	18	4		3.0	Very stiff brown CLAY (A-7-6), trace to little silt, damp. @ 9.0', light gray.						
10.5	648.0	15 36 26	18	5		--	Very dense brown COARSE AND FINE SAND (A-3a), little to some silty clay, trace to little gravel, damp to moist.						
13.0	645.5	7 11 17	15	6		--	Soft to medium hard gray SANDSTONE; highly weathered to decomposed.						
15													
16.5	642.0	50/3	3	7		--	Medium hard gray SANDSTONE; fine grained, slightly weathered, thinly bedded to medium bedded, moderately fractured. @ 19.5', 19.6', 20.3', clay seams.						
		Core 60"	Rec 60"	RQD 86%	R-1								
20													
21.5	637.0						Bottom of Boring - 21.5'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
62
50+

FILE: 0121-3070-03 { 11/28/2006 1:29 PM }

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-43 | Location: Sta. 383+50.8, 85.5 ft. RT of TR 234 Ramp B BL | Date Drilled: 8/18/06 to 8/18/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	648.1						Topsoil - 9"						
1.0	647.1	8 7 10	18	1		3.0	Very stiff light brown SILT AND CLAY (A-6a), "and" fine sand, trace coarse sand; contains roots; moist.	0	2	--	46	25	27
3.5	644.6	7 7 9	15	2		3.0	Very stiff mottled brown and gray SILT AND CLAY (A-6a), little to some fine sand, trace coarse sand; moist.						
5		5 5 20	18	3		3.0		0	5	--	32	28	35
8.5	639.6	50/3	3	4			Very soft to soft gray SANDSTONE; very fine grained, decomposed.						
10.0	638.1	Core 60"	Rec 59"	RQD 95%	R-1		Medium hard gray SANDSTONE; fine grained, slightly weathered, medium bedded to thickly bedded, slightly fractured.						
15.0	633.1						Bottom of Boring - 15.0'						
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-44 | Location: Sta. 383+50.9, 60.6 ft. LT of TR 234 Ramp B BL | Date Drilled: 08/21/06

WATER OBSERVATIONS:
Water seepage at: 9.0'-12.5', 16.0'-16.5'
Water level at completion: 11.0' (prior to coring)
5.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	658.1													Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ (10 20 30 40)
0.6	657.5						Topsoil - 7"							
		7 8 9	16	1		4.0	Hard brown SILT AND CLAY (A-6a), little to some fine to coarse sand; damp to moist.							
							@ 3.5'-7.5', "and" fine to coarse sand.							
		6 7 8	16	2		4.5+		0	5	--	57	5	33	
5														
		5 7 7	15	3		4.5+								
8.0	650.1													
		9 8 8	18	4		-	Medium dense brown FINE SAND (A-3), trace silty clay, trace coarse sand, trace gravel; wet.							
10														
		2 1 2	18	5		-	@ 11.0'-12.5', very loose.	1	9	--	82	8		Non-Plastic
						1.0	@ 13.0'-13.6', sandy silt seam.							
13.6	644.5	1 2 3	18	6A 6B	P-1	0.25	Very soft to soft gray CLAY (A-7-6), trace silt; moist to wet.							
15														
15.5	642.6	10 50/5	9	7A 7B		- -	Very dense brown GRAVEL WITH SAND AND SILT (A-2-4), some fine to coarse sand, little silt, trace clay; moist to wet.							50+
17.0	641.1						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, thinly bedded to medium bedded, moderately fractured.							
		Core 60"	Rec 60"	RQD 96%	R-1									
20														
22.0	636.1						Bottom of Boring - 22.0'							
25														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * . 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-45 | Location: Sta. 32+47.9, 65.8 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 08/21/06 to 08/23/06

WATER OBSERVATIONS: Water seepage at: 11.0' - 12.5'
Water level at completion: 15.6' (prior to coring)
7.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	659.7												
0.4	659.3						Topsoil - 5"						
		4 4 5	18	1		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
3.0	656.7												
		5 6 7	12	2		4.5+	Hard brown SILTY CLAY (A-6b), "and" fine sand, damp.	0	0	--	56	18	26
5													
5.5	654.2												
		5 8 7	18	3		-	Medium dense brown COARSE AND FINE SAND (A-3a), little silty clay; damp.						
							@ 8.0', trace silty clay.						
		3 9 11	18	4		-		0	19	--	70	11	
10							@ 10.5', moist to wet.						
		9 13 7	18	5		-							
					P-1								
15.0	644.7						Very soft brown SILTY CLAY (A-6b), trace to little fine to coarse sand; moist to wet.						
		1 3 4	12	6		<0.25		0	7	--	8	45	40
18.5	641.2	50/3	3	7		-	Soft brown SANDSTONE; highly weathered to decomposed.						
20.0	639.7	Core 60"	Rec 60"	RQD 80%	R-1		Medium hard gray SANDSTONE; fine grained, slightly weathered, thinly bedded to medium bedded, moderately fractured. @ 20.2', 20.7', 21.0', thin clay seams.						
25.0	634.7						Bottom of Boring - 25.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-46 | Location: Sta. 32+47.8, 62.1 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 8/18/06 to 8/18/06

WATER OBSERVATIONS: Water seepage at: 8.5'-12.5', 16.0'-16.9'
Water level at completion: 9.2' (Prior to coring)
8.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	659.7						Topsoil- 8"						
1.0	658.7	8 7 7	12	1		4.5	Hard light brown SILTY CLAY (A-6b), little fine sand; damp.	0	2	--	24	31	43
		2 5 7	16	2		4.5							
5													
6.0	653.7	7 9 11	18	3			Medium dense light brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; moist to wet.	0	6	--	70	6	18
		3 5 6	18	4									
10		2 4 7	18	5									
13.5	646.2	1 1 1	16	6	P-1	0.5	Soft gray SILTY CLAY (A-6b); wet.	0	0	--	1	60	39
15							@ 16.0'-16.4', gravel seam.						
16.4	643.3	12 50/3	8	7			Soft gray SANDSTONE; very fine grained, highly weathered to decomposed.						
18.0	641.7						@ 18.0'-18.7', lost recovery.						
20		Core 60"	Rec 52"	RQD 74%	R-1		Medium hard to hard gray SANDSTONE; fine grained, slightly weathered, thinly bedded, moderately fractured.						
23.0	636.7						Bottom of Boring - 23.0'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ——— LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-47 | Location: Sta. 25+99.3, 58.2 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 08/25/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring); 5.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	718.0												
0.8	717.2	15 15 19	12	1		4.5+	Topsoil - 9" Hard brown SANDY SILT (A-4a), some fine to coarse sand, some gravel; damp.	24	14	--	10	39	13
3.0	715.0	24 23 27	6	2		-	Soft brown SILTSTONE; highly weathered to decomposed						
		9 16 21	10	3		-							
		45 42 50/3	13	4		-							
10.1	707.9	Core 60"	Rec 60"	RQD 68%	R-1		Medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, thinly bedded, highly fractured. @ 11.0'-11.1', coarse grained. @ 14.8', becomes gray.						
15.0	703.0						Bottom of Boring - 15.0'						
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]OMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-48 | Location: Sta. 26+00.0, 64.8 ft. RT of Rel Shumway Hollow CL | Date Drilled: 08/25/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring); 7.2' (includes drilling water

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	692.6												
0.8	691.8	14 14 13	15	1		4.5+	Topsoil - 9" Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel, damp.	9	7	--	6	48	30
3.0	689.6	10 10 13	12	2		4.5+	Hard mottled brown and gray CLAY (A-7-6), little to some silt, trace fine sand, trace gravel; damp.						
5		4 9 13	12	3		4.5+		2	0	--	1	22	75
		4 8 11	17	4		4.5+	@ 8.5'-10.0', grayish brown, little fine to coarse sand.						
10													
10.5	682.1	10 16 24	18	5A 5B		3.0	Very stiff brown CLAY (A-7-6), some silt, little fine to coarse sand, trace gravel; damp to moist.	1	4	--	5	33	57
14.5	678.1	22 17 50/4	9	6		-							
15.0	677.6	Core 60"	Rec 57"	RQD 83%	R-1		Soft brown SILTSTONE; highly weathered to decomposed. Medium hard brown SANDSTONE; very fine to fine grained, moderately weathered, laminated to thinly bedded, moderately fractured. @ 17.8'-18.0', lost recovery.						
20.0	672.6						Bottom of Boring - 20.0'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
56
50+

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-49 | Location: Sta. 27+17.4, 46.5 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 08/24/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring), 6.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	691.2												
0.6	690.6	8 12 9	14	1		4.5+	Topsoil - 7" Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel, moist.						
3.0	688.2	5 8 10	12	2		4.5+	Very stiff to hard mottled brown and gray CLAY (A-7-6), trace silt, trace fine sand; moist.						
5		3 4 4	16	3		2.5	@ 6.0'-7.5', grayish brown.	0	0	--	0	4	96
		2 5 6	18	4		3.0	@ 8.5'-12.5', brown.						
10		1 5 7	18	5		2.75							
		3 3 5	18	6		2.5	@ 13.5'-15.0', grayish brown.	0	0	--	1	9	90
15		1 2 6	18	7		2.5							
					P-1	2.0	@ 18.1', thin, hard silt layer.						
20		2 5 5	18	8		1.75	@ 21.0'-30.0, stiff.						
		2 3 4	18	9		1.5							
25		6 5 7	18	10		1.75		0	0	--	2	30	68
		3 5		11		1.5							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

66
75

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-49 | Location: Sta. 27+17.4, 46.5 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 08/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	661.4													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
30.0	661.2	4	18				Stiff to very stiff grayish brown SILTY CLAY (A-6b), trace fine sand; contains silt seams; moist.							
					P-2	2.5 1.25								
35														
39.0	652.2	27 50/3	9	12										50+
40.0	651.2						Severely weathered gray SILTSTONE.							
							Very soft to soft, gray SILTSTONE; highly weathered to decomposed, broken.							
41.8	649.4	Core 60"	Rec 60"	RQD 58%	R-1		Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, thinly bedded to medium bedded, moderately fractured.							
45.0	646.2						Bottom of Boring - 45.0'							
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-50 | Location: Sta. 27+16.1, 47.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 08/23/06 to 08/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
12.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	701.7												
0.7	701.0	7 8 8	12	1		4.5+	Topsoil - 8" Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; damp.						
3.0	698.7	4 5 7	10	2		4.5+	Very stiff to hard grayish brown CLAY (A-7 6), trace silt ,trace gravel; moist.						
5		2 3 4	13	3		2.5		2	0	--	0	3	95
					P-1	1.5	@ 8.0'-10.0', stiff.						
10		1 3 3	18	4		2.25							
		3 4 5	18	5		2.75							
15		3 5 4	18	6		2.0							
		1 2 3	18	7		1.75	@ 17.5', becomes gray. @ 18.5'-30.0', stiff.						
20					P-2	1.5							
		3 3 4	18	8		1.5		2	0	--	0	7	91
25		2 3 4	18	9		1.5							
		2 2		10		1.5							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
63
64

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring C-50 | Location: Sta. 27+16.1, 47.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 08/23/06 to 08/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
12.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	671.9	4	18				Very stiff grayish brown CLAY (A-7-6), trace silt, trace fine sand, trace gravel; moist.						
35		7 8 8	18	11		2.0							
38.5	663.2	4											
40		6 6	18	12		2.0	Very stiff grayish brown SILT AND CLAY (A-6a), trace fine sand, trace gravel; moist. @ 43.5'-45.0', mottled brown and gray.	1	0	--	1	61	37
45		14 9 14	10	13		3.25							
48.5	653.2	50/3	3	14		-	Severely weathered gray SILTSTONE.						
50.0	651.7	Core 60"	Rec 60"	RQD 66%	R-1		Very soft to soft gray SILTSTONE; highly weathered to decomposed, broken.						
55.0	646.7						Bottom of Boring - 55.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-209 | Location: Sta. 353+46.5, 29.0 ft. RT of SR 823 CL | Date Drilled: 9/1/04 to 9/2/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.5 (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0.2	634.4 / 634.2						Topsoil - 2"/11" soil removed before drilling
		8 9 18	18	1		4.5+	Hard brown SANDY SILT (A-4a); contains sandstone fragments; damp.
3.0	631.4						Severely weathered brown and gray SANDSTONE.
		50/4	4	2			
5							
		50/1	1	3			
8.0	626.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to massive, moderately to slightly fractured.
10		Core 60"	Rec 60"	RQD 100%	R-1		@ 9.1', argillaceous laminations.
							@ 11.8'-12.2', laminations.
15		Core 84"	Rec 84"	RQD 100%	R-2		
							@ 19.0', low angle fracture.
20.0	614.4						Bottom of Boring - 20.0'
25							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-210 | Location: Sta. 357+50.8, 44.4 ft. LT of SR 823 CL | Date Drilled: 8/26/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring), 6.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	680.0												
0.2	679.8						Topsoil - 2"						
		15 13 12	18	1		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
		22 17 15	18	2		4.5+							
5													
5.5	674.5						Very stiff to hard brown and gray CLAY (A-7-6); damp to moist.						
		2 9 10	18	3		4.5+							
		6 6 6	18	4		2.0							
10													
		3 5 5	18	5		2.25		0	0	--	0	9	91
		4 5 5	18	6		2.5							
15													
		3 5 6	18	7		1.5	@ 16.0'-26.3', medium stiff to stiff.						
		6 7 8	18	8		1.0	@ 18.5', dark brown and dark gray.						
20													
		5 6 6	18	9		1.0							
		6 9 8	18	10		1.25							
25													
26.3	653.7	8 10 12	18	11A 11B		0.75	Medium dense brown GRAVEL WITH SAND (A-1-b), trace silt; dry to damp.						
		4 4		12				11	51	--	32	6	

STANDARD PENETRATION (N) — Natural Moisture Content, % - ● — PL ⊢⊣ LL — Blows per foot - ○ (10, 20, 30, 40)

64

Non-Plastic

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-210 | Location: Sta. 357+50.8, 44.4 ft. LT of SR 823 CL | Date Drilled: 8/26/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	650.1	7	18				Medium dense brown GRAVEL WITH SAND (A-1-b), trace silt; dry to damp.						
32.0	648.0						Very dense brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; moist.						
35		9 14 41	18	13									
37.0	643.0						Severely weathered gray SANDSTONE.						
40		50/1	1	14									
40.5	639.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, moderately to slightly fractured. @ 42.4'-42.5', high angle clay filled fracture.						
45		Core 120"	Rec 120"	RQD 98%	R-1								
50													
50.5	629.5						Bottom of Boring - 50.5'						
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
55+
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]MBUS, OHIO 43229 * (614)888-0040

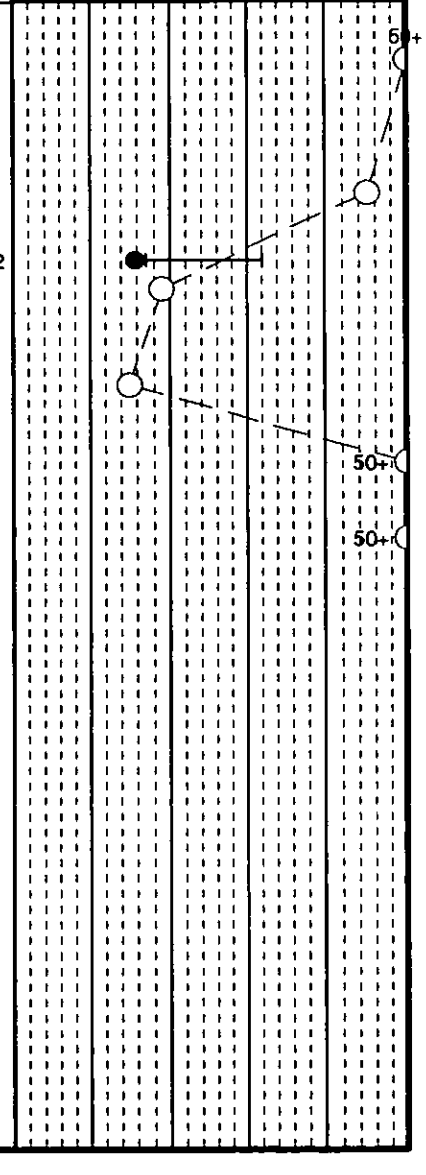
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-211 | Location: Sta. 357+51.4, 147.6 ft. RT of SR 823 CL | Date Drilled: 8/26/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	651.6						No Topsoil						
		50/5	5	1		2.5	Very stiff reddish brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; damp.						
		38 21 24	18	2		3.0							
5													
5.5	646.1												
		4 9 10	18	3		2.5	Very stiff brown SILT AND CLAY (A-6a), some fine to coarse sand, some gravel; contains sandstone fragments; damp.	20	12	--	18	28	22
		6 7 8	18	4		3.5							
10													
10.5	641.1						Severely weathered brown SANDSTONE.						
		35 50/3	9	5									
		50/1	1	6									
15													
15.5	636.1						Hard grayish brown SANDSTONE; very fine to fine grained, moderately weathered, pyritic, micaceous, thinly bedded to massive, slightly fractured.						
							@ 15.5'-15.6', rust stained.						
20		Core 120"	Rec 120"	RQD 100%	R-1								
25													
25.5	626.1						Bottom of Boring - 25.5'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-213 | Location: Sta. 361+59.9, 15.3 ft. RT of SR 823 CL | Date Drilled: 8/24/04 to 8/26/04

WATER OBSERVATIONS: Water seepage at: 23.5'
Water level at completion: None (prior to coring)
3.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
0	671.8	6 8 10	18	1		4.0	No Topsoil Very stiff light brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp to moist.							
3.0	668.8	7 8 11	18	2		2.0	Very stiff brown CLAY (A-7-6), trace to little fine to coarse sand; moist.							
5		8 11 11	18	3		3.0		0	1	--	9	23	67	65
		5 8 11	18	4		4.0								
10		4 5 8	18	5		4.0								
		4 5 7	18	6		2.5								
15		4 5 7	18	7		2.0								
		5 7 11	18	8		2.5								
20														
20.5	651.3	3 3 4	18	9			Loose orangish brown COARSE AND FINE SAND (A-3a); moist.	0	0	--	87	10	3	Non-Plastic
		4 4 5	18	10										
25														
25.5	646.3	40 45 50/4	16	11			Severely weathered brown and gray SANDSTONE.							50+
		33 50/2	8	12										50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-213 | Location: Sta. 361+59.9, 15.3 ft. RT of SR 823 CL | Date Drilled: 8/24/04 to 8/26/04

WATER OBSERVATIONS: Water seepage at: 23.5'
Water level at completion: None (prior to coring)
3.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30	641.9													
30.5	641.3	Core 120"	Rec 115"	RQD 85%	R-1		Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to massive, moderately to slightly fractured. @ 30.5'-30.7',32.7'-33.0', broken with typically low angle fractures. @ 30.5'-33.0', contains moderate argillaceous laminations.							
35														
40														
40.5	631.3						Bottom of Boring - 40.5'							
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-214 | Location: Sta. 364+08.0, 54.8 ft. LT of SR 823 CL | Date Drilled: 8/24/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	630.0 / 629.8						Topsoil - 2"/4" soil removed before drilling						
		10 14 15	18	1		3.5	Very stiff brown and gray SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; damp.						
5		8 10 15	18	2		3.0		20	8	--	14	41	17
5.5	624.5						Severely weathered gray and brown SANDSTONE.						
6.5	623.5	50/2	2	3			Hard gray and brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to massive.						
10		Core 78"	Rec 78"	RQD 96%	R-1		@ 6.5',6.6',7.3',7.4', 7.5'-8.5', low angle rust stained fractures.						
15		Core 84"	Rec 84"	RQD 100%	R-2		@ 16.3'-16.4', IRONSTONE.						
20.0	610.0						Bottom of Boring - 20.0'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-215 | Location: Sta. 363+95.9, 162.4 ft. RT of SR 823 CL | Date Drilled: 8/24/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢⊣ LL Blows per foot - ○ 10 20 30 40
0.2	614.4						Topsoil - 2"/1.2' soil removed before drilling							
	614.2	50/3	3	1			Severely weathered brown SANDSTONE.							50+
		50/1	1	2										50+
5.0	609.4	Core 90"	Rec 90"	RQD 100%	R-1		Hard gray and brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to massive, slightly fractured to unfractured.							
10							@ 11.0', low angle clay filled fracture.							
15		Core 96"	Rec 96"	RQD 100%	R-2									
20.0	594.4						Bottom of Boring - 20.0'							
25														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]UMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-217 | Location: Sta. 367+46.2, 65.9 ft. LT of SR 823 CL | Date Drilled: 8/20/04 to 8/23/04

WATER OBSERVATIONS: Water seepage at: 23.5'
Water level at completion: 25.9' (prior to coring)
6.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
0	673.3													
0.2	673.1						Topsoil - 2"							
		7 5 5	18	1		2.0	Very stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp to moist.							
3.0	670.3													
		7 9 9	18	2		3.5	Very stiff brown CLAY (A-7-6), little silt, trace fine to coarse sand; damp to moist.							
5		4 5 9	13	3		3.75								
		4 5 8	14	4		2.5								
10		5 5 9	18	5		1.5		0	1	--	1	15	83	68
		4 6 7	18	6		2.5								
15														
15.5	657.8						Medium dense brown COARSE AND FINE SAND (A-3a), little silt; dry to damp.							
		4 12 12	18	7										
		5 7 9	18	8										
20							@ 21.0', orangish brown.							
		8 10 10	18	9				0	1	--	82	17		Non-Plastic
		8 9 10	18	10										
25														
25.5	647.8						Medium dense to dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; contains sandstone fragments; moist.							
		9 35 50/4	17	11										50+
		12 12		12			@ 28.5', wet.							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-217 | Location: Sta. 367+46.2, 65.9 ft. LT of SR 823 CL | Date Drilled: 8/20/04 to 8/23/04

WATER OBSERVATIONS: Water seepage at: 23.5'
Water level at completion: 25.9' (prior to coring)
6.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢⊣ LL Blows per foot - ○ 10 20 30 40
30	643.4	12	12				Medium dense to dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; contains sandstone fragments; wet.							
32.0	641.3						Hard light gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, slightly argillaceous, laminated to medium bedded, contains occasional dark gray laminae.							
35		Core 120"	Rec 116"	RQD 94%	R-1		@ 36.0'-36.8', highly weathered, broken zone with loss.							
40														
42.0	631.3						Bottom of Boring - 42.0'							
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-218 | Location: Sta. 367+47.7, 112.9 ft. RT of SR 823 CL | Date Drilled: 8/19/04 to 8/20/04

WATER OBSERVATIONS: Water seepage at: 8.5'
Water level at completion: 15.4' (prior to coring)
4.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	659.2													Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0.3	658.9						Topsoil - 3"							
		8 8 8	18	1		4.5+	Very stiff to hard orangish brown SILT AND CLAY (A-6a), trace gravel, trace fine to coarse sand; contains roots; damp.							
		8 8 8	18	2		3.5								
5														
5.5	653.7						Medium dense to dense orangish brown COARSE AND FINE SAND (A-3a), little silt, trace gravel; moist to wet.							
		9 11 15	18	3										
		8 16 16	14	4				3	32	--	53	12		● Non-Plastic
10														
		4 3 3	12	5										
		3 3 3	2	6										
15														
15.5	643.7						Medium dense brown and gray GRAVEL WITH SAND AND SILT (A-2-4); contains sandstone fragments; wet.							
		10 14 50/2	12	7										
17.5	641.7	50/2	2	8			Severely weathered brown SANDSTONE.							50+ 50+
18.5	640.7						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, slightly fractured. @ 20.7',27.4',28.7', low angle fractures.							
20														
		Core 120"	Rec 120"	RQD 98%	R-1									
25														
28.5	630.7						Bottom of Boring - 28.5'							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-220 | Location: Sta. 370+96.8, 24.0 ft. LT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 33.5'; Water level at completion: 34.9' (prior to coring), 5.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	681.3												
0.3	681.0						Topsoil - 3"						
		8 6 6	18	1		4.0	Very stiff light brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
3.0	678.3												
		6 7 8	18	2		3.5	Stiff to very stiff brown CLAY (A-7-6), trace fine to coarse sand, trace silt; damp to moist.	0	0	--	0	5	95
5		5 5 5	18	3		1.25		0	0	--	1	2	97
		2 3 3	18	4		1.5							
10		3 6 6	18	5		2.5							
		3 3 4	18	6		1.5							
15		3 4 4	18	7		1.0							
		4 5 6	18	8		1.0							
20													
21.8	659.5	9 10 10	18	9A 9B		1.25	Loose to medium dense brown FINE SAND (A-3), trace silt; moist.						
		2 2 2	18	10				0	6	--	88	6	
25		2 2 5	18	11									
		5 5		12			@ 28.5', damp.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

72
74
Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-220 | Location: Sta. 370+96.8, 24.0 ft. LT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 33.5'
Water level at completion: 34.9' (prior to coring)
5.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
30	651.4	6	18				Loose to medium dense brown FINE SAND (A-3), trace silt; moist.							
32.0	649.3	8 9 11	18	13			Medium dense dark brown COARSE AND FINE SAND (A-3a); moist.							
38.5	642.8	Core 120"	Rec 120"	RQD 100%	R-1		Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, slightly fractured. @ 38.5'-38.8', rust stained. @ 43.3', 45.3', 45.8' low angle fractures							
48.5	632.8						Bottom of Boring - 48.5'							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-221 | Location: Sta. 370+97.1, 106.2 ft. RT of SR 823 CL | Date Drilled: 8/14/04 to 8/19/04

WATER OBSERVATIONS: Water seepage at: 13.5'
Water level at completion: 14.4' (prior to coring)
4.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	664.3												
0.2	664.1						Topsoil - 2"						
		10 7 9	18	1		3.25	Very stiff brown CLAY (A-7-6), trace to little silt; damp to moist.						
		6 7 8	18	2		3.5							
5		3 5 8	18	3		2.0		0	0	--	1	10	89
8.0	656.3												
		4 5 7	18	4			Loose to medium dense light brown COARSE AND FINE SAND (A-3a), little silt; dry.	0	0	--	84	16	
10		7 4 4	18	5			@ 11.0', redish brown; damp.						
		2 2 2	18	6			@ 13.5'-17.5', wet.						
15		1 1 1	18	7			@ 16.0'-17.5', very loose.						
		3 3 7	18	8									
20													
21.0	643.3	50/0	0	9			Hard light brown SANDSTONE; very fine to fine grained, moderately weathered, micaceous, slightly argillaceous, laminated to medium bedded. @ 21.0'-21.4', brown, moderately weathered. @ 21.4',21.6',21.9', low angle weathered fracture. @ 23.9'-24.0', low angle clay filled fracture with very small rock fragments. @ 25.1', low angle weathered fracture.						
25		Core 120"	Rec 120"	RQD 92%	R-1								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

68
Non-Plastic
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-221 | Location: Sta. 370+97.1, 106.2 ft. RT of SR 823 CL | Date Drilled: 8/14/04 to 8/19/04

WATER OBSERVATIONS:
Water seepage at: 13.5'
Water level at completion: 14.4' (prior to coring)
4.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
30	634.4						Hard light brown SANDSTONE.							
31.0	633.3						Bottom of Boring - 31.0'							
35														
40														
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-317 | Location: Sta. 375+24.5, 159.5 ft. LT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: 8.5'
Water level at completion: 12.3' (prior to coring)
6.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0	657.1													
0.3	656.8	39 23 26	18	1			Topsoil - 3"/1.8' soil removed before drilling Dense brown SANDY SILT (A-4a), little gravel; contains sandstone fragments; dry to damp.							
3.0	654.1	10 11 12	18	2		4.5+	Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp.							
5		10 15 19	18	3		4.5+								
8.5	648.6	15 40 42	18	4			Dense brown GRAVEL WITH SAND (A-1-b), trace clay; damp.							82
10		14 32 50/5	17	5										50+
13.0	644.1	50/4	4	6			Severely weathered brownish gray SANDSTONE argillaceous, micaceous.							50+
15.0	642.1						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, moderately fractured, with typically low angle clay filled fractures.							
20		Core 120"	Rec 114"	RQD 92%	R-1									
25.0	632.1						Bottom of Boring - 25.0'							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-318 | Location: Sta. 375+20.0, 48.4 ft. RT of SR 823 CL | Date Drilled: 2/1/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
None (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	631.7												
0.3	631.4						Asphalt concrete - 4"						
		18 18 10	14	1			Medium dense brownish gray SILT (A-4b), some gravel, little fine to coarse sand, trace clay; contains sandstone fragments; damp.						
							@ 3.5', brown.						
		4 8 8	13	2									
5													
5.5	626.2						Severely weathered gray SANDSTONE argillaceous, micaceous.						
		39 50/2	8	3									
		50/5	4	4									
9.0	622.7						Medium hard to hard gray to SANDSTONE, very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thick bedded, highly to moderately fractured.						
10													
		Core 120"	Rec 112"	RQD 77%	R-1								
15													
19.0	612.7						Bottom of Boring - 19.0'						
20													
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

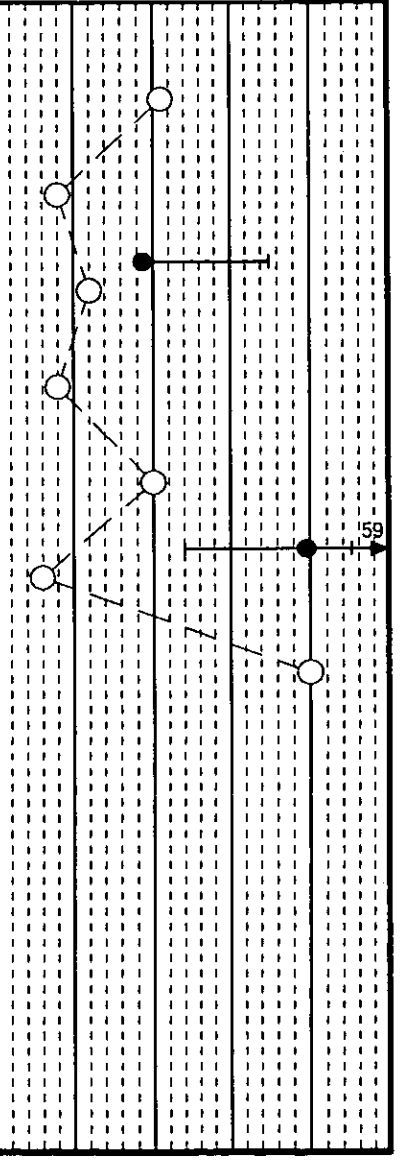
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-321 | Location: Sta. 379+12.0, 6.0 ft. RT of SR 823 CL | Date Drilled: 8/26/04

WATER OBSERVATIONS: Water seepage at: 13.5'
Water level at completion: 12.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	661.9												
0.4	661.5	10 9 12	10	1		--	Topsoil - 5" Very stiff to hard brown SILTY CLAY (A-6b), "and" fine sand, trace gravel; damp.						
5		5 4 4	13	2		4.0							
		3 6 6	12	3		3.5	@ 6.0', orangeish brown.	0	1	--	57	42	
8.0	653.9	3 4 4	14	4			Loose to medium dense orangeish brown COARSE AND FINE SAND (A-3a), little silt; moist.						
10		3 6 14	13	5									
13.0	648.9	2 2 4	12	6		0.25	Very soft light brown CLAY (A-7-6), some silt, trace fine to coarse sand; moist.	0	1	--	2	22	75
15													
15.5	646.4	6 22 18	14	7			Dense brown SANDY SILT (A-4a), some gravel, trace clay; moist.						
18.5	643.4												
20		Core 78"	Rec 70"	RQD 23%	R-1		Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to meduim, highly fractured, with typically low angle clay filled fractures; contains few to moderate argillaceous laminations. @ 22.7'-23.0',24.0'-24.4', high angle fractures.						
25.0	636.9						Bottom of Boring - 25.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-323 | Location: Sta. 387+22.9, 111.9 ft. LT of SR 823 CL | Date Drilled: 8/23/04 to 8/24/04

WATER OBSERVATIONS: Water seepage at: 48.5'
Water level at completion: 15.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	699.7						Topsoil - 12"						
1.0	698.7	8 6 7	10	1		4.5+	Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand; dry to damp.						
3.0	696.7	4 5 7	18	2		4.5+	Very stiff to hard brown and gray CLAY (A-7-6), trace fine to coarse sand; damp to moist.						
5		3 3 4	18	3		2.0		0	0	--	1	7	92
		2 3 4	18	4	P1	2.0							
10		2 4 5	18	5		2.5							
		2 4 5	18	6		2.5							
15		3 4 5	18	7		1.75	@ 16.0'-22.5', stiff.						
		2 4 5	18	8	P2	1.5							
20		2 4 5	18	9		1.75							
		3 5 6	18	10		2.75							
25		4 4 5	18	11		2.0	@ 26.0', gray.						
		3 3		12		1.5	@ 28.5'-30.0', stiff.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
61

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring R-323 | Location: Sta. 387+22.9, 111.9 ft. LT of SR 823 CL | Date Drilled: 8/23/04 to 8/24/04

WATER OBSERVATIONS: Water seepage at: 48.5'
Water level at completion: 15.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
30	669.8	3	18				Very stiff brown and gray CLAY (A-7-6); dry to damp.							
35		2 3 4	18	13		0.75	@ 33.5'-35.0', medium stiff, contains sand seams.							
40		4 6 8	18	14		3.0	@ 38.5'-40.0', brown, some fine to coarse sand.							
42.0	657.7													
45		5 9 9		15			Medium dense light brown COARSE AND FINE SAND (A-3a), little silt; dry.	0	0	--	85	15		Non-Plastic
50		5 7 9	15	16			@ 48.5', trace gravel; wet.							
55		40 30 37	18	17			@ 53.5', gray.							67
57.0	642.7													
							Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to massive.							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring R-323 | Location: Sta. 387+22.9, 111.9 ft. LT of SR 823 CL | Date Drilled: 8/23/04 to 8/24/04

WATER OBSERVATIONS: Water seepage at: 48.5'
Water level at completion: 15.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢⊣ LL Blows per foot - ○ 10 20 30 40
60	640.0	Core 120"	Rec 120"	RQD 91%	R-1		Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to massive, moderately to slightly fractured.							
65							@ 57.0'-57.9', broken zone with rust stained fractures.							
67.0	632.7						Bottom of Boring - 67.0'							
70														
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring R-326 | Location: Sta. 387+27.3, 122.5 ft. RT of SR 823 CL | Date Drilled: 8/24/04

WATER OBSERVATIONS: Water seepage at: 23.6'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	674.0												
0.3	673.7						Topsoil - 4"						
		4 5 6	12	1		3.0	Stiff to very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.						
		4 4 10	3	2		--		8	7	--	12	53	20
5		9 13 17	16	3		3.0							
8.0	666.0						Stiff brown CLAY (A-7-6), trace fine to coarse sand; damp to moist.						
		3 5 6	13	4		2.0							
10													
		3 4 5	18	5		1.5		0	2	--	2	20	76
13.0	661.0						Medium dense brown FINE SAND (A-3), trace silt; dry.						
		2 7 8	16	6				0	5	--	89	6	
15		6 7 9	14	7									
		3 5 5	12	8									
20													
20.5	653.5						Medium dense orangeish brown COARSE AND FINE SAND (A-3a), little silt; moist to wet.						
		6 6 6	14	9									
		1 1 1	9	10			@ 23.5'-27.5', very loose to loose.						
25													
		0 2 3	18	11									
28.0	646.0						Very soft gray SILT AND CLAY (A-6a), little to some fine to coarse sand; moist.						
		0 7		12		<0.25		0	11	--	9	38	42

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

58

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-326 | Location: Sta. 387+27.3, 122.5 ft. RT of SR 823 CL | Date Drilled: 8/24/04

WATER OBSERVATIONS: Water seepage at: 23.6'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	644.1	10	18				Very soft gray SILT AND CLAY (A-6a), little to some fine to coarse sand; moist.							Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
33.5	640.5						Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, thinly bedded to thickly bedded, highly to moderately fractured; contains few argillaceous laminations.							
35		Core 120"	Rec 120"	RQD 59%	R-1		@ 33.6',34.1',34.6', 35.0', 39.6', low angle clay filled fractures.							
40							@ 35.4'-35.8', high angle clay filled fracture.							
43.5	630.5						Bottom of Boring - 43.5'							
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-328 | Location: Sta. 391+22.6, 2.1 ft. RT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 5.0', 38.5'-48.5'
Water level at completion: 42.0' (prior to coring)
33.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	692.5												
0.3	692.2						Topsoil - 4"						
		7 9 9	18	1		4.5+	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp.	7	9	--	19	43	22
3.0	689.5						Stiff to very stiff brown and gray CLAY (A-7-6); moist.						
		3 3 4	18	2		3.0							
5		3 3 5	18	3		1.5							
		3 2 3	18	4		2.5							
10		2 3 4	18	5		2.0							
		2 3 5	18	6		2.0							
15		7 4 4	18	7		2.25		0	0	--	0	13	87
		2 3 3	18	8		1.5							
20		2 2 6	18	9		3.5							
		2 2 3	18	10		1.5							
25		3 4 6	18	11		1.0							
		2 2		12		0.75	@ 28.5'-30.0', medium stiff.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40
62

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-328 | Location: Sta. 391+22.6, 2.1 ft. RT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS:
Water seepage at: 5.0', 38.5'-48.5'
Water level at completion: 42.0' (prior to coring)
33.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	662.7												
30.0	662.5	3	18				Medium dense brown FINE SAND (A-3), trace silt; dry.						
		6 11 11	18	13									
35													
		6 5 6	18	14			@ 38.5', moist to wet.						
40													
		4 5 11	18	15									
45													
47.0	645.5						Medium stiff gray SILTY CLAY (A-6b), trace fine to coarse sand; contains sand seams; moist.						
		1 1 2	18	16		0.5		0	0	--	0	60	40
50													
51.0	641.5						Hard gray SANDSTONE, very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, massively bedded, slightly fractured.						
		Core 120"	Rec 120"	RQD 65%	R-1		@ 51.9',52.7', low angle clay filled fractures.						
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-328 | Location: Sta. 391+22.6, 2.1 ft. RT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 5.0', 38.5'-48.5'
Water level at completion: 42.0' (prior to coring)
33.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60	632.8						Hard gray SANDSTONE.							Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
61.0	631.5						Bottom of Boring - 61.0'							
65														
70														
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-329 | Location: Sta. 391+25.0, 98.3 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: 8.5', 33.5'
Water level at completion: 12.2' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	683.2												
1.0	682.2	4 6 10	18	1		4.5+	Topsoil - 12" Hard brown SANDY SILT (A-4a), some clay, little gravel; contains roots; damp.						
5		6 14 18	18	2		4.5+	@ 3.5', brown and gray.	12	12	--	17	33	26
5.5	677.7	5 7 8	18	3		3.5	Stiff to very stiff brown and gray CLAY (A-7-6), little fine to coarse sand, trace gravel; damp to moist.						
10		3 4 4	18	4		1.5							
		1 1 3	24	5	P-1	2.5		0	0	--	0	40	60
		2 1 2	18	6		2.75							
15		2 3 5	16	7		1.25							
		1 2 3	18	8	P2	1.5							
20		3 3 5	18	9		1.0							
23.0	660.2												
		4 10 12	18	10			Medium dense brown FINE SAND (A-3); dry.						
25		3 6 16	18	11									
		4 7		12			@ 28.5'-30.0', some silt; damp.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

72

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-329 | Location: Sta. 391+25.0, 98.3 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: 8.5', 33.5'
Water level at completion: 12.2' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	653.3	7	18				Loose brown FINE SAND (A-3); wet.						
		4 3 2	18	13									
37.0	646.2						Medium stiff to stiff gray SILT AND CLAY (A-6a), little fine to coarse sand; moist.						
		1 50/4	12	14		1.0		0	6	--	6	47	41
40.5	642.7						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to massive, moderately fractured; contains few argillaceous laminations and small clasts. @ 41.0',41.6',42.9', low angle fractures. @ 42.5', low angle rust stained fracture. @ 47.2', low angle fracture.						
		Core 120"	Rec 120"	RQD 48%	R-1								
50.5	632.7						Bottom of Boring - 50.5'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-331 | Location: Sta. 395+20.9, 89.9 ft. LT of SR 823 CL | Date Drilled: 8/17/04 to 8/18/04

WATER OBSERVATIONS: Water seepage at: 3.5', 48.5'
Water level at completion: 15.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	697.6												
0.3	697.3						Topsoil - 3"						
		7 17 16	18	1			Medium dense to dense brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp.						
		9 9 9	18	2									
5													
5.5	692.1						Stiff to very stiff brown and gray CLAY (A-7-6), trace fine sand; moist.						
		4 5 8	18	3		3.5							
		2 4 5	18	4	P1	4.5+	@ 8.5'-10.0', hard.	0	0	--	0	50	50
10													
		2 2 4	18	5		1.5							
		2 3 4	18	6		2.0							
15													
		2 3 5	18	7		2.0							
		WOH 1 2	18	8	P2	0.5	@ 18.0'-27.5', medium stiff, gray.						
20													
		1 1 2	18	9		0.5							
		1 1 2	18	10		0.75		0	0	--	1	9	90
25													
		1 2 3	18	11		0.5							
		1 2		12		1.25							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40
63
65

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD * COLUMBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-331 | Location: Sta. 395+20.9, 89.9 ft. LT of SR 823 CL | Date Drilled: 8/17/04 to 8/18/04

WATER OBSERVATIONS: Water seepage at: 3.5', 48.5'
Water level at completion: 15.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	667.8	3	18				Medium stiff to stiff brown and gray CLAY (A-7-6); moist.						
35		1 2 3	18	13		0.5							
40		2 3 6	18	14		2.0	@ 38.5'-40.0', dark brown.						
42.0	655.6						Medium dense brown FINE SAND (A-3), trace silt, trace coarse sand; dry.						
45		9 11 12	18	15									
47.0	650.6						Soft gray SILT AND CLAY (A-6a), trace fine sand; moist.						
50		2 4 4	18	16		0.25		0	0	--	2	65	33
52.0	645.6						Very dense brown and black COARSE AND FINE SAND (A-3a), little gravel; contains coal fragments; moist.						
55.0	642.6	24 50/2	6	17									
55.4	642.2						Medium hard brown SANDSTONE; fine to medium grained, highly weathered, broken with typically high angle rust stained fractures .						
							Hard gray SANDSTONE, very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, massive, slightly						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢—⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD[illegible]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-331 | Location: Sta. 395+20.9, 89.9 ft. LT of SR 823 CL | Date Drilled: 8/17/04 to 8/18/04

WATER OBSERVATIONS: Water seepage at: 3.5', 48.5'
Water level at completion: 15.0' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
60	637.9	Core 120"	Rec 120"	RQD 97%	R-1		fractured . Hard gray SANDSTONE, very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, massive, slightly fractured .							
65.0	632.6						Bottom of Boring - 65.0'							
70														
75														
80														
85														

STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢——⊣ LL / Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-333 | Location: Sta. 395+25.2, 132.0 ft. RT of SR 823 CL | Date Drilled: 8/24/04 to 8/25/04

WATER OBSERVATIONS: Water seepage at: 6.0', 43.5'
Water level at completion: 17.5' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	693.7												
0.3	693.4						Topsoil - 4"						
		4 6 6	18	1		4.5+	Very stiff to hard brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand; damp.						
		2 2 2	8	2		3.0							
5		1 1 1	10	3		1.0	@ 6.0'-12.5', medium stiff.						
		1 1 2	18	4		0.75							
10		WOH 2 2	18	5		0.5		0	1	--	3	74	22
		4 7 11	18	6		4.5							
15													
15.5	678.2												
		3 4 8	18	7		2.0	Stiff to very stiff brown and gray CLAY (A-7-6), trace silt, trace fine to coarse sand; damp to moist.						
		2 4 6	18	8		3.0							
20		2 3 4	18	9		2.5		0	1	--	0	3	96
		3 4 5	18	10		2.75							
25		2 2 5	18	11		1.75							
		2 4		12		2.0							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

72

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [illegible]US, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-333 | Location: Sta. 395+25.2, 132.0 ft. RT of SR 823 CL | Date Drilled: 8/24/04 to 8/25/04

WATER OBSERVATIONS: Water seepage at: 6.0', 43.5'
Water level at completion: 17.5' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	663.8	4	18				Stiff to very stiff brown and gray CLAY (A-7-6), trace silt, trace fine to coarse sand; damp to moist.						
32.0	661.7						Medium dense light brown FINE SAND (A-3); dry.						
35		4 11 12	18	13									
		6 5 6	18	14			@ 38.5', orangeish brown.	0	0	--	90	10	
40													
		1 1 2	18	15			@ 43.5'-45.0', very loose, wet.						
45													
47.0	646.7						Very loose gray SILT (A-4b), little to some clay; wet.						
		1 1 2	18	16									
50													
51.5	642.2						Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, micaceous, argillaceous, massively bedded, slightly fractured.						
55		Core 120"	Rec 112"	RQD 73%	R-1		@ 51.5'-51.7', broken zone.						

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-333 | Location: Sta. 395+25.2, 132.0 ft. RT of SR 823 CL | Date Drilled: 8/24/04 to 8/25/04

WATER OBSERVATIONS: Water seepage at: 6.0', 43.5'
Water level at completion: 17.5' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
60	634.0						Hard gray SANDSTONE.							
61.5	632.2						Bottom of Boring - 61.5'							
65														
70														
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-335 | Location: Sta. 399+23.9, 6.0 ft. RT of SR 823 CL | Date Drilled: 8/23/04

WATER OBSERVATIONS: Water seepage at: 38.5'; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	686.1												
0.3	685.8						Topsoil - 3"						
		5 5 5	12	1		4.5+	Very stiff to hard light brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp to moist.						
		6 9 11	16	2		4.0		1	5	--	5	66	23
5		8 8 11	17	3		2.0							
8.0	678.1						Stiff to very stiff brown CLAY (A-7-6), trace fine to coarse sand; moist.						
		4 4 8	9	4		3.5							
10		4 4 4	4	5		1.75							
							@ 13.0'-13.5', SILT AND CLAY (A-6a); wet.						
		2 2 3	18	6	P1			1 0	6 0	-- --	2 0	38 41	53 59
15		2 3 4	18	7		2.25							
		1 3 3	18	8		1.0							
20		3 4 4	18	9		1.5							
							@ 23.5'-25.5', medium stiff, gray.						
		1 2 2	18	10		0.75							
25		2 3 4	18	11		1.75							
28.0	658.1						Medium dense light brown FINE SAND (A-3); dry.						
		5 7		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

84

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-335 | Location: Sta. 399+23.9, 6.0 ft. RT of SR 823 CL | Date Drilled: 8/23/04

WATER OBSERVATIONS: Water seepage at: 38.5'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
30	656.3	10	18				Medium dense light brown FINE SAND (A-3); dry.							
		6 5 4	12	13			@ 33.5'-35.0', orangish brown, damp.							
38.0	648.1	7 4 4	18	14		<0.25	Very soft gray SILT (A-4b), trace clay, trace fine to coarse sand; moist to wet.							
44.0	642.1	50/0	0	15										50+
45		Core 120"	Rec 120"	RQD 39%	R-1		Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly bedded to massive, moderately fractured; contains few argillaceous laminations. @ 44.5',44.7',45.6', low angle fractures.							
49.7	636.4						Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, micaceous, argillaceous, medium to massively bedded, slightly fractured to unfractured. @ 46.2',48.1',49.5', low angle fractures.							
54.0	632.1						Bottom of Boring - 54.0'							
55														

FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

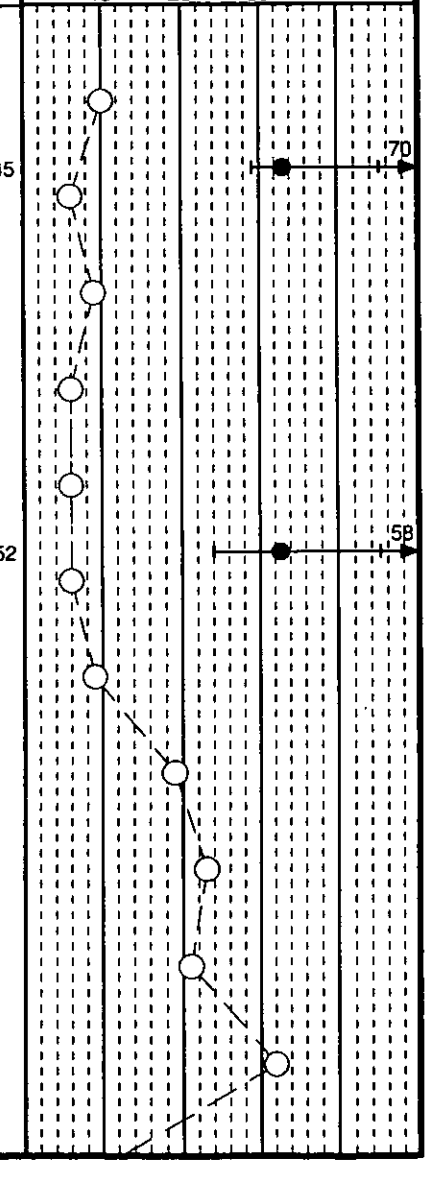
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-339 | Location: Sta. 403+20.1, 2.5 ft. RT of SR 823 CL | Date Drilled: 8/20/04

WATER OBSERVATIONS: Water seepage at: 23.5'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	675.8												
1.0	674.8	5 6 4	14	1			Topsoil-4" Loose to medium dense brown COARSE AND FINE SAND (A-3a); contains weathered sandstone fragments; dry.						
3.0	672.8	3 3 3	9	2		2.5	Stiff to very stiff brown and gray CLAY (A-7-6), trace fine to coarse sand, trace gravel; moist.	1	1	--	1	52	45
5		3 4 5	10	3		2.0							
		2 3 3	10	4		1.5							
10		2 2 4	18	5		1.5							
		1 3 3	18	6		1.75		0	0	--	1	47	52
15		2 4 5	18	7		2.0							
18.0	657.8	8 8 11	15	8			Medium dense to dense orangeish brown FINE SAND (A-3); dry to damp.						
20		8 10 13	14	9									
		5 8 13	18	10			@ 23.5', moist.						
25		5 19 13	15	11			@ 26.0', wet.						
28.0	647.8	0 4		12		<0.25	Very soft gray SILTY CLAY (A-6b), trace to little fine to coarse sand; moist to wet.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]US, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-339 | Location: Sta. 403+20.1, 2.5 ft. RT of SR 823 CL | Date Drilled: 8/20/04

WATER OBSERVATIONS: Water seepage at: 23.5'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	645.9	7	18				Very soft gray SILTY CLAY (A-6b), trace to little fine to coarse sand; moist to wet.						
33.5	642.3						Medium hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, argillaceous, medium to massive bedding, highly to moderately fractured.						
35		Core 72"	Rec 70"	RQD 65%	R-1		@ 34.3'-34.6', sand and clay filled fractures.						
							@ 38.6'-39.1', broken with typical high angle fractures.						
39.5	636.3						@ 30.5'-31.4', high angle fractures.						
40							Bottom of Boring - 39.5'						
45													
50													
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

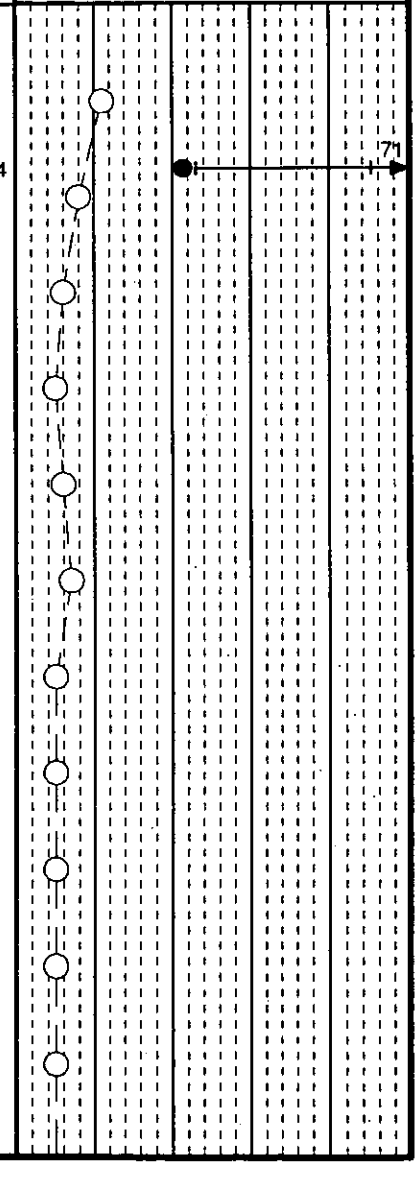
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-341 | Location: Sta. 407+19.9, 108.1 ft. LT of SR 823 CL | Date Drilled: 8/19/04 to 8/20/04

WATER OBSERVATIONS: Water seepage at: 38.5'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	698.2												
1.0	697.2	3 5 6	12	1		4.5+	Topsoil-3" Medium stiff to stiff brown CLAY (A-7-6), trace fine to coarse sand, trace gravel; damp to moist. @ 1.0'-5.0', hard.						
		3 4 4	18	2		4.5+		0	1	--	2	13	84
5		2 3 3	18	3		1.75							
		2 2 3	18	4		1.75							
10		1 2 4	18	5		1.75	@ 11.0'-12.5', trace dry clay layers.						
		3 3 4	18	6		2.0							
15		2 2 3	18	7		0.5	@ 16.0'-17.5', gray.						
		1 2 3	18	8		2.0							
20		1 2 3	18	9		1.0	@ 21.0', becomes gray.						
		1 2 3	18	10		0.5							
25		1 2 3	18	11		0.5							
		1 2		12		1.0							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-341 | Location: Sta. 407+19.9, 108.1 ft. LT of SR 823 CL | Date Drilled: 8/19/04 to 8/20/04

WATER OBSERVATIONS: Water seepage at: 38.5'; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	668.4	3	18				Medium stiff gray CLAY (A-7-6); moist.						
35		WOH 3 3	18	13		0.75		0	0	--	0	69	31
37.0	661.2						Stiff brown SILT (A-4b), some clay, some fine to coarse sand; wet.						
40		3 7 7	18	14				0	3	--	25	51	21
42.0	656.2						Very soft to soft gray SILTY CLAY (A-6b); moist.						
45		2 1 2	18	15		0.25		0	0	--	0	61	39
47.0	651.2						Very dense brown GRAVEL WITH SAND (A-1-b), trace clay; damp to moist.						
50		17 26 29	18	16									
52.0	646.2						Severely weathered gray SANDSTONE.						
55.0	643.2	50/3	2	17			Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to slightly weathered, micaceous, argillaceous, thinly bedded to medium, occassional pyrite nodules; contains turbidity bedding. @ 55.4',55.6',55.9', low angle clay filled fractures. @ 56.1',56.8', low angle clay filled fractures.						

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

78
55
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-341 | Location: Sta. 407+19.9, 108.1 ft. LT of SR 823 CL | Date Drilled: 8/19/04 to 8/20/04

WATER OBSERVATIONS: Water seepage at: 38.5'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
60	638.5	Core 120"	Rec 120"	RQD 69%	R-1		Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thinly bedded to massive, occassional pyrite nodules, slightly fractured to unfractured.							
65.0	633.2						Bottom of Boring - 65.0'							
70														
75														
80														
85														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-342 | Location: Sta. 407+21.2, 2.4 ft. RT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 44.0'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	689.1												
0.4	688.7						Topsoil - 5"						
		6 5 5	13	1		2.5	Very stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand; dry to damp.						
3.0	686.1						Hard brown CLAY (A-7-6), trace silt; damp to moist.						
		4 4 5	10	2		4.5+							
5		2 4 5	0	3		2.0	@ 6.0'-27.5', medium stiff to stiff.						
		2 3 4	18	4		1.25							
10		2 2 3	18	5		0.5	@ 11.0'-12.5', gray.	0	0	--	0	4	96
		2 2 3	18	6		1.0							
15		1 2 4	18	7		1.5							
		2 2 3	18	8		1.5							
20		2 3 4	18	9		1.0							
		2 3 4	18	10		2.0	@ 23.5'-28.0', carbonaceous seams.						
25		2 3 4	18	11		0.5							
		2 4		12		0.25	@ 28.5'-30.0', soft, gray.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
75

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-342 | Location: Sta. 407+21.2, 2.4 ft. RT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 44.0'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	659.2												
30.0	659.1	6	18				Stiff brown CLAY (A-7-6); damp.						
35		2 3 4	18	13		1.5							
37.0	652.1						Medium dense brown COARSE AND FINE SAND (A-3a), little silt; damp.						
40		9 10 11	14	14				0	3	--	80	17	
42.0	647.1						Dense brown and gray GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); contains sandstone fragments; moist.						
45		7 22 12	18	15									
47.0	642.1						Severely weathered gray SANDSTONE argillaceous, micaceous.						
48.5	640.6	0 5 38	14	16			@ 48.5'-48.8', broken.						
50							Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thinly bedded to massive, slightly fractured.						
		Core 120"	Rec 120"	RQD 83%	R-1		@ 48.7',48.8',58.2', low angle clay filled fractures.						
55													
58.5	630.6						Bottom of Boring - 58.5'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-343 | Location: Sta. 407+19.5, 114.1 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: 33.5'; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	683.8												
0.4	683.4	5 5 5	13	1			Topsoil - 5" Medium dense brown SANDY SILT (A-4a); dry to damp. @ 1.0'-2.5', contains roots.						
		7 7 6	14	2									
5													
5.5	678.3	4 6 8	14	3		3.0	Stiff to very stiff brown and gray CLAY (A-7-6); damp to moist.						
		2 3 4	12	4		2.0							
10													
		2 3 4	18	5		2.25							
		1 3 3	17	6	P1	2.0		0	0	--	5	53	42
15													
		3 4 4	18	7		1.5	@ 16.0', contains sand seams.	0	1	--	2	20	77
		5 3 3	18	8		1.0							
20													
		3 5 4	18	9	P2	0.5	@ 21.0'-22.5', medium stiff.						
		2 3 5	18	10		1.0	@ 23.5', brown and black.						
25													
25.5	658.3	7 10 12	14	11			Medium dense brown COARSE AND FINE SAND (A-3a), trace clay; damp to moist.						
		6 7		12				0	2	--	85	13	

STANDARD PENETRATION (N) — Natural Moisture Content, % - ● — PL ⊢——⊣ LL — Blows per foot - ○ (10 20 30 40)

58

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

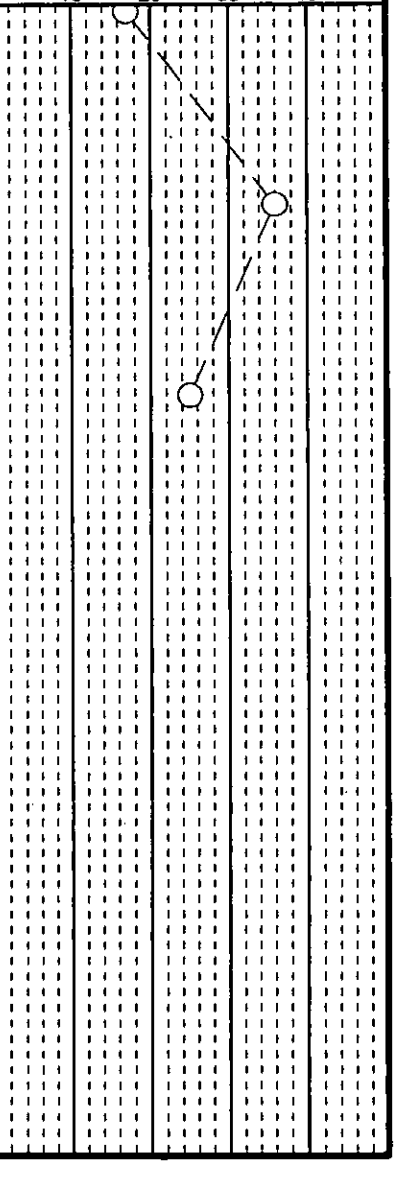
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-343 | Location: Sta. 407+19.5, 114.1 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: 33.5'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	654.0	10	15				Medium dense to dense brown COARSE AND FINE SAND (A-3a); wet.						
		12 17 19	15	13									
35													
37.0	646.8						Medium dense brown and gray SANDY SILT (A-4a), little clay; contains sandstone fragments; wet.						
		12 5 20	16	14									
40													
43.5	640.3						Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, laminated to massively bedded; contains few argillaceous laminations.						
45							@ 43.5'-45.0',46.7'-47.5', broken with typically low angle clay filled fractures; contains moderate argillaceous laminations.						
		Core 120"	Rec 120"	RQD 69%	R-1								
50							@ 50.0',51.4',52.0', low angle clay filled fractures.						
53.5	630.3						Bottom of Boring - 53.5'						
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

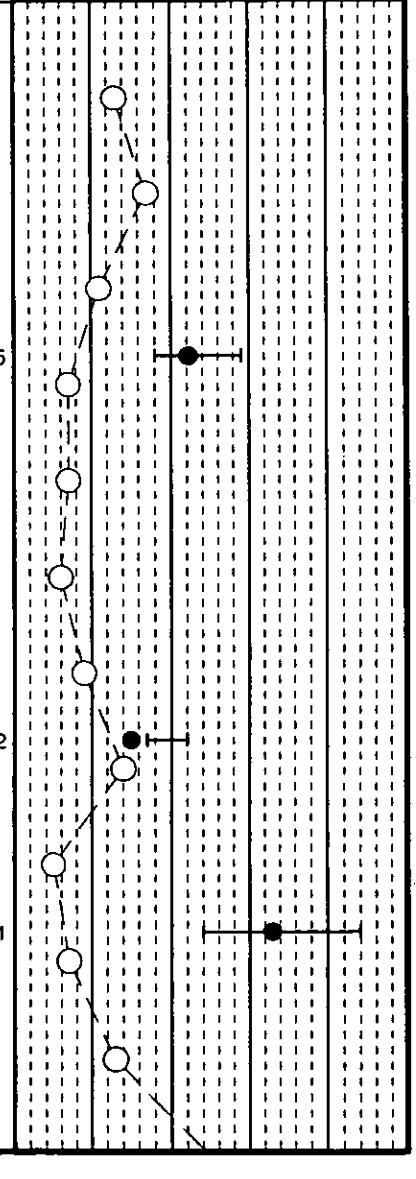
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-345 | Location: Sta. 411+24.0, 115.7 ft. LT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	701.1												
0.3	700.8						Topsoil-3"						
		6 7 6	14	1			Medium dense brown SANDY SILT (A-4a), trace gravel, trace clay; contains shale fragments; damp to moist.						
		6 7 10	14	2									
5													
		3 5 6	17	3									
8.0	693.1												
		3 3 4	17	4		0.5	Soft brown SILT AND CLAY (A-6a), trace fine sand; moist.	0	0	--	8	57	35
10													
10.5	690.6						Stiff brown and gray CLAY (A-7-6); damp.						
		2 3 4	18	5		1.5							
		2 3 3	18	6		2.0							
15													
		2 4 5	18	7		1.25							
18.0	683.1						Medium dense brown SANDY SILT (A-4a), some clay, little gravel; damp.						
		4 6 8	18	8				12	17	--	24	25	22
20													
20.5	680.6						Very soft light brown CLAY (A-7-6), some silt, trace fine to coarse sand; moist to wet.						
		3 2 3	18	9		<0.25							
		2 3 4	18	10		<0.25		0	0	--	2	27	71
25													
25.5	675.6						Medium dense brown SANDY SILT (A-4a), some clay; damp to moist:						
		1 6 7	18	11									
		3 4		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-345 | Location: Sta. 411+24.0, 115.7 ft. LT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	671.2													Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ 10 20 30 40
30.0	671.1	21	18				Very soft brown CLAY (A-7-6), "and" silt, little fine to coarse sand; moist to wet.							
		2 3 3	18	13		0.25								
35														
		7 3 3	18	14		0.25								
40														
43.0	658.1						Medium hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded, highly to slightly fractured; contains few argillaceous laminations.							
45							@ 44.2'-44.8', broken with typically low angle clay filled fractures.							
		Core 120"	Rec 120"	RQD 50%	R-1									
50							@ 43.2',46.7',48.8', low angle clay filled fractures.							
							@ 49.5',49.6', low angle clay filled fractures.							
53.0	648.1						Bottom of Boring - 53.0'							
55														

GRADATION

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

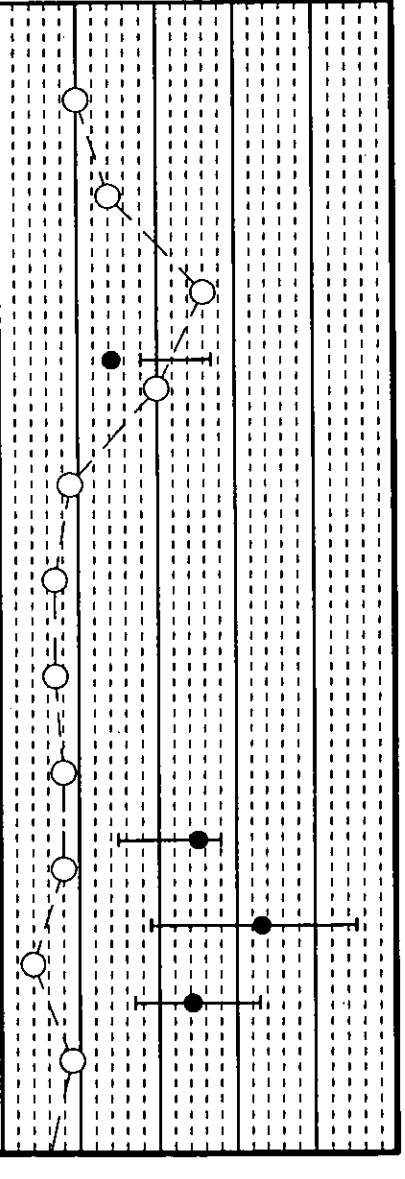
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-346 | Location: Sta. 411+19.2, 3.7 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: 33.5'; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	693.0	5 5 5	13	1		4.5+	No Topsoil Hard brown SANDY SILT (A-4a), some clay; damp.						
		5 6 8	13	2		4.0	@ 3.5', contains sandstone fragments						
5		9 13 13	18	3		4.5+							
		6 12 8	18	4		4.5+		20	14	--	16	28	22
10													
10.5	682.5	3 4 5	15	5		2.5	Stiff to very stiff brown and gray CLAY (A-7-6); damp to moist.						
		2 3 4	18	6		1.5							
15		2 3 4	18	7		2.25							
		2 3 5	18	8		1.0							
20													
20.5	672.5	2 4 4	18	9		<0.25	Very soft light gray and brown SILT AND CLAY (A-6a), some fine to coarse sand, trace to little gravel; contains sandstone fragments; moist.	10	1	--	23	29	37
23.0	670.0	1 2 2	18	10	P1	<0.25	Very soft light brown CLAY (A-7-6), trace fine to coarse sand; moist to wet.	0	0	--	11	49	40
25													
26.0	667.0	0 2 7	18	11	P2	0.5	Soft brown SILTY CLAY (A-6b), trace to little fine to coarse sand; contains sandstone fragments; moist.	0	1	--	9	58	32
		2 3		12		0.5							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-346 | Location: Sta. 411+19.2, 3.7 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: 33.5'
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	663.2	3	18				Soft brown SILTY CLAY (A-6b), trace to little fine to coarse sand; contains sandstone fragments; moist.						
32.0	661.0						Soft to medium stiff light brown and gray SILT AND CLAY (A-6a); moist to wet.						
		0 2 2	18	13		0.25	@ 33.5'-35.0', trace brown and black sand seams.						
35													
		0 0 6	18	14		1.0							
40													
42.0	651.0						Very dense gray SANDY SILT (A-4a), trace gravel; damp to moist.						
		10 13 50/5	18	15									
45.0	648.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, thinly bedded to massive, slightly fractured.						
50		Core 120"	Rec 115"	RQD 72%	R-1	*491	@ 45.0'-47.2', highly weathered to broken with typical low angle fractures.						
55.0	638.0						Bottom of Boring - 55.0'						

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-348 | Location: Sta. 411+16.9, 167.4 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
48.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	679.7	5 6 6	18	1		4.5+	No topsoil Very stiff to hard brown SANDY SILT (A-4a), little gravel, trace clay; damp.						
		3 6 5	18	2		3.0							
5		4 4 5	11	3		4.5+							
8.0	671.7	1 2 3	18	4		2.0	Stiff brown and gray CLAY (A-7-6); damp.						
10		2 3 4	18	5		1.5							
		2 3 6	18	6		2.0							
15		2 2 4	18	7		0.5	@ 16.0'-22.5', soft to medium stiff, gray.						
		3 3 4	18	8		0.25		0	0	--	1	10	89
20		2 2 3	18	9		0.25	@ 21.0', silt seams.						
23.0	656.7	1 7 8	18	10			Medium dense brown COARSE AND FINE SAND (A-3a), some silt; damp.						
25		4 6 5	18	11				0	1	--	76	23	
28.5	651.2	2 4		12			Loose to medium dense brown and gray GRAVEL WITH SAND						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

53

Non-Plastic

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-348 | Location: Sta. 411+16.9, 167.4 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
48.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
30	649.8	3	12				(A-1-b), trace clay; moist to wet. Loose to medium dense brown and gray GRAVEL WITH SAND (A-1-b), trace clay; contains sandstone fragments; moist to wet.							
		19 17 13	18	13										
35														
38.7	641.0	50/2	1	14			Medium hard to hard gray SANDSTONE; fine to very fine grained, massive, argillaceous, micaceous, highly to moderately fractured; contains few argillaceous laminations.							50+
40														
		Core 120"	Rec 119"	RQD 78%	R-1									
45														
48.7	631.0						Bottom of Boring - 48.7'							
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-349 | Location: Sta. 414+18.9, 122.6 ft. LT of SR 823 CL | Date Drilled: 8/17/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	735.4						Topsoil - 3"						
		8 10 12	12	1			Medium dense to dense brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; damp. @ 1.0'-2.5', contains roots.						
		12 15 21	17	2									
5		9 23 26	16	3									
8.0	727.6						Very stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp to moist.						
		8 7 4	15	4		4.0							
10		4 11 11	13	5		3.5							
		3 5 8	18	6		2.5							
15													
15.5	720.1	50/4	3	7		4.5+	Severely weathered brown SANDSTONE.						
17.0	718.6	Core 48"	Rec 44"	RQD 35%	R-1	*293	Soft to medium hard brown SANDSTONE; medium to coarse grained, highly weathered to decomposed, thinly bedded to thickly bedded, broken with typically low angle rust stained fractures. @ 19.1'-21.0', very fine to fine grained, slightly to moderately weathered, micaceous, moderately to highly fractured.						
20													
21.0	714.6						Bottom of Boring - 21.0'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [illegible]US, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-350 | Location: Sta. 414+13.9, 10.8 ft. RT of SR 823 CL | Date Drilled: 8/18/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	718.8												
0.2	718.6						Topsoil - 2"						
		8 7 6	13	1		--	Very stiff to hard brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp.						
		5 5 8	14	2		4.5+							
5													
5.5	713.3						Soft to medium hard brown SANDSTONE; highly weathered.						
		10 13 20	15	3									
		21 20 50	18	4									
10													
		43 50/3	8	5									
12.0	706.8						Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, thinly bedded to massive, broken to highly fractured.						
15		Core 96"	Rec 91"	RQD 34%	R-1	*237	@ 12.0'-13.6',14.4'-15.4', highly fractured with typically low angle fractures, filled with sand and clay.						
							@ 15.1'-15.3',18.0'-18.2', high angle rust stained fractures.						
20.0	698.8						Bottom of Boring - 20.0'						
25													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
70
50+

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

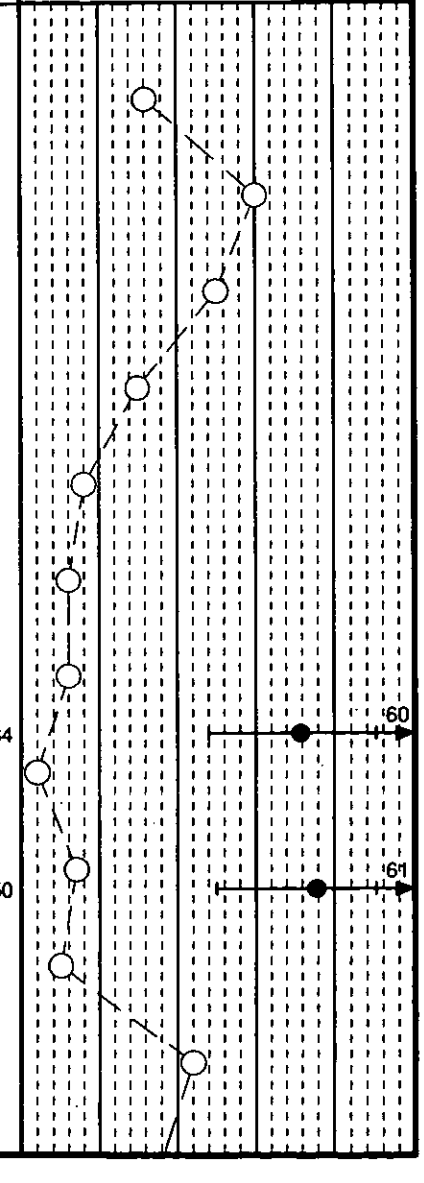
Client: TranSystems, Inc.	Project: SCI-823-0.00	Job No. 0121-3070.03

LOG OF: Boring R-351 Location: Sta. 414+18.4, 91.4 ft. RT of SR 823 CL Date Drilled: 8/17/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	710.1												
0.3	709.8						Topsoil - 3"						
		7 7 9	15	1		2.5	Very stiff to hard brown and gray SANDY SILT (A-4a), trace gravel, trace clay; contains sandstone fragments; damp.						
		7 12 18	18	2		3.0							
5		8 10 15	18	3		4.5+							
		8 8 7	18	4		4.5+							
10													
10.5	699.6						Stiff grayish brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; moist.						
		3 3 5	18	5		1.0							
13.0	697.1						Soft to medium stiff gray CLAY (A-7-6), trace fine to coarse sand; moist.						
		3 3 3	18	6		0.5							
15		2 2 4	18	7		0.5							
		1 1 1	18	8	P-1	1.0		0	1	--	1	14	84
20		0 3 4	18	9		1.0	@ 21.0'-22.5', brown.						
					P-2			0	0	--	0	50	50
		0 2 3	18	10		0.5							
25		5 10 12	18	11		3.0	@ 26.0'-27.5', very stiff, contains sandstone fragments.						
		1 8		12		1.0							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-351 | Location: Sta. 414+18.4, 91.4 ft. RT of SR 823 CL | Date Drilled: 8/17/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION: % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
	680.3													
30.0	680.1	10	16				Dense to very dense brown and gray SANDY SILT (A-4a), trace gravel, trace clay; contains sandstone fragments; damp.							
35		3 20 28	17	13										
40		7 14 17	18	14										
		9 20 50/1	15	15										50+
45.0	665.1						Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, micaceous, thinly bedded to thickly bedded, highly fractured, typically low angle rust stained fractures; contains decomposed SHALE and soil in fractures.							
46.8	663.3													
50		Core 120"	Rec 118"	RQD 77%	R-1		Medium hard gray and brown SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded. @ 48.3'-50.2', highly fractured with typically low angle clay-filled fractures; contains moderate argillaceous laminations.							
55.0	655.1						Bottom of Boring - 55.0'							

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-353 | Location: Sta. 416+22.8, 102.8 ft. LT of SR 823 CL | Date Drilled: 7/28/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	792.9												
0.2	792.7						Topsoil - 2"						
		50/3	3	1			Severely weathered light brown SANDSTONE.						
		50/2	2	2									
5													
5.5	787.4						Medium hard light brown, reddish brown, and gray SANDSTONE; very fine to fine grained, highly weathered, thinly bedded to thickly bedded, broken with rust stained and clay filled fractures, contains occasional argillaceous beds.						
		Core 90"	Rec 90"	RQD 51%	R-1		@ 6.6'-7.1', high angle rust stained fracture.						
10													
15													
16.3	776.6						Medium hard light gray and dark gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, massively bedded, slightly fractured to unfractured.						
		Core 120"	Rec 120"	RQD 99%	R-2		@ 17.7', low angle clay filled fracture.						
20													
25													
		Core 120"	Rec 120"	RQD 100%	R-3								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
60+
50+

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-353 | Location: Sta. 416+22.8, 102.8 ft. LT of SR 823 CL | Date Drilled: 7/28/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / Blows per foot
30	763.1						Medium hard light gray and dark gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, massively bedded, slightly fractured to unfractured.							
35		Core 120"	Rec 120"	RQD 99%	R-4		@ 35.0', low angle clay filled fracture. @ 36.8', low angle clay filled fracture.							
40							@ 40.8', low angle clay filled fracture.							
45		Core 120"	Rec 120"	RQD 98%	R-5		@ 42.9'-43.0', broken. @ 43.0'-43.2', high angle fracture.							
50														
55		Core 120"	Rec 120"	RQD 100%	R-6									

PL — LL

Blows per foot - ○ (10, 20, 30, 40)

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring R-353 | Location: Sta. 416+22.8, 102.8 ft. LT of SR 823 CL | Date Drilled: 7/28/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	733.2						Medium hard light gray and dark gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, massively bedded, slightly fractured to unfractured.						
65		Core 120"	Rec 120"	RQD 94%	R-7		@ 69.3'-69.5', high angle fracture. @ 70.4'-70.5', high angle fracture. @ 71.1',71.6',72.6', low angle clay filled fractures; contains argillaceous laminations. @ 72.6'-75.4', turbidity bedding.						
70													
75		Core 84"	Rec 84"	RQD 100%	R-8		@ 74.2'-74.6', fine to medium grained. @ 75.4'-75.9', fine to medium grained.						
80.0	712.9						Bottom of Boring - 80.0'						
85													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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

LOG OF: Boring R-354 | Location: Sta. 416+57.7, 23.1 ft. LT of SR 823 CL | Date Drilled: 7/27/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	792.3						
0.3	792.0						Topsoil - 3"
		50/4	4	1			Severely weathered light brown SANDSTONE.
		50/5	5	2			
5							
5.5	786.8						Medium hard brown and light gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, highly fractured with typically low angle rust stained to clean fractures.
		Core 84"	Rec 71"	RQD 52%	R-1		@ 8.8'-9.0', high angle clay filled fracture.
10							
13.4	778.9						@ 12.9'-13.0', high angle rust stained fracture.
							Hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massively bedded, slightly fractured to unfractured.
15							@ 14.8'-15.9', brown.
		Core 120"	Rec 120"	RQD 96%	R-2		@ 15.2'-15.5', broken with low angle fracture.
							@ 14.8'-15.9', brown, broken with low angle fracture.
20							@ 20.0', brown with a low angle fracture.
							@ 20.7'-30.0', brown with a low angle fracture.
25							@ 24.4'-24.6', brown with a low angle fracture.
		Core 120"	Rec 120"	RQD 100%	R-3		

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 | 11/28/2006 1:29 PM |

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

LOG OF: Boring R-354 | Location: Sta. 416+57.7, 23.1 ft. LT of SR 823 CL | Date Drilled: 7/27/04

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None (prior to coring); 3.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL — LL Blows per foot - ○ 10 20 30 40
30	762.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, thinly bedded to massive, slightly fractured to unfractured.							
35		Core 120"	Rec 120"	RQD 98%	R-4		@ 34.3', low angle clay filled fracture.							
40														
45		Core 120"	Rec 120"	RQD 100%	R-5									
50														
55.0	737.3	Core 30"	Rec 20"	RQD 67%	R-6		Bottom of Boring - 55.0'							

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

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

LOG OF: Boring TR-24 | Location: Sta. 384+43.9 147.1 ft. LT of SR 823 CL | Date Drilled: 8/20/04 to 8/23/04

WATER OBSERVATIONS: Water seepage at: 6.0'
Water level at completion: 29.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	686.2						Topsoil - 12"						
1.0	685.2	6 10 13	18	1		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
		13 10 10	18	2		4.5+							
5													
6.0	680.2	3 3 8	12	3		2.75	Stiff to very stiff brown CLAY (A-7-6), little fine to coarse sand, little silt; varved; moist.						
		2 3 5	18	4		2.0							
10		2 2 3	18	5		2.0							
		2 4 5	18	6		2.25							
15		2 3 4	18	7		1.25							
		1 3 4	18	8		3.75							
20		2 3 3	18	9		1.0							
		3 4 5	18	10		1.5							
25													
27.0	659.2	4 3 12	18	11		1.75	Medium dense brown FINE SAND (A-3), trace gravel; damp.						
		5 5		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring TR-24 | Location: Sta. 384+43.9 147.1 ft. LT of SR 823 CL | Date Drilled: 8/20/04 to 8/23/04

WATER OBSERVATIONS: Water seepage at: 6.0'
Water level at completion: 29.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	656.4	5	18				Medium dense brown FINE SAND (A-3), trace gravel; damp.						
34.0	652.2	4 2 2	18	13		0.5	Soft gray SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; moist.						
37.0	649.2						Severely weathered gray SANDSTONE, argillaceous.						
40		10 17 22	18	14			@ 43.0', augers encountered difficult drilling.						
43.5	642.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, moderately to highly fractured.						
45							@ 44.8' to 44.9',45.2',45.4',47.0' contains argillaceous laminations and fractures.						
50		Core 120"	Rec 118"	RQD 77%	R-1		@ 47.0', slightly weathered, unfractured to slightly fractured.						
53.5	632.7						Bottom of Boring - 53.5'						
55													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

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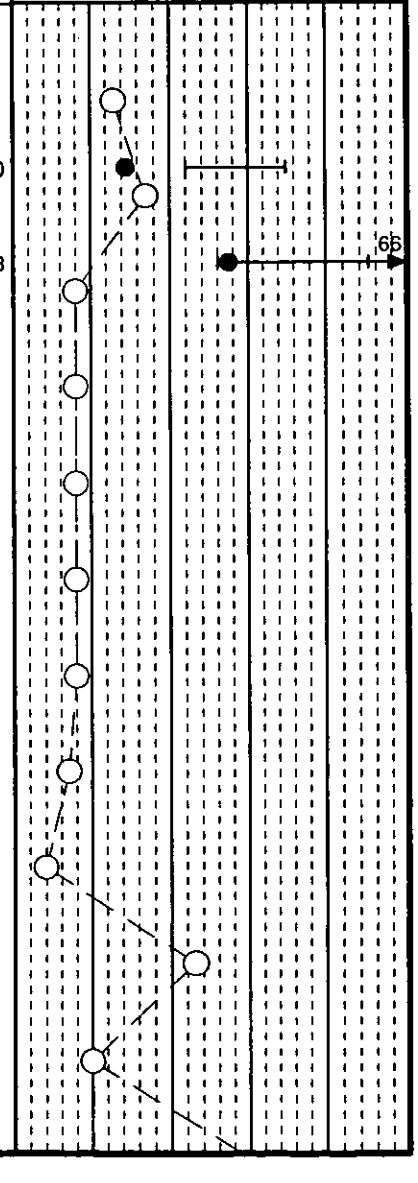
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-25 | Location: Sta. 384+41.0, 4.4 ft. LT of SR 823 CL | Date Drilled: 8/19/04 to 8/20/04

WATER OBSERVATIONS: Water seepage at: 16.0', 21.0'
Water level at completion: 16.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	674.6												
0.5	674.1						Topsoil - 6"						
		4 7 6	18	1		4.0	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.						
		6 8 9	18	2		4.5		4	6	--	13	37	40
5													
5.5	669.1						Stiff to very stiff brown CLAY (A-7-6), little silt, trace fine sand; damp to moist.						
		2 3 5	18	3		2.0		0	0	--	1	11	88
		2 3 5	18	4		1.25							
10													
		2 4 4	18	5		1.75							
		3 3 5	18	6		2.5							
15													
		2 3 5	18	7		2.25							
18.0	656.6						Loose to medium dense brown FINE SAND (A-3), trace silt; damp to wet.						
		4 3 4	18	8									
20													
		1 1 3	18	9									
		9 11 12	18	10									
25													
		7 3 7	18	11									
28.0	646.6						Dense brown GRAVEL WITH SAND (A-1-b); contains sandstone fragments; moist.						
		2 14		12									

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 | 11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring TR-25 | Location: Sta. 384+41.0, 4.4 ft. LT of SR 823 CL | Date Drilled: 8/19/04 to 8/20/04

WATER OBSERVATIONS: Water seepage at: 16.0', 21.0'
Water level at completion: 16.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	644.7	16	18											Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
30.0	644.6						Severely weathered brown and gray SANDSTONE.							
		27 50/5	6	13										50+
32.0	642.6						Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, massively bedded, slightly fractured. @ 32.0'-37.0', highly fractured.							
		Core 48"	Rec 46"	RQD 42%	R-1									
35														
		Core 72"	Rec 72"	RQD 100%	R-2									
40														
42.0	632.6						Bottom of Boring - 42.0'							
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]BUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring TR-26 | Location: Sta. 384+04.3, 126.8 ft. RT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 8.5'
Water level at completion: 8.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	665.2												
1.0	664.2	5 5 8	18	1		4.5	Topsoil - 12" Hard brown CLAY (A-7-6), "and" fine to coarse sand, trace gravel, little silt; damp to moist.						
5		8 9 11	18	2		4.5+		0	2	--	38	12	48
5.5	659.7	7 7 8	18	3			Loose to medium dense brown COARSE AND FINE SAND (A-3a), little silty clay; moist to wet.	0	0	--	81	19	
		4 9 7	18	4									
10		3 4 6	18	5									
		4 5 10	18	6									
15		5 4 3	18	7			@ 16.0', wet.						
		2 3 4	18	8									
20													
20.5	644.7	4 8 13	18	9			Medium dense gray GRAVEL WITH SAND (A-1-b); contains sandstone fragments; moist.						
23.0	642.2						Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, slightly to moderately weathered, massively bedded, slightly fractured. @ 23.0'-25.5', moderately fractured. @ 23.1', 23.5', thin clay seams.						
25		Core 120"	Rec 111"	RQD 73%	R-1								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic

FILE: 0121-3070-03 (11/28/2006 1:29 PM)

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring TR-26 | Location: Sta. 384+04.3, 126.8 ft. RT of SR 823 CL | Date Drilled: 8/19/04

WATER OBSERVATIONS: Water seepage at: 8.5'
Water level at completion: 8.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢⊣ LL Blows per foot - ○ 10 20 30 40
	635.4													
30.0	635.2						Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, slightly to moderately weathered, massively bedded, slightly fractured.							
33.0	632.2						Bottom of Boring - 33.0'							
35														
40														
45														
50														
55														

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring TR-27 | Location: Sta. 35+91.3, 5.9 ft. LT of Rel. Shumway Hollow CL | Date Drilled: 8/25/04

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (boring collapsed @ 6.0')

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	646.3						
0.4	645.9						Topsoil - 5"
		7 10 13	18	1		4.5+	Hard brown SANDY SILT (A-4a), trace clay, trace to little gravel; damp.
		8 13 13	18	2		4.5+	
5							
		4 10 50	16	3		4.5+	@ 6.0'-7.5', contains sandstone fragments.
7.5	638.8						Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, slightly to highly weathered, argillaceous, micaceous, massive, slightly fractured.
10		Core 120"	Rec 120"	RQD 98%	R-1		@ 7.5'-10.0', rust stained. @ 7.8',8.9', 15.6', low angle fractures.
15							@ 14.9'-15.2', high angle fracture.
17.5	628.8						Bottom of Boring - 17.5'
20							
25							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
60

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]US, OHIO 43229 * (614)888-0040

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

LOG OF: Boring TR-28 | Location: Sta. 38+20.7, 17.8 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 02/02/05

WATER OBSERVATIONS: Water seepage at: 14.0', 18.5'
Water level at completion: 10.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
0	659.7													
0.7	659.0	4 8 8	16	1		4.0	Asphalt Concrete Pavement - 8" Very stiff to hard brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp.							
3.0	656.7	5 5 7	15	2			Medium dense reddish brown COARSE AND FINE SAND (A-3a); moist. (residual soil)							
5		8 8 7	18	3										
		6 4 2	18	4										
10		3 5 4	14	5										
		1 4 4	13	6										
15														
15.5	644.2	50/2	2	7			Severely weathered gray SANDSTONE argillaceous.							50+
18.5	641.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, massively bedded, slightly fractured. @ 18.5'-24.0', broken.							
20		Core 60"	Rec 30"	RQD 12%	R-1									
25		Core 84"	Rec 84"	RQD 100%	R-2									

GRADATION

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, [redacted]MBUS, OHIO 43229 * (614)888-0040

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

LOG OF: Boring TR-28 | Location: Sta. 38+20.7, 17.8 ft. RT of Rel. Shumway Hollow CL | Date Drilled: 02/02/05

WATER OBSERVATIONS: Water seepage at: 14.0', 18.5'
Water level at completion: 10.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	629.8													Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
30.5	629.2						Bottom of Boring - 30.5'							

35 40 45 50 55

FILE: 0121-3070-03 [11/28/2006 1:29 PM]

APPENDIX B

Summaries of Laboratory Test Results
Summary of Subgrade Conditions

Summary of Shear Strength Test Data
Shumway-Hollow Interchange

Boring Number	Sample Number	Sample Depth (feet)	ODOT Designation	Type of Test: Gradation: % AGG	% Sand: Coarse	% Sand: Fine	% Fines: Silt	% Fines: Clay	Atterberg Limits: LL	Atterberg Limits: PI	Moisture Content %	Consolidated-undrained: Cohesion, (psf): Total	Cohesion, (psf): Effective	Friction Angle, (degrees): Total	Friction Angle, (degrees): Effective	Unconsolidated-undrained: Cohesion (psf)	Unconsolidated-undrained: Friction Angle (degrees)	Consolidation: Cc	Cr	Pc (tsf)	e0	Unconfined Compression: Cohesion (psf)
B-1	P-1	8.0 - 10.0	A-7-6	0	0	1	13	86	52	26	28	-	-	-	-	-	-	-	-	-	-	2051
B-1	P-2	12.5 - 14.5	A-7-6	0	0	2	19	79	52	28	30	-	-	-	-	-	-	-	-	-	-	2365
B-1	P-3	18.0 - 19.1	A-7-6	0	0	1	24	75	49	23	28	-	-	-	-	-	-	0.21	0.1	0.74	0.955	-
B-2	P-1	6.0 - 8.0	A-7-6	1	0	0	14	85	67	40	23	-	-	-	-	-	-	0.16	0.09	0.7	0.709	2005
B-2	P-2A	11.0 - 12.0	A-7-6	0	2	4	24	70	52	30	23	-	-	-	-	-	-	-	-	-	-	2572
B-2	P-2B	12.0 - 13.0	A-7-6	5	1	2	12	80	78	54	31	-	-	-	-	-	-	0.18	0.08	3.18	0.833	2198
B-3	P-1	8.0 - 10.0	A-7-6	0	0	1	9	90	60	34	31	-	-	-	-	-	-	-	-	-	-	1658
B-3	P-2	10.0 - 12.0	A-7-6	0	0	3	28	71	44	25	28	-	-	-	-	-	-	-	-	-	-	2204
B-4	P-1A	8.0 - 8.2	A-6a	2	5	8	43	42	31	14	18	-	-	-	-	-	-	-	-	-	-	-
B-1314	P-1	13.5 - 15.5	A-7-6	1	2	4	21	72	51	26	29	646	740	19.9	27.9	-	-	-	-	-	-	-
B-1318	P-1	8.5 - 10.5	A-7-6	7	0	1	7	85	66	37	28	228	228	14.2	21	-	-	-	-	-	-	-
B-1318	P-2	18.5 - 20.5	A-7-6	0	0	0	12	88	58	30	37	-	-	-	-	-	-	0.35	0.12	5.46	1.06	-
B-1320	P-1	18.5 - 20.5	A-7-6	0	1	1	3	95	63	34	35	-	-	-	-	1438	0	-	-	-	-	-
B-1320	P-2	33.0 - 35.0	A-7-6	0	0	0	5	95	54	26	37	860	1024	11.2	15.1	-	-	-	-	-	-	-
B-1322	P-1	8.5 - 10.5	A-7-6	0	0	1	17	82	54	30	30	-	-	-	-	-	-	-	-	-	-	969
B-1322	P-2	18.5 - 20.5	A-7-6	0	0	0	10	90	56	23	33	-	-	-	-	-	-	-	-	-	-	-
B-1322	P-3	28.5 - 30.5	A-7-6	0	0	0	6	94	63	37	37	-	-	-	-	-	-	0.27	0.13	1.79	1.026	-
B-1323	P-1	13.0 - 15.0	A-7-6	0	0	0	15	85	55	29	39	-	-	-	-	1578	0	-	-	-	-	-
B-1323	P-2	21.0 - 23.0	A-7-6	0	0	0	6	94	61	34	37	-	-	-	-	-	-	-	-	-	-	2509
B-1326	P-2	26.0 - 28.0	A-7-6	0	0	0	5	95	63	36	37	592	0	15.2	26.8	-	-	-	-	-	-	-
B-1328	P-1	11.0 - 13.0	A-7-6	0	0	1	3	96	66	37	33	-	-	-	-	-	-	-	-	-	-	-
B-1328	P-2	16.0 - 18.0	A-7-6	0	0	1	12	87	69	39	38	282	0	10.8	20.6	-	-	-	-	-	-	-
C-19	P-1	16.5 - 18.5	A-7-6	1	4	4	20	72	66	40	33	-	-	-	-	-	-	0.23	0.06	4.15	0.901	1143
C-19	P-2	21.0 - 23.0	A-4b	0	0	1	71	28	28	7	34	-	-	-	-	-	-	-	-	-	-	215
C-21	P-2	22.7 - 24.0	A-4b	0	0	1	71	28	28	7	34	-	-	-	-	216	0	-	-	-	-	-
C-21	P-2	22.0 - 22.7	A-6a	0	0	1	62	37	34	12	35	-	-	-	-	-	-	0.4	0.07	0.8	1.111	-
R-329	P-1	11.0 - 13.0	A-7-6	0	0	0	40	60	72	44	40	-	-	-	-	-	-	0.33	0.15	0.8	1.037	1999
R-331	P-1	8.0 - 10.0	A-7-6	0	0	0	50	50	63	39	39					-	-	-	-	-	-	-
R-335	P-1	13.0 - 15.0	A-6a	1	6	2	38	53	27	12	32	-	-	-	-	1680	0	0.47	0.17	2	1.157	-
R-343	P-1	13.0 - 15.0	A-7-6	0	0	5	53	42	58	38	28	-	-	-	-	1590	0	0.24	0.11	1	0.963	-
R-346	P-1	23.0 - 25.0	A-7-6	0	0	11	49	40	45	26	33	-	-	-	-	-	-	-	-	-	-	-
R-346	P-2	25.0 - 27.0	A-6b	0	1	9	58	32	33	16	24	-	-	-	-	1720	0	-	-	-	-	-
R-351	P-1	18.0 - 20.0	A-7-6	0	1	1	14	84	60	36	36	-	-	-	-	2025	0	-	-	-	-	-
R-351	P-2	22.0 - 24.0	A-7-6	0	0	0	50	50	61	36	38	-	-	-	-	-	-	0.41	0.18	5.41	1.101	1668

-NC

Summary of Laboratory Test Results
Shumway-Hollow Interchange

Boring	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	% LL	% PI	% W.C.	ODOT Class
B-1	12.5 - 14.5	0	0	2	19	79	52	28	30	A-7-6
B-1	18.0 - 19.5	0	0	1	24	75	49	23	28	A-7-6
B-1	19.5 - 20.0	0	0	1	21	78	59	36	30	A-7-6
B-1	23.5 - 25.0	0	0	80	20		NP	NP	10	A-3a
B-1	4.0 - 5.0	2	0	1	30	67	59	39	21	A-7-6
B-1	6.0 - 7.5	5	0	0	4	91	70	44	34	A-7-6
B-1	8.0 - 10.0	0	0	1	13	86	52	26	28	A-7-6
B-2	11.0 - 12.5	0	2	4	24	70	52	30	23	A-7-6
B-2	12.5 - 13.0	5	1	2	12	80	78	54	31	A-7-6
B-2	18.5 - 20.0	0	0	85	15		NP	NP	8	A-3a
B-2	3.5 - 5.0	2	1	3	11	83	60	38	23	A-7-6
B-2	6.0 - 8.0	1	0	0	14	85	67	40	23	A-7-6
B-2	8.5 - 10.0	4	2	2	9	83	61	31	33	A-7-5
B-3	10.0 - 12.0	0	0	3	26	71	44	25	28	A-7-6
B-3	16.0 - 17.5	0	1	80	19		NP	NP	10	A-3a
B-3	3.5 - 4.5	2	5	9	48	36	25	10	13	A-4a
B-3	6.0 - 7.5	0	1	2	11	86	63	36	26	A-7-6
B-3	8.0 - 10.0	0	0	1	9	90	60	34	31	A-7-6
B-4	13.5 - 15.0	0	0	83	17		NP	NP	18	A-3a
B-4	3.5 - 5.0	3	6	8	44	39	29	13	15	A-6a
B-4	6.0 - 7.5	3	2	4	27	64	45	25	23	A-7-6
B-4	8.0 - 8.2	2	5	8	43	42	31	14	18	A-6a
B-4	8.2 - 10.0	0	8	89	3		NP	NP	-	A-3
C-1	1.0 - 2.5	14	16	14	45	11	24	3	19	A-4a
C-2	1.0 - 2.5	15	15	16	35	19	23	7	12	A-4a
C-2	3.5 - 5.0	5	9	18	48	20	23	5	13	A-4a
C-2	6.0 - 7.5	2	6	16	47	29	25	8	13	A-4a
C-2	8.5 - 10.0	1	8	29	45	17	24	3	18	A-4a
C-3	1.0 - 2.5	0	3	12	65	20	22	5	16	A-4b
C-3	3.5 - 5.0	9	25	19	32	15	21	2	12	A-4a
C-4	1.0 - 2.5	5	11	11	58	15	29	5	16	A-4b
C-4	3.5 - 5.0	15	15	22	35	13	19	2	10	A-4a
C-6	1.0 - 2.5	5	22	19	46	8	NP	NP	10	A-4a
C-19	1.0 - 2.5	13	23	20	31	13	21	3	9	A-4a
C-19	13.5 - 15.0	2	0	0	12	86	57	33	33	A-7-6
C-19	16.5 - 17.5	1	3	4	20	72	66	40	33	A-7-6
C-19	17.5 - 18.5	1	5	8	31	55	45	21	27	A-7-6
C-19	18.5 - 20.0	0	0	1	63	36	34	13	29	A-6a
C-19	21.0 - 22.5	0	0	1	62	37	34	12	35	A-6a
C-19	22.5 - 23.0	0	0	1	71	28	28	7	34	A-4b
C-19	24.5 - 25.0	1	9	24	45	21	22	5	18	A-4a
C-19	6.0 - 7.5	5	0	0	7	88	65	39	34	A-7-6
C-20	11.0 - 12.5	3	3	16	30	48	36	15	30	A-6a
C-20	19.0 - 20.0	0	2	81	17		NP	NP	27	A-3a

Summary of Laboratory Test Results
Shumway-Hollow Interchange

Boring	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	% LL	% PI	% W.C.	ODOT Class
C-20	3.5 - 5.0	12	25	15	32	16	26	7	12	A-4a
C-20	8.0 - 10.0	0	0	5	18	77	51	21	31	A-7-5
C-21	21.5 - 22.7	0	0	1	62	37	34	12	35	A-6a
C-21	22.7 - 23.5	0	0	1	71	28	28	7	34	A-4b
C-21	3.5 - 5.0	9	25	21	30	15	22	4	12	A-4a
C-21	8.5 - 10.0	0	0	81	19		NP	NP	12	A-3a
C-43	1.0 - 2.5	0	2	46	25	27	24	12	13	A-6a
C-43	6.0 - 7.5	0	5	32	28	35	25	12	17	A-6a
C-44	11.0 - 12.5	1	9	82	8		NP	NP	34	A-3
C-44	3.5 - 5.0	0	5	57	5	33	29	13	16	A-6a
C-45	16.0 - 17.5	0	7	8	45	40	37	16	35	A-6b
C-45	3.5 - 5.0	0	0	56	18	26	35	19	21	A-6b
C-45	8.5 - 10.0	0	19	70	11		NP	NP	17	A-3a
C-46	1.0 - 2.5	0	2	24	31	43	34	17	18	A-6b
C-46	13.5 - 15.0	0	0	1	60	39	36	18	34	A-6b
C-46	6.0 - 7.5	0	6	70	6	18	28	10	16	A-2-4
C-47	1.0 - 2.5	24	14	10	39	13	24	2	8	A-4a
C-48	1.0 - 2.5	9	7	6	48	30	33	13	12	A-6a
C-48	11.0 - 12.5	1	4	5	33	57	43	23	20	A-7-6
C-48	6.0 - 7.5	2	0	1	22	75	56	33	11	A-7-6
C-49	13.5 - 15.0	0	0	1	9	90	75	47	39	A-7-6
C-49	26.0 - 27.5	0	0	2	30	68	47	25	31	A-7-6
C-49	6.0 - 7.5	0	0	0	4	96	66	41	34	A-7-6
C-50	23.5 - 25.0	2	0	0	7	91	64	41	36	A-7-6
C-50	38.5 - 40.0	1	0	1	61	37	35	13	27	A-6a
C-50	6.0 - 7.5	2	0	0	3	95	63	36	34	A-7-6
B-1301	0.5 - 2.5	2	14	14	51	19	22	3	14	A-4b
B-1301	2.5 - 4.5	9	28	13	31	19	25	7	12	A-4a
B-1303	0.2 - 2.0	18	17	19	35	11	21	3	4	A-4a
B-1303	2.0 - 4.0	20	18	14	35	13	23	4	6	A-4a
B-1305	18.5 - 20.0	2	13	46	21	18	23	5	12	A-4a
B-1305	6.0 - 7.5	2	13	22	26	37	41	21	15	A-7-6
B-1307	21.0 - 22.5	0	0	0	13	87	60	38	34	A-7-6
B-1307	23.5 - 25.0	0	0	0	12	88	57	28	33	A-7-6
B-1307	26.0 - 27.5	0	0	1	21	78	54	30	32	A-7-6
B-1307A	20.0 - 22.0	0	0	0	8	92	57	34	36	A-7-6
B-1307A	22.0 - 24.0	0	0	0	12	88	60	35	40	A-7-6
B-1307A	24.0 - 26.0	0	0	1	12	87	48	25	34	A-7-6
B-1307A	26.0 - 28.0	0	0	0	20	80	53	29	36	A-7-6
B-1307A	3.5 - 5.0	5	11	7	47	30	34	15	16	A-6a
B-1308	11.0 - 12.5	0	1	3	51	45	34	13	28	A-6a
B-1311A	13.5 - 15.0	0	1	9	59	31	25	9	17	A-4b
B-1311A	4.0 - 6.0	0	0	17	52	31	25	11	16	A-6a
B-1312	1.0 - 2.5	0	3	27	42	28	21	7	20	A-4a

Summary of Laboratory Test Results
Shumway-Hollow Interchange

Boring	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	% LL	% PI	% W.C.	ODOT Class
B-1312A	13.5 - 15.0	0	0	1	37	62	42	21	22	A-7-6
B-1312A	18.5 - 20.0	2	6	9	64	19	26	7	15	A-4b
B-1312A	3.5 - 5.0	5	13	15	52	15	20	3	11	A-4b
B-1313	0.3 - 2.0	1	4	14	52	29	27	9	14	A-4b
B-1313	2.0 - 4.0	1	4	29	26	40	NP	NP	13	A-4a
B-1313A	0.7 - 2.0	0	2	5	73	20	26	7	13	A-4b
B-1313A	4.0 - 6.0	3	6	8	59	24	25	7	18	A-4b
B-1314	13.5 - 15.5	1	2	4	21	72	51	26	29	A-7-6
B-1314	21.0 - 22.5	0	0	88	12		NP	NP	5	A-3a
B-1314A	0.8 - 2.0	0	2	14	53	31	29	12	17	A-6a
B-1314A	2.0 - 4.0	1	1	29	42	27	23	10	20	A-4a
B-1317	11.0 - 12.5	1	0	1	23	75	60	35	33	A-7-6
B-1317	18.5 - 20.0	0	1	1	17	81	57	33	31	A-7-6
B-1317	26.0 - 27.5	0	2	79	19		NP	NP	8	A-3a
B-1318	18.5 - 20.5	0	0	0	12	88	58	30	37	A-7-6
B-1318	8.5 - 10.5	7	0	1	7	85	66	37	28	A-7-6
B-1319	1.0 - 2.5	1	1	2	54	42	35	17	21	A-6b
B-1319	3.5 - 5.0	0	0	1	15	84	46	22	16	A-7-6
B-1320	18.5 - 20.5	0	1	1	3	95	63	34	35	A-7-6
B-1320	33.0 - 35.0	0	0	0	5	95	54	26	37	A-7-6
B-1321	26.0 - 27.5	0	0	0	23	77	54	30	34	A-7-6
B-1321	33.5 - 35.0	0	0	3	43	54	40	21	27	A-6b
B-1322	16.0 - 17.5	0	0	0	11	89	61	37	33	A-7-6
B-1322	18.5 - 20.5	0	0	0	10	90	56	23	33	A-7-5
B-1322	21.0 - 22.5	0	0	0	8	92	52	28	34	A-7-6
B-1322	28.5 - 30.5	0	0	0	6	94	63	37	37	A-7-6
B-1322	8.5 - 10.5	0	0	1	17	82	54	30	30	A-7-6
B-1323	13.0 - 15.0	0	0	0	15	85	55	28	39	A-7-6
B-1323	18.5 - 20.0	0	0	1	7	92	57	31	32	A-7-6
B-1323	21.0 - 23.0	0	0	0	6	94	61	30	37	A-7-5
B-1323	23.5 - 25.0	0	0	1	16	83	55	30	34	A-7-6
B-1323	26.0 - 27.5	0	0	0	4	96	60	33	36	A-7-6
B-1325	11.0 - 12.5	6	7	8	44	35	32	16	14	A-6b
B-1325	33.5 - 35.0	0	0	1	26	73	50	29	33	A-7-6
B-1326	26.0 - 28.0	0	0	0	5	95	63	36	37	A-7-6
B-1328	11.0 - 13.0	0	0	1	3	96	66	37	33	A-7-6
B-1328	16.0 - 18.0	0	0	1	12	87	69	39	36	A-7-5
B-1329	1.0 - 2.5	8	10	9	48	25	27	8	10	A-4a
B-1331	0.4 - 2.0	7	15	26	52		NP	NP	14	A-4a
B-1331	2.0 - 4.0	0	3	36	34	27	21	8	19	A-4a
B-1331	5.0 - 6.0	0	3	43	25	29	24	11	18	A-6a
B-1331	6.5 - 7.5	0	20	69	11		NP	NP	24	A-3a
B-1332	1.0 - 2.0	22	14	17	40	7	NP	NP	11	A-4a
B-1332	11.0 - 12.5	0	1	3	48	48	38	14	34	A-6a

Summary of Laboratory Test Results
Shumway-Hollow Interchange

Boring	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	% LL	% PI	% W.C.	ODOT Class
B-1332	2.5 - 4.0	49	19	13	19		NP	NP	7	A-1-b
B-1332	4.5 - 6.0	0	6	42	36	16	NP	NP	17	A-4a
B-1332	6.0 - 7.5	0	25	59	16		NP	NP	18	A-3a
B-1333	0.3 - 2.0	32	18	21	22	7	NP	NP	6	A-2-4
B-1333	11.0 - 12.5	0	24	72	4		NP	NP	29	A-3
B-1333	13.5 - 15.0	0	0	1	60	39	35	11	32	A-6a
B-1333	2.0 - 4.0	0	7	61	10	22	24	8	14	A-2-4
B-1333	4.0 - 6.0	0	2	69	9	20	NP	NP	12	A-3a
B-1333	6.0 - 7.5	0	15	68	17		NP	NP	12	A-3a
B-1334	1.1 - 2.0	13	10	23	41	13	21	7	9	A-4a
B-1334	2.0 - 4.0	0	14	70	16		NP	NP	7	A-3a
B-1334	4.0 - 6.0	0	13	76	11		NP	NP	9	A-3a
B-1334	6.0 - 7.5	0	20	74	6		NP	NP	17	A-3
B-1334	8.5 - 10.0	2	3	4	56	35	44	14	29	A-7-5
B-1340	11.0 - 12.5	0	8	68	24		NP	NP	16	A-3a
B-1340	4.0 - 5.0	10	7	29	37	17	21	5	16	A-4a
B-1340	9.0 - 10.0	0	3	35	27	35	26	13	22	A-6a
B-1341	11.0 - 12.5	0	1	1	62	36	35	15	31	A-6a
B-1341	3.5 - 5.0	0	7	48	15	30	23	10	15	A-4a
B-1341	6.0 - 7.5	0	8	78	14		NP	NP	15	A-3a
B-1342	1.0 - 2.5	1	2	26	30	42	28	14	19	A-6a
B-1342	14.0 - 15.0	1	1	2	63	34	38	16	30	A-6b
B-1342	3.5 - 5.0	0	4	56	14	26	26	13	17	A-6a
B-1342	6.5 - 7.5	0	8	79	13		NP	NP	13	A-3a
R-210	11.0 - 12.5	0	0	0	9	91	64	40	32	A-7-6
R-210	28.5 - 30.0	11	51	32	6		NP	NP	6	A-1-b
R-211	6.0 - 7.5	20	12	18	28	22	32	15	16	A-6a
R-213	21.0 - 22.5	0	0	87	10	3	NP	NP	20	A-3a
R-213	6.0 - 7.5	0	1	9	23	67	65	43	26	A-7-6
R-214	3.5 - 5.0	20	8	14	41	17	25	7	15	A-4a
R-217	11.0 - 12.5	0	1	1	15	83	63	39	31	A-7-6
R-217	21.0 - 22.5	0	1	82	17		NP	NP	9	A-3a
R-218	8.5 - 10.0	3	32	53	12		NP	NP	17	A-3a
R-220	23.5 - 25.0	0	6	88	6		NP	NP	4	A-3
R-220	3.5 - 5.0	0	0	0	5	95	72	46	25	A-7-6
R-220	6.0 - 7.5	0	0	1	2	97	74	47	38	A-7-6
R-221	6.0 - 7.5	0	0	1	10	89	68	42	34	A-7-6
R-221	8.5 - 10.0	0	0	84	16		NP	NP	1	A-3a
R-321	13.5 - 15.0	0	1	2	22	75	59	35	40	A-7-6
R-321	6.0 - 7.5	0	1	57	42		35	16	19	A-6b
R-323	43.5 - 45.0	0	0	85	15		NP	NP	7	A-3a
R-323	6.0 - 7.5	0	0	1	7	92	61	37	32	A-7-6
R-326	11.0 - 12.5	0	2	2	20	76	58	35	28	A-7-6
R-326	13.5 - 15.0	0	5	89	6		NP	NP	2	A-3

Summary of Laboratory Test Results
Shumway-Hollow Interchange

Boring	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	% LL	% PI	% W.C.	ODOT Class
R-326	28.5 - 30.0	0	11	9	38	42	37	15	32	A-6a
R-326	3.5 - 5.0	8	7	12	53	20	33	12	13	A-6a
R-328	1.0 - 2.5	7	9	19	43	22	30	13	11	A-6a
R-328	16.0 - 17.5	0	0	0	13	87	62	38	31	A-7-6
R-328	48.5 - 50.0	0	0	0	60	40	39	17	29	A-6b
R-329	11.0 - 13.0	0	0	0	40	60	72	44	40	A-7-6
R-329	3.5 - 5.0	12	12	17	33	26	27	10	12	A-4a
R-329	38.5 - 39.5	0	6	6	47	41	33	12	29	A-6a
R-331	23.5 - 25.0	0	0	1	9	90	65	37	36	A-7-6
R-331	48.5 - 50.0	0	0	2	65	33	36	15	28	A-6a
R-331	8.0 - 10.0	0	0	0	50	50	63	39	39	A-7-6
R-333	11.0 - 12.5	0	1	3	74	22	33	15	26	A-6a
R-333	21.0 - 22.5	0	1	0	3	96	72	47	36	A-7-6
R-333	38.5 - 40.0	0	0	90	10		NP	NP	6	A-3
R-335	13.0 - 13.5	1	6	2	38	53	27	12	32	A-6a
R-335	13.5 - 15.0	0	0	0	41	59	84	56	37	A-7-6
R-335	3.5 - 5.0	1	5	5	66	23	35	17	19	A-6b
R-339	13.5 - 15.0	0	0	1	47	52	58	34	33	A-7-6
R-339	3.5 - 5.0	1	1	1	52	45	70	41	33	A-7-6
R-341	3.5 - 5.0	0	1	2	13	84	71	48	21	A-7-6
R-341	33.5 - 35.0	0	0	0	69	31	78	52	39	A-7-6
R-341	38.5 - 40.0	0	3	25	51	21	24	9	25	A-4b
R-341	43.5 - 45.0	0	0	0	61	39	36	16	32	A-6b
R-342	11.0 - 12.5	0	0	0	4	96	75	50	37	A-7-6
R-342	38.5 - 40.0	0	3	80	17		NP	NP	9	A-3a
R-343	13.0 - 15.0	0	0	5	53	42	58	38	28	A-7-6
R-343	16.0 - 17.5	0	1	2	20	77	47	25	31	A-7-6
R-343	28.5 - 30.0	0	2	85	13		NP	NP	12	A-3a
R-345	18.5 - 20.0	12	17	24	25	22	22	5	15	A-4a
R-345	23.5 - 25.0	0	0	2	27	71	44	20	33	A-7-6
R-345	8.5 - 10.0	0	0	8	57	35	29	11	22	A-6a
R-346	21.0 - 22.5	10	1	23	29	37	28	13	25	A-6a
R-346	23.0 - 25.0	0	0	11	49	40	45	26	33	A-7-6
R-346	26.0 - 27.0	0	1	9	58	32	33	16	24	A-6b
R-346	8.5 - 10.0	20	14	16	28	22	27	9	14	A-4a
R-348	18.5 - 20.0	0	0	1	10	89	53	31	36	A-7-6
R-348	26.0 - 27.5	0	1	76	23		NP	NP	18	A-3a
R-351	18.0 - 20.0	0	1	1	14	84	60	36	36	A-7-6
R-351	22.0 - 24.0	0	0	0	50	50	61	36	38	A-7-6
TR-25	3.5 - 5.0	4	6	13	37	40	35	13	15	A-6a
TR-25	6.0 - 7.5	0	0	1	11	88	66	40	27	A-7-6
TR-26	3.5 - 5.0	0	2	38	12	48	44	25	20	A-7-6
TR-26	6.0 - 7.5	0	0	81	19		NP	NP	16	A-3a

SUBGRADE EVALUATION
RELOCATED SHUMWAY HOLLOW ROAD
PROJECT SCI-823-0.00

Soil Investigation Summary

Do NOT Rubblize & Roll
Global CS is NOT an option
Global LS may be an option

Design CBR is 6

Number of Borings = 10

Classification Counts by Sample															
R	1a	1b	3	3a	2-4	2-5	2-6	2-7	4a	4b	5	6a	6b	7-5	7-6
7	0	0	0	0	0	0	0	0	4	4	0	0	0	0	14
24%									14%	14%					48%
24.1%	0.0%								75.9%						

Class @ Surface		
2-5	0	
4b	2	20%
5	0	
7-5	0	
7-6	5	50%
R	2	20%

% Borings	
N_L <	0%
N_L < 10	40%
N_L < 20	0%
M+	40%

% @ Surface	
100%	
50%	50%

% Borings					
80%					
50%	50%	20%	10%	50%	50%

	N	N_L	PI			M	M_{OPT}	GI
Average	13.9	10.0			20.4		54.4			22.2	17.2	12.65
Maximum	37	15	66	29	40	73	92	100	40	26		20
Minimum	6	6	21	18	3	8	11	46	4	10		2

SCI-823 Shumway Hollow Road						Standard Penetration				Physical Characteristics						Moisture		Classification		Comments	Problem		Treatments			
#	B #	Boring Location	Depth	To	Cut Fill	n_2	n_3	N	N_L	LL	PL	PI	% Silt	% Clay	P 200	M	M_{OPT}	Class	GI		w/ Class	w/ MN	LS	CS	UC Class	UC MN
1	1301	As-Drilled Survey	0.5	2.5	0.0	10	8	18		22	19	3	51	19	70	14	14	4b	7		4b				3	
		Sta. 12+39	2.5	4.5		6	9	15		25	18	7	31	19	50	12	13	4a	3							
			4.5	5.5		30		30	15									R			BR				2	
2	1303	As-Drilled Survey	2.3	4.1	2.1	5	7	12		21	18	3	35	11	46	4	13	4a	2							
		Sta. 15+40	4.1	6.1		18	18	36		23	19	4	35	13	48	6	14	4a	3							
			6.1	8.0		6	31	37	12							9	10	4a								
3	1311A	As-Drilled Survey	ROCK		-30.4													R			BR				2	
		Sta. 19+00	ROCK															R			BR				2	
			ROCK															R			BR				2	
4	1312A	As-Drilled Survey	ROCK		-25.9													R			BR				2	
		Sta. 22+88	ROCK															R			BR				2	
			ROCK															R			BR				2	
5	1307A	As-Drilled Survey	0.0	1.8	-20.4	3	3	6		57	23	34	8	92	100	36	20	7-6	19			MN	--			3
		Sta. 27+08	1.8	3.6		4	6	10		60	25	35	12	88	100	40	22	7-6	20			MN	12			1
			3.6	5.6		3	3	6	6	48	23	25	12	87	99	34	20	7-6	16			MN	--			3
6	1307	As-Drilled Survey	0.3	1.8	-20.7	7	8	15		60	22	38	13	87	100	35	19	7-6	20			M	12			1
		Sta. 27+53	2.8	4.3		7	9	16		57	29	28	12	88	100	33	26	7-6	19			M				1
			5.3	6.8		6	5	11	11	54	24	30	21	78	99	32	21	7-6				MN	12			1
7	TR-24	As-Drilled Survey	0.0	0.7	-14.3	4	5	9									18	7-6	14			N				1
		Sta. 28+55	1.7	3.2		3	4	7									18	7-6	14			N				2
			4.2	5.7		3	4	7	7								18	7-6	14			N				2
8	TR-25	As-Drilled Survey	0.4	1.9	-5.6	3	5	8		66	26	40	11	88	99	27	23	7-6	20		LL	MN	--		All	2
		Sta. 29+95	2.9	4.4		3	5	8									18	7-6	14			N				2
			5.4	6.9		4	4	8	8								18	7-6				N				2
9	1313A	As-Drilled Survey	2.2	3.5	1.5	4	5	9		26	19	7	73	20	93	13	14	4b	8		4b	N		14	3	1
		Sta. 31+04	3.5	5.5		4	4	8									10	4b	8		4b	N			3	2
			5.5	7.5		4	7	11	8	25	18	7	59	24	83	18	13	4b			4b	MN		12	3	1
10	TR-26	As-Drilled Survey	3.4	4.9	2.4	5	8	13									18	7-6	14							
		Sta. 31+28	5.9	7.4		9	11	20	13	44	19	25	12	48	60	20	18	7-6								
11	1314A	As-Drilled Survey	12.4' Fill																							
		Sta. 34+98																								
		12.4' Fill																								

November 28, 2006

APPENDIX C

Stability Analyses

Portsmouth Bypass
Shumway-Hollow Roadway Embankments
Anlaysis Results Summary

Proj. No: 121-3070.03
By: WMA
Date: 11/23/2006

1) Main Alignment Analysis-No Stage Construction

Emb. Height(ft)	Condition	FS
57	Undrained	0.73
57	Drained	1.94

2) Main Alignment Analysis-Stage Construction

a) Undrained Analysis

Emb. Height at end of Stage(ft)	FS	Stage #	Time to next stage
25	1.29	Stage 1-Und	60 days
57	1.34	Stage 2-Und	--

Max. Settlement=30 inches

b) Drained Analysis

Emb. Height at end of Stage(ft)	FS	Stage #	Critical pore water pressure head (ft)*
25	1.31	Stage 1-Drained	19 (above)
57	1.5	Stage 2-Drained	-10 (below)

* Head measured from the ground surface.

Wick Drains Design Summary

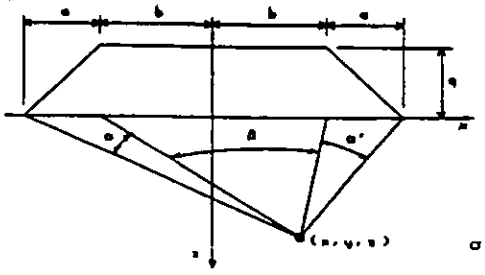
Location	Configuration	Spacing (ft)	Wick Drain Dim.
Main Alignment	Triangular	3	4 in x 1/4 in
Ramps A/B	Triangular	3	4 in x 1/4 in
Ramps C/D	Triangular	3	4 in x 1/4 in

DLZ

SUBJECT	Client	TranSystems, Inc.	JOB NUMBER	0121-3070.03	
	Project	SCI-823-0.00	SHEET NO.	1	OF 1
	Item	Shumway Hollow / Main Road Embankment	COMP. BY	WMA	DATE 11/23/06
		STAGE 1 (Undrained)	CHECKED BY		DATE

STAGE CONSTRUCTION ANALYSIS - EMBANKMENT- Total Stress Analysis

Embankment Informaiton:



Groundwater Table:	D=	38.0	ft			
Embankment Height:	H =	25	ft			
Fill Unit Weight:	γ_{emb} =	125	pcf	q =	3,125	psf
Width of Slope:	a =	50				
Top half-width of Emb:	b =	97				
Distance from CL:	x =	0				
Output Range:	z =	0	to	45	ft	

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi \cdot a}\right)\cdot\left(a\cdot(\alpha(z)+\beta(z)+\alpha'(z)) + b\cdot(\alpha(z)+\alpha'(z)) + x\cdot(\alpha(z)-\alpha'(z))\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right] + \operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-z)}{z}\right] - \operatorname{atan}\left[\frac{(b-z)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right] - \operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-2-1902 "Slope Stability"

Wick Drains:

$$\ln\left(\frac{1}{1-U_v}\right) = \left(\frac{t}{D^2/8c_h}\right)\left(\ln\frac{D}{d_w} - 0.75\right)$$

t=	60	days	consolidation time
S=	3	ft	Spacing
D=	3.15	ft	diameter of wick drain influence zone (Rectangular D=1.13S; Triangular D=1.05S)
c_h=	0.03	ft^2/day	horizontal drainage coefficient
a=	4	in	width of drain (Assume for 4" wide x1/4" thick)
b=	0.25	in	thickness of drain (Assume for 4" wide x1/4" thick)
d_w=	0.23	ft	equivalent diameter
U_h=	0.54		Horizontal Average Degree of Consolidation

C_v=	5.E-05	in^2/sec	*(0.030)* ft^2/day
t=	60	days	0.16 year
H=	25.00	ft	
T=	0.00		$T=tCv/H^2$
U_v=	0.06		Vertical Average Degree of Consolidation

Need Wick Drains to accelerate the settlement

U_{avg}=	0.56		Total Average Degree of Consolidation $U=1-(1-U_v)(1-U_h)$
C_{uci}=	646	psf	$C_{uci}=C_{uci}+(U_{avg})(\Delta\sigma_z)(\tan\phi_{cons})$
ϕ_{cons}=	28.0		

Total Settlement= 25 inches (See Settlement Calculation Sheet)

Stage Settlement= 14 inches

Soil Properties: *Stresses are calculated at mid-point of layer*

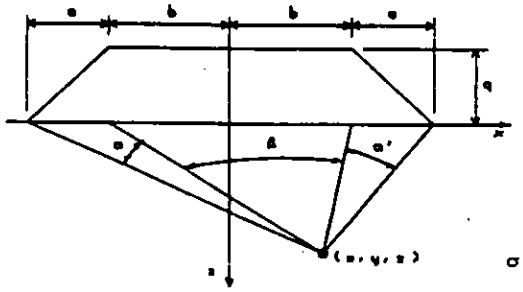
No.	Elevation Top	Bott.	Layer Bott.		Soil Type	g_{soil} (pcf)	s'_o (psf)	Dsz (psf)	s'_f (psf)	Change in Strength U_{avg}	ϕ_{cons}	C_{uu}
1	670.0	665.0	5.0	ft	Clay	125	313	3,125	3,437	0.56	28.0	1584
1	665.0	660.0	10.0	ft	Clay	125	938	3,125	4,062	0.56	28.0	1584
2	660.0	655.0	15.0	ft	Clay	125	1,563	3,124	4,686	0.56	28.0	1584
4	655.0	650.0	20.0	ft	Clay	125	2,188	3,121	5,309	0.56	28.0	1583
5	650.0	645.0	25.0	ft	Clay	125	2,813	3,116	5,929	0.56	28.0	1582
6	645.0	641.0	29.0	ft	Silt & Clay	125	3,375	3,110	6,485			
7												
8										Average=	1583	psf
9												
10												

DLZ

SUBJECT	Client	TranSystems, Inc.	JOB NUMBE	0121-3070.03	
	Project	SCI-823-0.00	SHEET NO. 1	OF	1
	Item	Shumway Hollow / Main Road Embankment	COMP. BY WMA	DATE	11/23/06
		STAGE 1 (Drained)	CHECKED BY	DATE	

STAGE CONSTRUCTION ANALYSIS - EMBANKMENT- Effective Stress Analysis

Embankment Informaiton:



Groundwater Table:	D=	38.0	ft			
Embankment Height:	H =	25	ft			
Fill Unit Weight:	γ_{emb} =	125	pcf	q =	3,125	psf
Width of Slope:	a =	50				
Top half-width of Emb:	b =	97				
Distance from CL:	x =	0				
Output Range:	z =	0	to	45	ft	

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi a}\right)\left(a\left(\alpha(z)+\beta(z)+\alpha'(z)\right)+b\left(\alpha(z)+\alpha'(z)\right)+x\left(\alpha(z)-\alpha'(z)\right)\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right]+\operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right]-\operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right]-\operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-2-1902 "Slope Stability"

Wick Drains:

$$\ln\left(\frac{1}{1-U_h}\right)=\left(\frac{t}{D^2/8c_h}\right)\left(\ln\frac{D}{d_w}-0.75\right)$$

t=	30	days	consolidation time
S=	3	ft	Spacing
D=	3.15	ft	diameter of wick drain influence zone (Rectangular D=1.13S; Triangular D=1.05S)
c_h=	0.03	ft^2/day	horizontal drainage coefficient
a=	4	in	width of drain (Assume for 4" wide x1/4" thick)
b=	0.25	in	thickness of drain (Assume for 4" wide x1/4" thick)
d_w=	0.23	ft	equivalent diameter
U_h=	0.32		Horizontal Average Degree of Consolidation

C_v=	5.E-05	in^2/sec	*(0.030)*	ft^2/day
t=	30	days	0.08	year
H=	25.00	ft		
T=	0.00		T=tCv/H^2	
U_v=	0.04	Vertical Average Degree of Consolidation		

Need Wick Drains to accelerate the settlement

U_{avg}= 0.35 Total Average Degree of Consolidation $U=1-(1-U_v)(1-U_h)$

ϕ_{CD}= 28.0

K_o= 0.53 $K_o=1-\sin\phi_{CD}$

B= 1.00 Pore pressure parameter $\Delta u_p=B[(1+2K_o/3]\Delta\sigma_z(1-U_{avg})$ (Excess pore water pressure)

Soil Properties: *Stresses are calculated at mid-point of layer*

No.	Elevation Top	Bott.	Layer Bott.		Soil Type	g_{soil} (pcf)	s'$_o$ (psf)	Dsz (psf)	s'$_f$ (psf)	U_{avg}	ϕ_{CD}	Δu_p (psf)
1	670.0	665.0	5.0	ft	Clay	125	313	3,125	3,437	0.35	28.0	2756
1	665.0	660.0	10.0	ft	Clay	125	938	3,125	4,062	0.35	28.0	2756
2	660.0	655.0	15.0	ft	Clay	125	1,563	3,124	4,686	0.35	28.0	2755
4	655.0	650.0	20.0	ft	Clay	125	2,188	3,121	5,309	0.35	28.0	2753
5	650.0	645.0	25.0	ft	Silt & Clay	125	2,813	3,116	5,929			
6	645.0	641.0	29.0	ft	Silt & Clay	125	3,375	3,110	6,485			
7												
8												
9						0						
10						0						

Avg. 2754

Total Settlement= 25 *inches* *(See Settlement Calculation Sheet)*

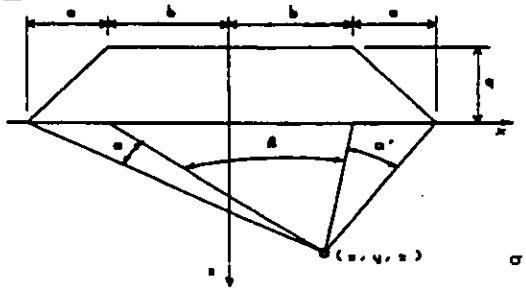
Stage Settlement= 9 *inches*

DLZ

SUBJECT	Client	TranSystems, Inc.	JOB NUMBE 0121-3070.03
	Project	SCI-823-0.00	SHEET NO. 1 OF 1
	Item	Shumway Hollow / Main Road Embankment	COMP. BY WMA DATE 11/23/06
		STAGE 2 (Drained)	CHECKED BY DATE

STAGE CONSTRUCTION ANALYSIS - EMBANKMENT- Effective Stress Analysis

Embankment Informaiton:



Groundwater Table:	D=	38.0	ft			
Embankment Height:	H =	57	ft			
Fill Unit Weight:	γ_{emb} =	125	pcf	q =	7,125	psf
Width of Slope:	a =	114				
Top half-width of Emb:	b =	65				
Distance from CL:	x =	0				
Output Range:	z =	0	to	45	ft	

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi\, a}\right)\left(a\cdot(\alpha(z)+\beta(z)+\alpha'(z)) + b\cdot(\alpha(z)+\alpha'(z)) + x\cdot(\alpha(z)-\alpha'(z))\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right] + \operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right] - \operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right] - \operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-2-1902 "Slope Stability"

Wick Drains:

$$\ln\left(\frac{1}{1-U_h}\right) = \left(\frac{t}{D^2/8c_h}\right)\left(\ln\frac{D}{d_w} - 0.75\right)$$

t=	168	days	consolidation time
S=	3	ft	Spacing
D=	3.15	ft	diameter of wick drain influence zone (Rectangular D=1.13S; Triangular D=1.05S)
c_h=	0.03	ft^2/day	horizontal drainage coefficient
a=	4	in	width of drain (Assume for 4" wide x1/4" thick)
b=	0.25	in	thickness of drain (Assume for 4" wide x1/4" thick)
d_w=	0.23	ft	equivalent diameter
U_h=	0.88		Horizontal Average Degree of Consolidation

C_v=	5.E-05	in^2/sec	*(0.030)* ft^2/day
t=	168	days	0.46 year
H=	25.00	ft	
T=	0.01		$T=tCv/H^2$
U_v=	0.10		Vertical Average Degree of Consolidation

Need Wick Drains to accelerate the settlement

U_{avg}=	0.90		Total Average Degree of Consolidation $U=1-(1-U_v)(1-U_h)$
ϕ_{CD}=	28.0		
K_o=	0.53		$K_o=1-\sin\phi_{CD}$
B=	1.00		Pore pressure parameter $\Delta u_p = B[(1+2K_o/3)\Delta\sigma_z(1-U_{avg})$ (Excess pore water pressure)

Soil Properties: *Stresses are calculated at mid-point of layer*

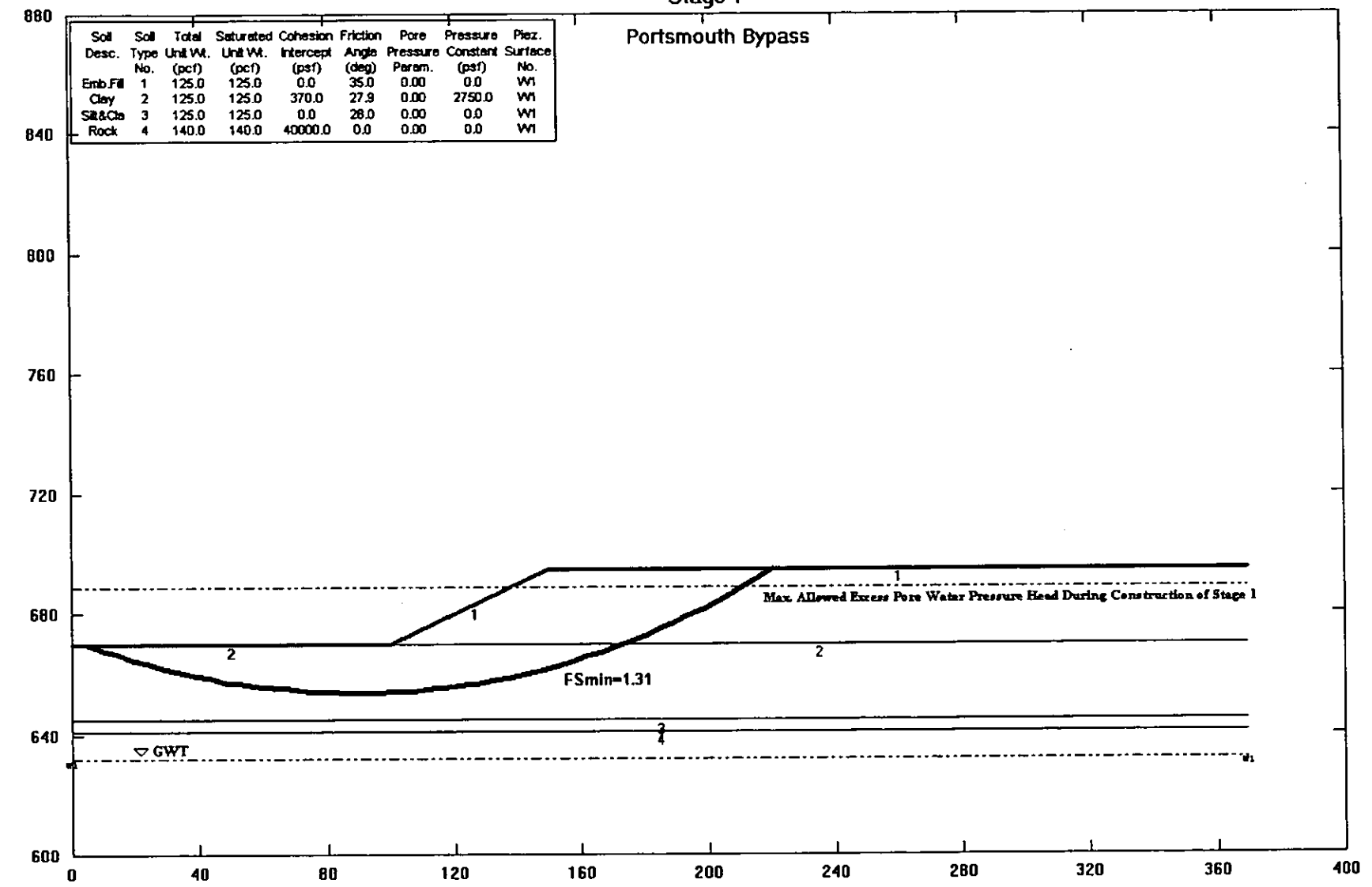
No.	Elevation Top	Bott.	Layer Bott.		Soil Type	g_{soil} (pcf)	s'_o (psf)	Dsz (psf)	s'_f (psf)	U_{avg}	ϕ_{CD}	Δu_p (psf)
1	670.0	665.0	5.0	ft	Clay	125	313	7,125	7,437	0.90	28.0	1006
1	665.0	660.0	10.0	ft	Clay	125	938	7,124	8,061	0.90	28.0	1006
2	660.0	655.0	15.0	ft	Clay	125	1,563	7,120	8,683	0.90	28.0	1006
4	655.0	650.0	20.0	ft	Clay	125	2,188	7,112	9,299	0.90	28.0	1004
5	650.0	645.0	25.0	ft	Silt & Clay	125	2,813	7,096	9,909			
6	645.0	641.0	29.0	ft	Silt & Clay	125	3,375	7,077	10,452			
7												
8												
9						0						
10						0						

Avg. 1005

Total Settlement= 25 *inches* *(See Settlement Calculation Sheet)*

Stage Settlement= 22 *inches*

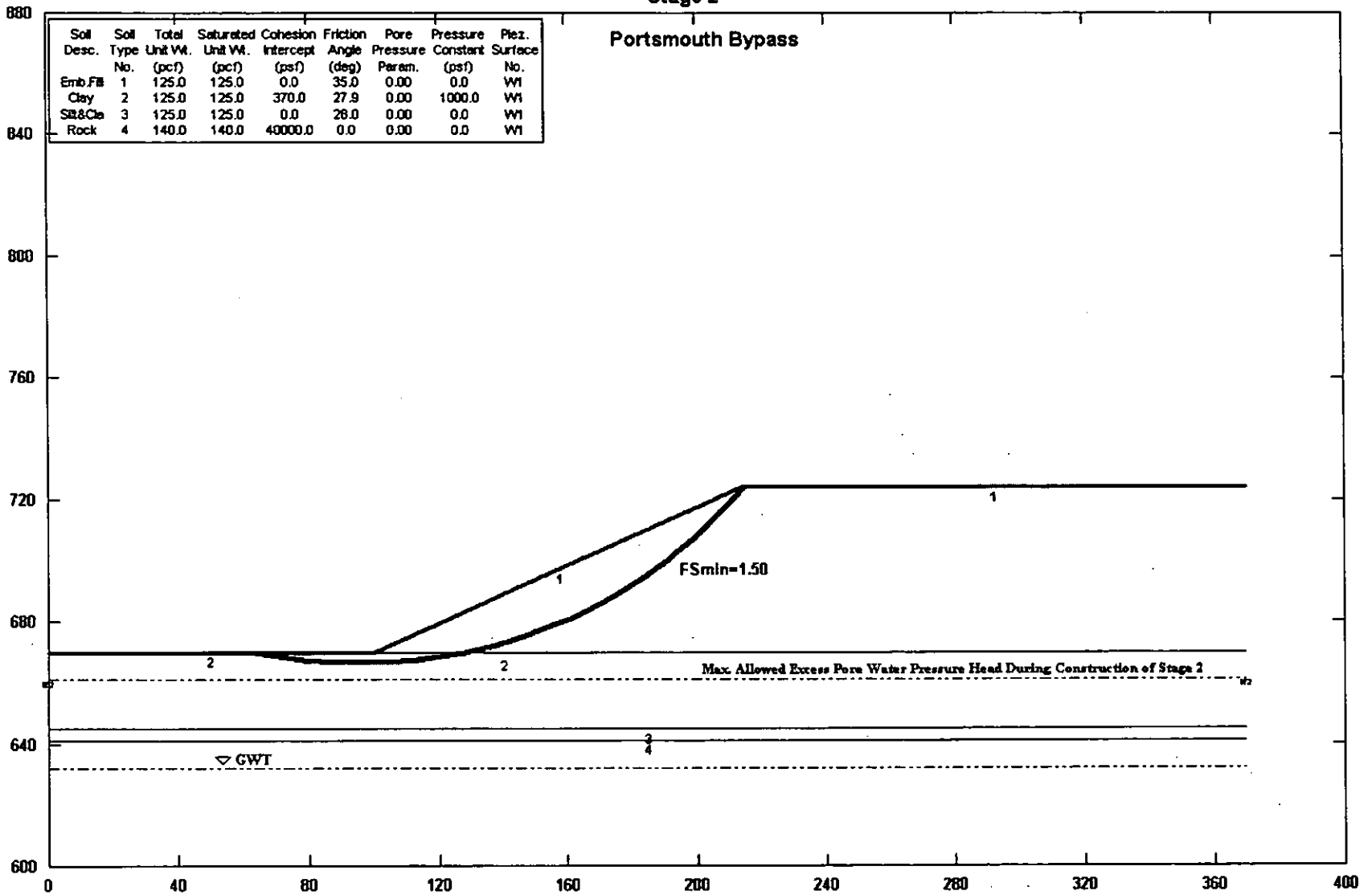
Shumway Hollow-Main Alignment Drained
Stage 1



Safety Factors Are Calculated By The Modified Bishop Method

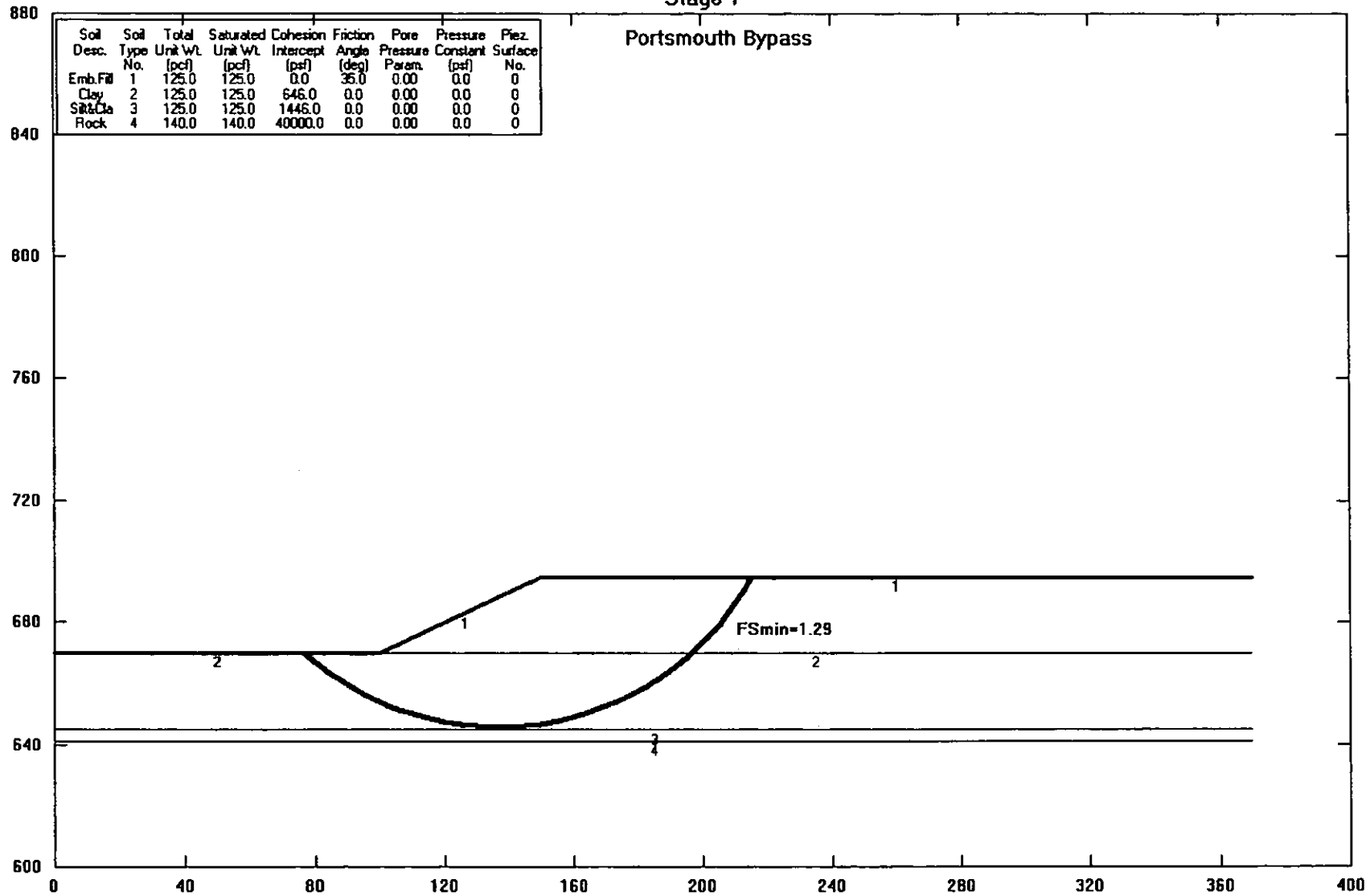
DLZ

Shumway Hollow-Main Alignment Drained
Stage 2



Safety Factors Are Calculated By The Modified Bishop Method

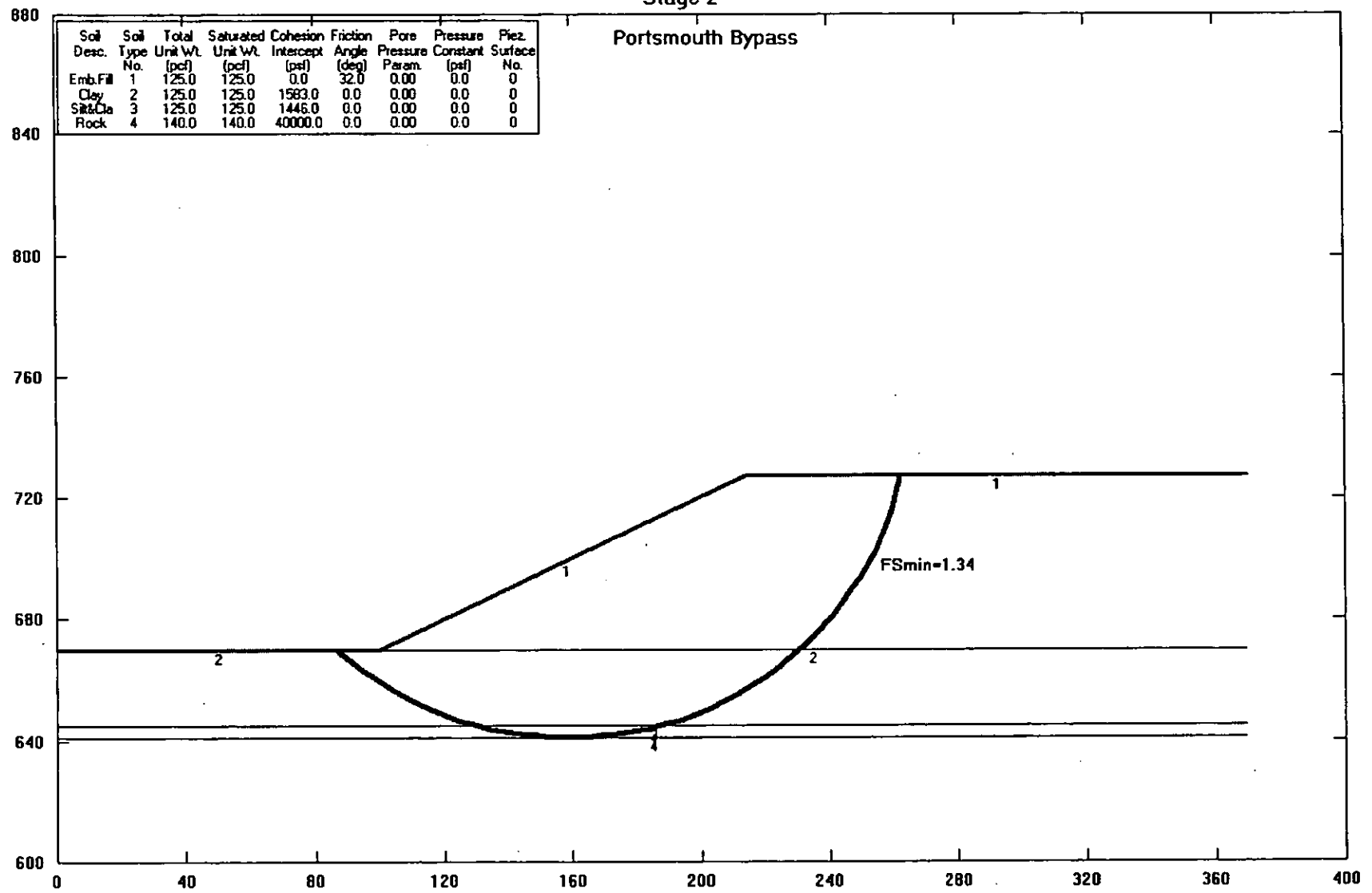
Shumway Hollow-Main Alignment Undrained
Stage 1



Safety Factors Are Calculated By The Modified Bishop Method

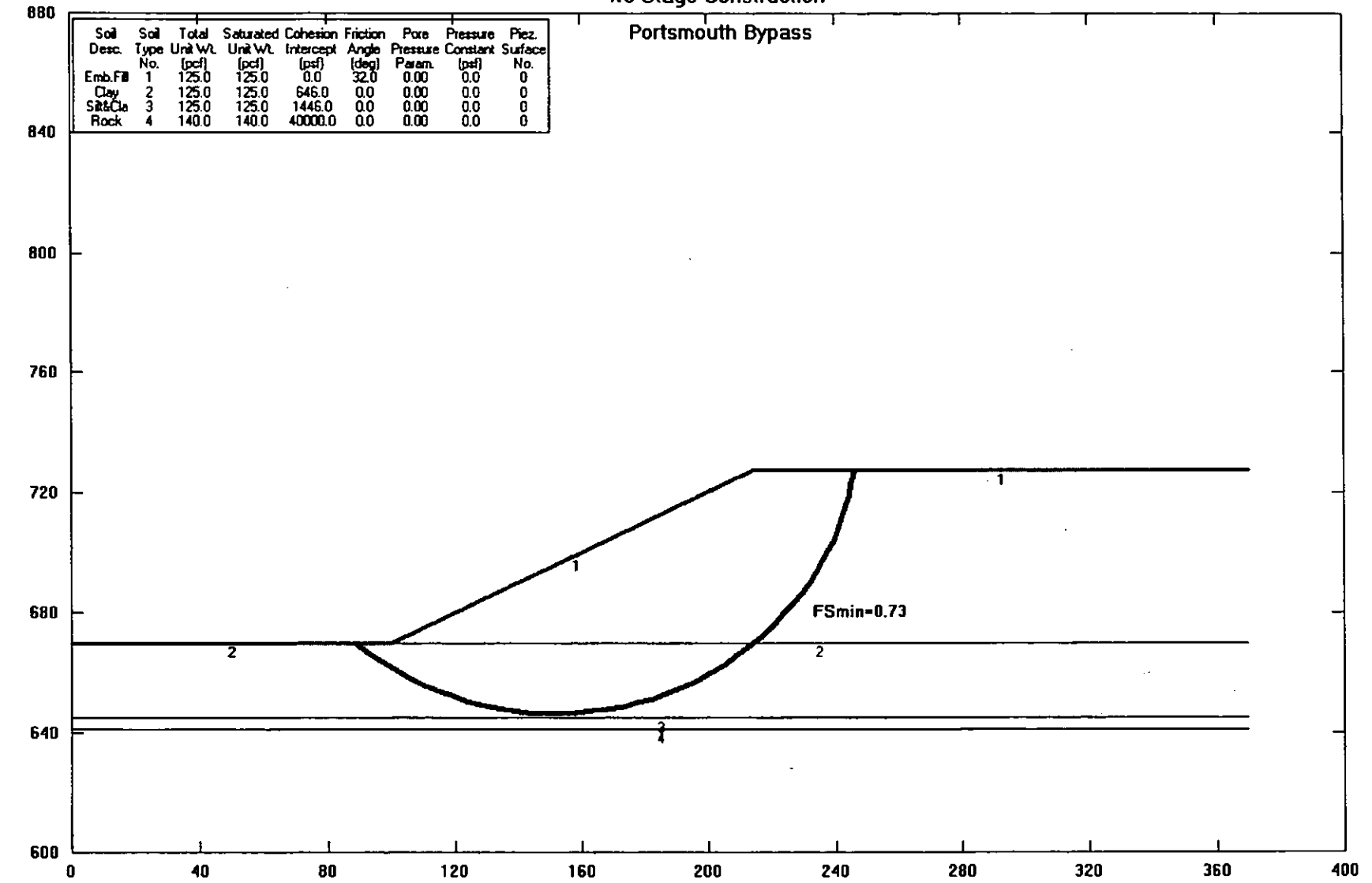
DLZ

Shumway Hollow-Main Alignment Undrained
Stage 2



Safety Factors Are Calculated By The Modified Bishop Method

Shumway Hollow-Main Alignment Undrained
No Stage Construction

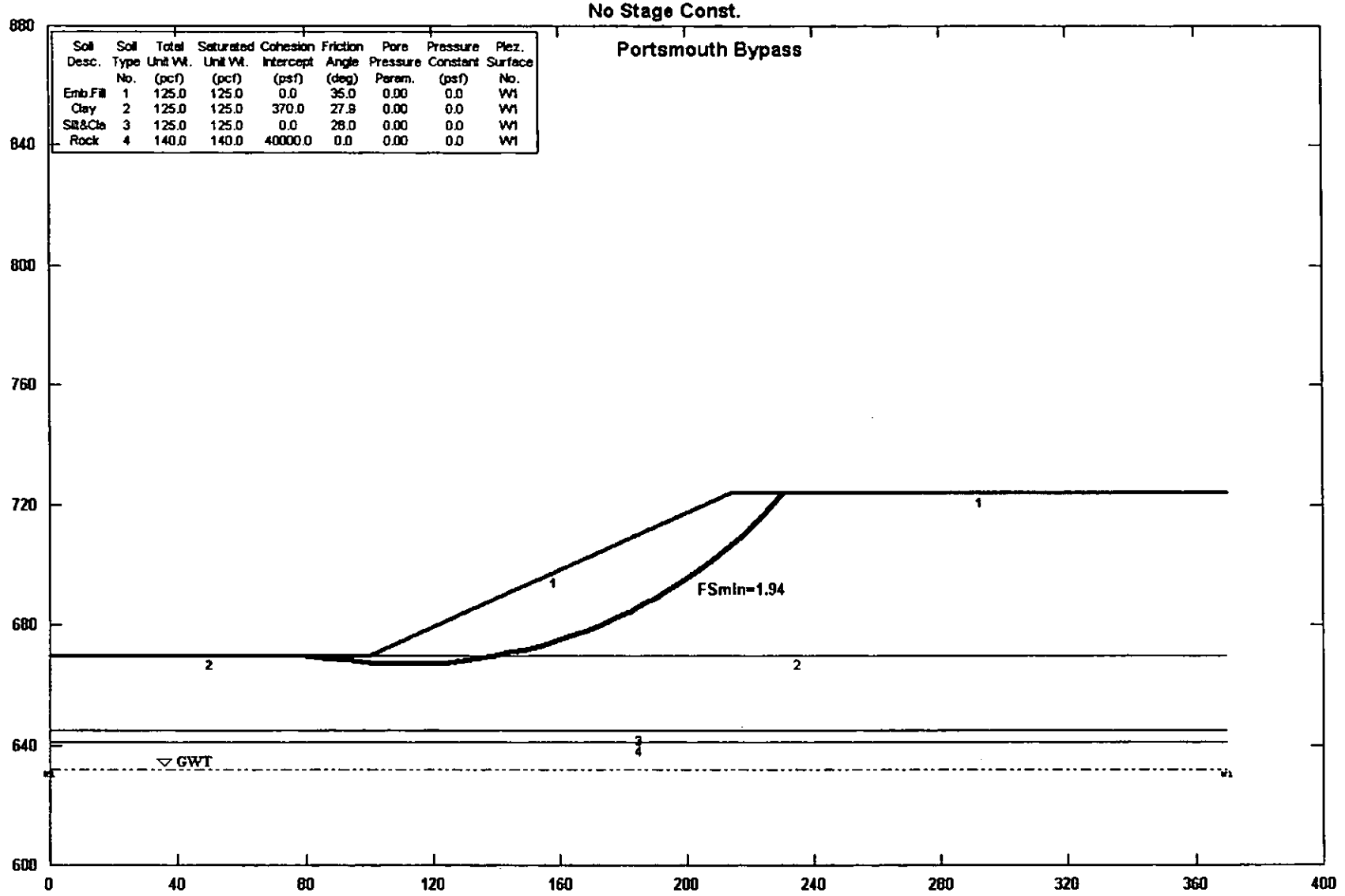


Safety Factors Are Calculated By The Modified Bishop Method

DLZ

Shumway Hollow-Main Alignment Drained
No Stage Const.

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Emb.Fill	1	125.0	125.0	0.0	35.0	0.00	0.0	W1
Clay	2	125.0	125.0	370.0	27.8	0.00	0.0	W1
Silt&Cla	3	125.0	125.0	0.0	28.0	0.00	0.0	W1
Rock	4	140.0	140.0	40000.0	0.0	0.00	0.0	W1



Safety Factors Are Calculated By The Modified Bishop Method

APPENDIX D

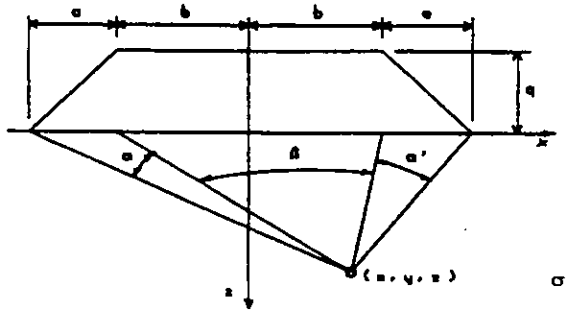
Settlement Analysis

DLZ

SUBJECT	Client	TranSystems, Inc.	JOB NUMBE	0121-3070.03	
	Project	SCI-823-6.81	SHEET NO.	1	OF 1
	Item	Shumway Hollow / Main Road Emb.	COMP. BY	WMA	DATE 11/23/06
		Total Settlement	CHECKED BY		DATE

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table:	D=	38.0	ft			
Embankment Height:	H =	57	ft			
Fill Unit Weight:	γ_{emb} =	125	pcf	q =	7,125	psf
Width of Slope:	a =	114				
Top half-width of Emb:	b =	65				
Distance from CL:	x =	0				
Output Range:	z =	0	to	45	ft	

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi}\right)\left(a\cdot(\alpha(z)+\beta(z)+\alpha'(z)) + b\cdot(\alpha(z)+\alpha'(z)) + x\cdot(\alpha(z)-\alpha'(z))\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right] + \operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right] - \operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right] - \operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis"

	Elevation		**Soil Properties:**		*Stresses are calculated at mid-point of layer*						Cohesionles s Soils	Cohesive Soils		
No.	Top	Bott.	Layer Bott.		Soil Type	g_{soil} (pcf)	s'_c (psf)	s'_o (psf)	Dsz (psf)	s'_f (psf)	C'	C_r	C_c	e_o
1	670.0	665.0	5.0	ft	Clay	125	10,912	313	7,125	7,437	0.0	0.12	0.35	1.060
1	665.0	660.0	10.0	ft	Clay	125	10,912	938	7,124	8,061	0.0	0.12	0.35	1.060
	660.0	655.0	15.0	ft	Clay	125	10,912	1,563	7,120	8,683	0.0	0.12	0.35	1.060
	655.0	650.0	20.0	ft	Clay	125	10,912	2,188	7,112	9,299		0.12	0.35	1.060
5	650.0	645.0	25.0	ft	Silt & Clay	125	3,068	2,813	7,096	9,909		0.17	0.47	1.157
6	645.0	641.0	29.0	ft	Silt & Clay	125	3,068	3,375	7,077	10,452		0.17	0.47	1.157
7														
8														
9														
10														

No.	Settlement:		Total Settlement
1	0.401	ft	
2	0.272	ft	**2.071 ft**
3	0.217	ft	
4	0.183	ft	
5	0.570	ft	**24.8 in**
6	0.428	ft	
7			
8			
9			
10			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($s'_0<s'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II ($s'_0<s'_c<s_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum\left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right) + \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils ($s'_0=s'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Cohesionless Soils ($s'_0=s'_f$)

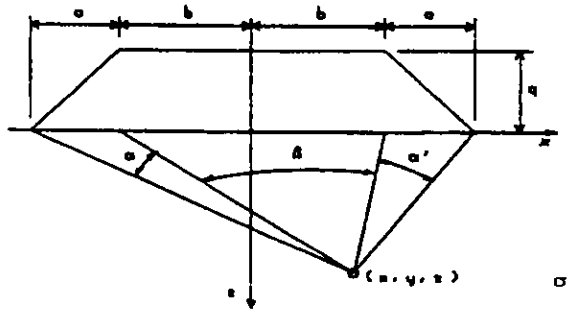
$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

DLZ

SUBJECT				
Client	TranSystems, Inc.	JOB NUMBE 0121-3070.03		
Project	SCI-823-6.81	SHEET NO. 1	OF	1
Item	Shumway Hollow /Ramp A(Sta. 403+00)	COMP. BY WMA	DATE	11/23/06
	Total Settlement	CHECKED BY	DATE	

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table:	D=	50.0	ft		
Embankment Height:	H =	51	ft		
Fill Unit Weight:	γ_{emb} =	125	pcf	q =	6,375 psf
Width of Slope:	a =	102			
Top half-width of Emb:	b =	25			
Distance from CL:	x =	0			
Output Range:	z =	0	to	45	ft

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi}\right)\left(a\left(\alpha(z)+\beta(z)+\alpha'(z)\right)+b\left(\alpha(z)+\alpha'(z)\right)+x\left(\alpha(z)-\alpha'(z)\right)\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right]+\operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right]-\operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right]-\operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis"

Soil Properties: *Stresses are calculated at mid-point of layer*

No.	Elevation Top	Bott.	Layer Bott.		Soil Type	g_{soil} (pcf)	s'_c (psf)	s'_o (psf)	Dsz (psf)	s'_f (psf)	Cohesionles s Soils C'	Cohesive Soils C_r	C_c	e_o
1	676.0	665.0	11.0	ft	Clay	125	10.912	688	6,372	7,059	0.0	0.12	0.35	1.060
1	665.0	660.0	16.0	ft	Clay	125	10.912	1,688	6,332	8,020	0.0	0.12	0.35	1.060
[illegible]	660.0	655.0	21.0	ft	Clay	125	10,912	2,313	6,278	8,591	0.0	0.12	0.35	1.060
[illegible]	[illegible]5.0	650.0	26.0	ft	Clay	125	10,912	2,938	6,203	9,140		0.12	0.35	1.060
5	650.0	645.0	31.0	ft	Silt & Clay	125	3.068	3,563	6,109	9,671		0.17	0.47	1.157
6	645.0	641.0	35.0	ft	Silt & Clay	125	3,068	4,125	6,011	10,136		0.17	0.47	1.157
7														
8														
9														
10														

No.	Settlement:		Total Settlement
1	0.648	ft	
2	0.197	ft	**1.968 ft**
3	0.166	ft	
4	0.144	ft	
5	0.473	ft	**23.6 in**
6	0.340	ft	
7			
8			
9			
10			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($s'_0<s'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II ($s'_0<s'_c<s_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right)+\frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils ($s'_0=s'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Cohesionless Soils ($s'_n=s'_r$)

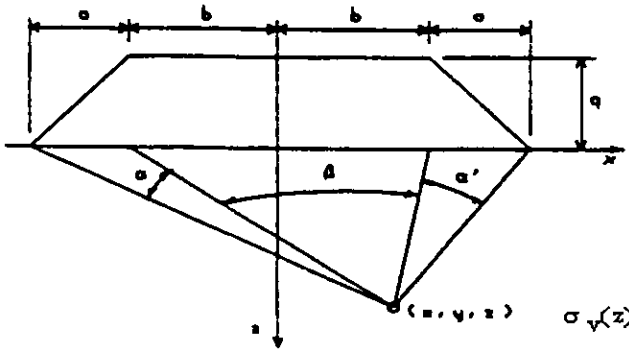
$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

DLZ

SUBJECT	Client TranSystems, Inc.	JOB NUMBER 0121-3070.03	
	Project SCI-823-6.81	SHEET NO. 1	OF 1
	Item Shumway Hollow /Ramp B(Sta. 372+20)	COMP. BY WMA	DATE 11/27/06
	Total Settlement	CHECKED BY	DATE

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table:	D=	11.0	ft		
Embankment Height:	H =	25	ft		
Fill Unit Weight:	γ_{emb} =	125	pcf	q = 3,125	psf
Width of Slope:	a =	50			
Top half-width of Emb:	b =	25			
Distance from CL:	x =	0			
Output Range:	z =	0	to 45	ft	

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi}\right)\left(a\cdot(\alpha(z)+\beta(z)+\alpha'(z)) + b\cdot(\alpha(z)+\alpha'(z)) + x\cdot(\alpha(z)-\alpha'(z))\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right] + \operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right] - \operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right] - \operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Soil Properties: *Settlement is calculated at mid-point of layer*

No.	Bot. of Laye		Soil Type	g_{soil} (pcf)	s'_c (psf)	s'_o (psf)	Dsz (psf)	s'_f (psf)	Cohesionless Soils C'	Cohesive Soils C_r	C_c	e_o
1	8.0	ft	V. Stiff Clay	125	1,396	500	3,124	3,624	0.0	0.11	0.24	0.709
2	21.0	ft	Loose-M Sand	125		1,594	3,079	4,673	44.0	0.00	0.00	0.000
3	0.0			0	0				0.0	0.00	0.00	0.000
4	0.0			0	0							
5	0.0			0	0							
6	0.0			0	0							
7	0.0			0	0							
8	0.0			0	0							
9	0.0			0	0							
10	0.0			0	0							

No.	Settlement:		Total Settlement
1	0.695	ft	
2	0.138	ft	**0.833 ft**
3			
4			
5			**10.0 in**
6			
7			
8			
9			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($s'_0<s'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II ($s'_0<s'_c<s_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum\left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right) + \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils ($s'_0=s'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Cohesionless Soils ($s'_0=s'_c$)

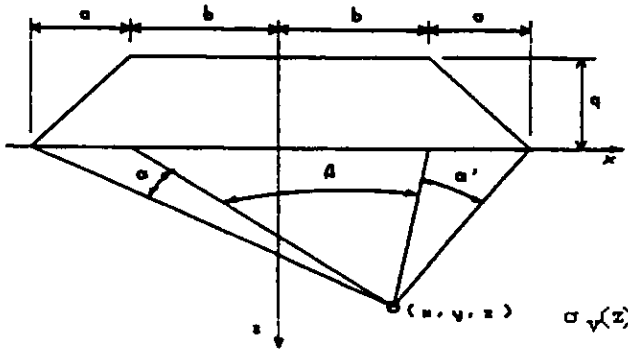
$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

DLZ SUBJECT

Client TranSystems, Inc.		JOB NUMBER 0121-3070.03	
Project SCI-823-6.81		SHEET NO. 1	OF 1
Item Shumway Hollow /Ramp C(Sta. 380+00)		COMP. BY WMA	DATE 11/27/06
Total Settlement		CHECKED BY	DATE

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table:	D=	10.0	ft		
Embankment Height:	H =	10	ft		
Fill Unit Weight:	γ_{emb} =	125	pcf	q =	1,250 psf
Width of Slope:	a =	20			
Top half-width of Emb:	b =	25			
Distance from CL:	x =	0			
Output Range:	z =	0	to	45	ft

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi}\right)\left(a\cdot(\alpha(z)+\beta(z)+\alpha'(z)) + b\cdot(\alpha(z)+\alpha'(z)) + x\cdot(\alpha(z)-\alpha'(z))\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right] + \operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right] - \operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right] - \operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Soil Properties: *Settlement is calculated at mid-point of layer*

No.	Bot. of Laye		Soil Type	g_{soil} (pcf)	s'_c (psf)	s'_o (psf)	Dsz (psf)	s'_f (psf)	Cohesionless Soils C'	Cohesive Soils C_r	C_c	e_o
1	11.0	ft	V. Stiff Clay	125	1,396	688	1,248	1,935	0.0	0.11	0.24	0.709
2	25.0	ft	Loose-M Sand	125		1,751	1,189	2,940	50.0	0.00	0.00	0.000
3	0.0			0	0				0.0	0.00	0.00	0.000
4	0.0			0	0							
5	0.0			0	0							
6	0.0			0	0							
7	0.0			0	0							
8	0.0			0	0							
9	0.0			0	0							
10	0.0			0	0							

No.	Settlement:		Total Settlement
1	0.437	ft	
2	0.063	ft	**0.500 ft**
3			
4			
5			**6.0 in**
6			
7			
8			
9			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I (s'_o<s'_c) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II (s'_o<s'_c<s_f) Eqn:11.25

$$(\delta_c)_{ult} = \sum\left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right) + \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils (s'_o=s'_c) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Cohesionless Soils (s'_o=s'_c)

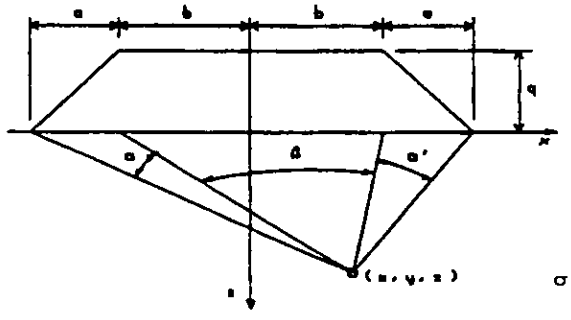
$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

DLZ

SUBJECT	Client	TranSystems, Inc.	JOB NUMBE 0121-3070.03
	Project	SCI-823-6.81	SHEET NO. 1 OF 1
	Item	Shumway Hollow /Ramp D(Sta. 404+00)	COMP. BY WMA DATE 11/23/06
		Total Settlement	CHECKED BY DATE

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table:	D=	50.0	ft		
Embankment Height:	H =	51	ft		
Fill Unit Weight:	γ_{emb} =	125	pcf	q =	6,375 psf
Width of Slope:	a =	102			
Top half-width of Emb:	b =	25			
Distance from CL:	x =	0			
Output Range:	z =	0	to	45	ft

**See Data output Attached*

$$\sigma_v(z) := \left(\frac{q}{\pi}\right)\left(a\left(\alpha(z)+\beta(z)+\alpha'(z)\right)+b\left(\alpha(z)+\alpha'(z)\right)+x\left(\alpha(z)-\alpha'(z)\right)\right)$$

$$\beta(z) := \operatorname{atan}\left[\frac{(b-x)}{z}\right]+\operatorname{atan}\left[\frac{(b+x)}{z}\right] \qquad \alpha'(z) := \operatorname{atan}\left[\frac{(a+b-x)}{z}\right]-\operatorname{atan}\left[\frac{(b-x)}{z}\right] \qquad \alpha(z) := \operatorname{atan}\left[\frac{(a+b+x)}{z}\right]-\operatorname{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis"

	Elevation		**Soil Properties:**		*Stresses are calculated at mid-point of layer*					Cohesionles s Soils	Cohesive Soils		
No.	Top	Bott.	Layer Bott.		Soil Type	g_{soil} (pcf)	s'_c (psf)	s'_o (psf)	Dsz (psf)	s'_f (psf)	C'	C_r	C_c	e_o
1	670.0	665.0	5.0	ft	Clay	125	10,912	313	6,375	6,687	0.0	0.12	0.35	1.060
1	665.0	660.0	10.0	ft	Clay	125	10,912	938	6,368	7,305	0.0	0.12	0.35	1.060
[illegible]	660.0	655.0	15.0	ft	Clay	125	10,912	1,563	6,343	7,906	0.0	0.12	0.35	1.060
[illegible]	5.0	650.0	20.0	ft	Clay	125	10,912	2,188	6,295	8,483		0.12	0.35	1.060
5	650.0	645.0	25.0	ft	Silt & Clay	125	3,068	2,813	6,218	9,030		0.17	0.47	1.157
6	645.0	641.0	29.0	ft	Silt & Clay	125	3,068	3,375	6,136	9,511		0.17	0.47	1.157
7														
8														
9														
10														

No.	Settlement:		Total Settlement
1	0.387	ft	
2	0.260	ft	**1.942 ft**
3	0.205	ft	
4	0.171	ft	
5	0.526	ft	**23.3 in**
6	0.392	ft	
7			
8			
9			
10			

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($s'_0<s'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Overconsolidated Soils - Case II ($s'_0<s'_c<s_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_0} H \log\left(\frac{\sigma'_c}{\sigma'_0}\right)+\frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right)\right]$$

Normally Consolidated Soils ($s'_0=s'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_0} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

Cohesionless Soils ($s'_0=s'_c$)

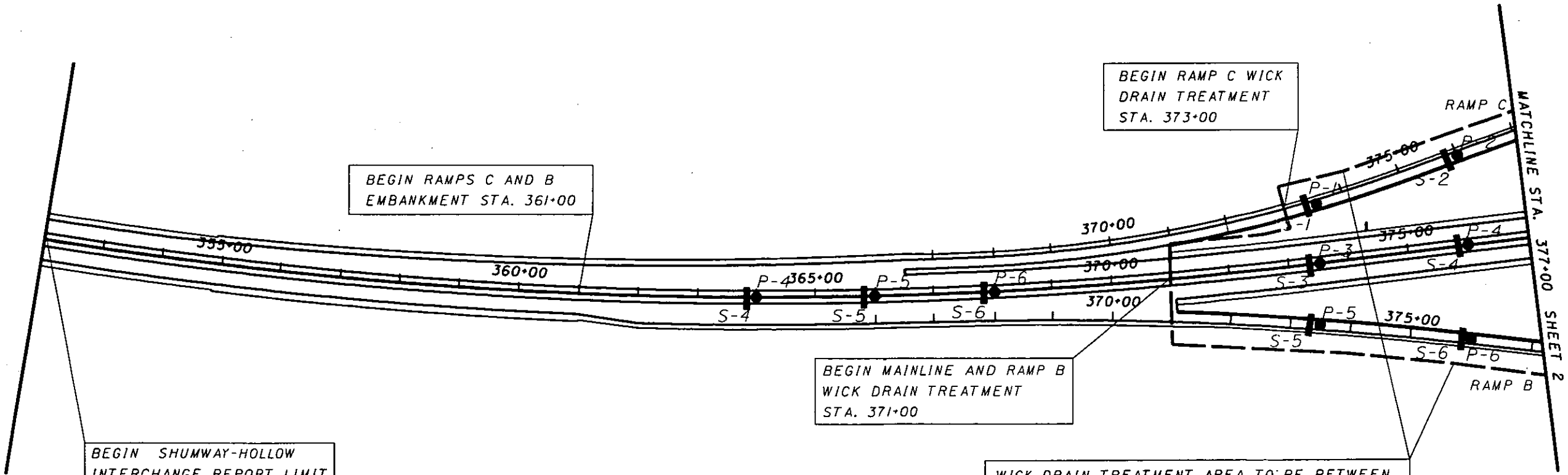
$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_0}\right)$$

APPENDIX E

Instrumentation Plans

PIEZOMETER TIP DEPTH FROM EXISTING GRADE		SR 823 STATION
P-7	20	373+50
P-8	20	376+00
P-9	20	373+50
P-10	20	376+00
P-11	20	373+50
P-12	20	376+00

SETTLEMENT PLATE	SR 823 STATION
S-7	373+60
S-8	376+10
S-9	373+60
S-10	376+10
S-11	373+60
S-12	376+10



LEGEND
PIEZOMETER
SETTLEMENT PLATE

0 100 50 200
SCALE IN FEET

WICK DRAIN AND INSTRUMENTATION PLAN
SR 823 STA. 352+00 TO STA. 377+00

DRAWN WMA CHECKED AMJ

DLZ

SCI-823-6.81

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END RAMPS C AND B
EMBANKMENT
STA. 384+33

END RAMP C WICK DRAIN
TREATMENT AREA
STA. 382+00

BEGIN RAMPS A AND D
EMBANKMENT
STA. 384+33

PIEZOMETER AND SETTLEMENT PLATE
LOCATIONS SHOWN ON SHEET 3

BEGIN RAMP D WICK DRAIN
TREATMENT AREA
STA. 395+50

20+00
25+00
385+00
RAMP D
390+00
395+00
400+00
RAMP C
380+00
S-7
P-7
S-8
P-8
S-9
P-9
MATCHLINE STA. 377+00 SHEET 1
MATCHLINE STA. 402+00 SHEET 2
380+00
S-10
P-10
S-11
P-11
385+00
S-12
P-12
S-13
P-13
390+00
S-14
P-14
395+00
S-15
P-15
S-16
P-16
400+00
S-17
P-17
P-25
S-24
P-24
S-23
P-23
395+00
P-22
390+00
S-21
P-21
380+00
P-18
S-18
RAMP B
S-19
P-19
385+00
S-20
P-20
RAMP A
WICK DRAIN TREATMENT AREA TO BE BETWEEN STATIONS 371+00 AND 415+00, AND EXTEND 15 FT RIGHT AND LEFT OF THE LIMITS OF THE TOE OF THE EMBANKMENT. *SEE DETAIL A*.
LEGEND
PIEZOMETER
SETTLEMENT PLATE
0+00
15+00
40+00
0
100
50
200
SCALE IN FEET

DLZ
DRAWN WMA
CHECKED AMJ
WICK DRAIN AND INSTRUMENTATION PLAN
SR 823 STA. 377+00 TO STA. 402+00
SCI-823-6.81
7
2
4

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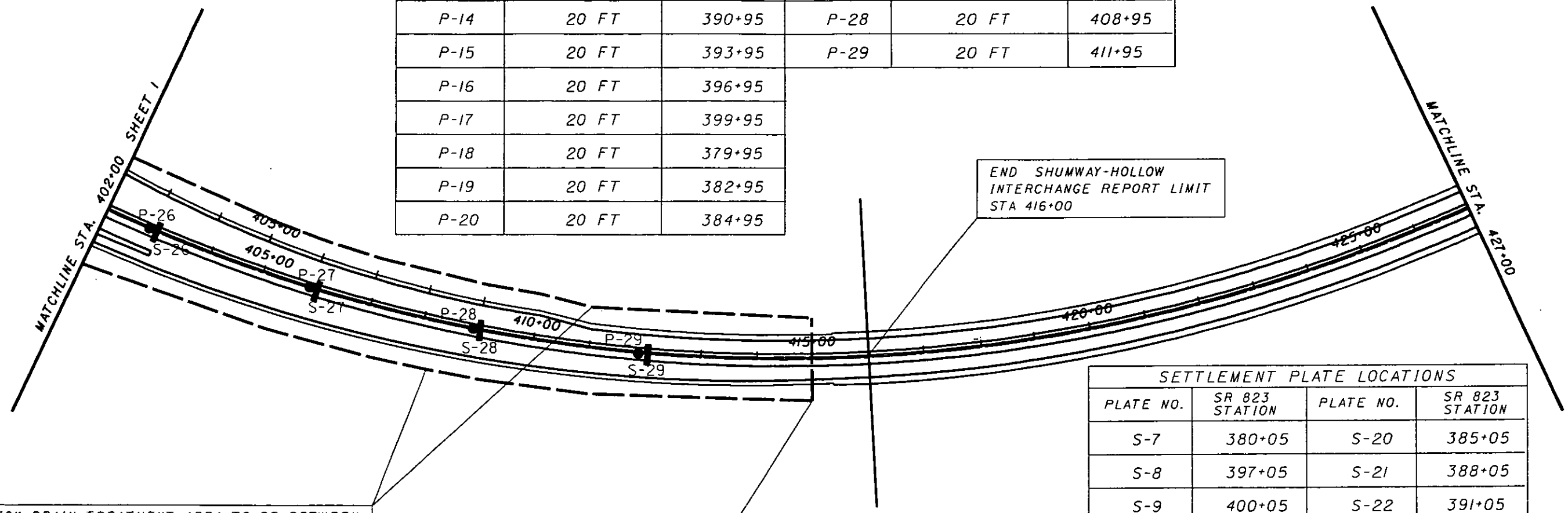
PIEZOMETER TIP DEPTH FROM EXISITNG GRADE		SR 823 STATION	PIEZOMETER TIP DEPTH FROM EXISITNG GRADE		SR 823 STATION
P-13	20 FT	379+95	P-21	20 FT	387+95
P-8	20 FT	396+95	P-22	20 FT	390+95
P-9	20 FT	399+95	P-23	20 FT	393+95
P-10	20 FT	379+95	P-24	20 FT	396+95
P-11	20 FT	382+95	P-25	20 FT	399+95
P-12	20 FT	384+95	P-26	20 FT	402+95
P-13	20 FT	387+95	P-27	20 FT	405+95
P-14	20 FT	390+95	P-28	20 FT	408+95
P-15	20 FT	393+95	P-29	20 FT	411+95
P-16	20 FT	396+95			
P-17	20 FT	399+95			
P-18	20 FT	379+95			
P-19	20 FT	382+95			
P-20	20 FT	384+95			



WICK DRAIN TREATMENT AREA TO BE BETWEEN STATIONS 371+00 AND 415+00 AND EXTEND 15 FT RIGHT AND LEFT OF THE LIMITS OF THE TOE OF THE EMBANKMENT. (SEE DETAIL A)

END RAMPS A AND D EMBANKMENT STA. 415+00

END SHUMWAY-HOLLOW INTERCHANGE REPORT LIMIT STA 416+00

LEGEND

- PIEZOMETER
- SETTLEMENT PLATE

0 50 100 200

SCALE IN FEET

SETTLEMENT PLATE LOCATIONS			
PLATE NO.	SR 823 STATION	PLATE NO.	SR 823 STATION
S-7	380+05	S-20	385+05
S-8	397+05	S-21	388+05
S-9	400+05	S-22	391+05
S-10	380+05	S-23	394+05
S-11	383+05	S-24	397+05
S-12	385+05	S-25	400+05
S-13	388+05	S-26	403+05
S-14	391+05	S-27	406+05
S-15	394+05	S-28	409+05
S-16	397+05	S-29	412+05
S-17	400+05		
S-18	380+05		
S-19	383+05		

DLZ

Drawn WMA
Checked AMJ

WICK DRAIN AND INSTRUMENTATION PLAN
SR 823 STA. 402+00 TO STA. 427+00

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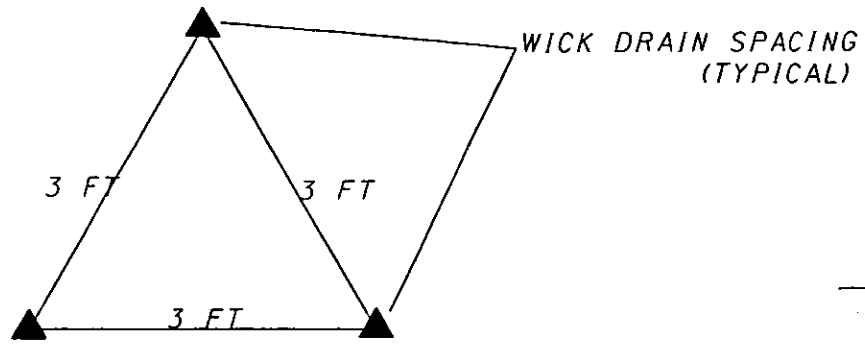
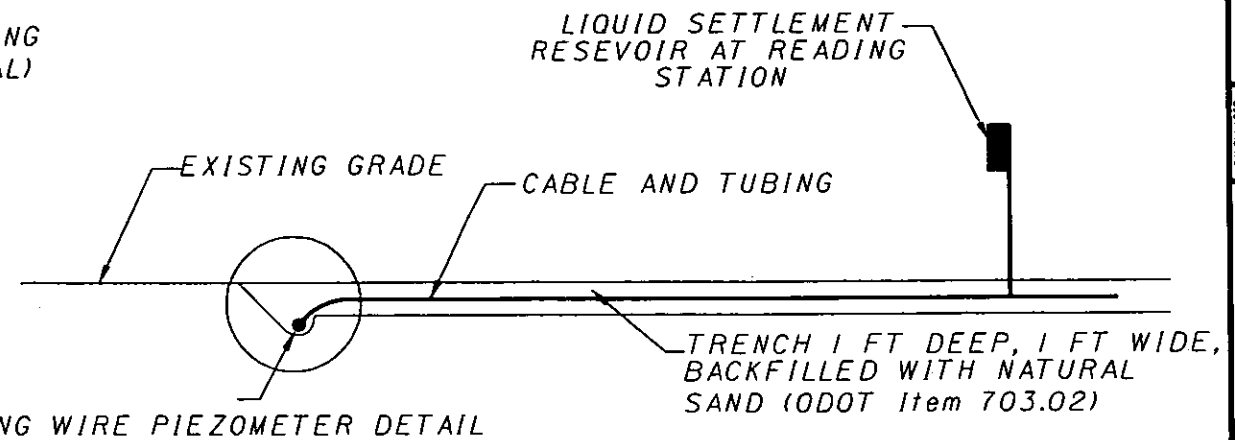
NOTES

1. PLACE 3 FEET OF ODOT ITEM 703.02 EMBANKMENT BEFORE THE INSTALLATION OF THE WICK DRAIN WICK DRAINS TO BE INSTALLED PRIOR TO EMBANKMENT CONSTRUCTION.
2. THE SAND SHALL CONSIST OF CLEAN, FREE-DRAINING, COARSE NATURAL SAND, OR SAND AND PEA GRAVEL, SHALL BE GRADED UNIFORMLY FROM COARSE TO FINE, AND SHALL BE OF SUCH SIZE THAT, WHEN TESTING ON U.S. STANDARD SIEVES IN ACCORDANCE WITH AASHTO T27 AND WASHING THE SAMPLE IN ACCORDANCE WITH AASHTO T11, SHALL CONFORM TO THE GRADING REQUIREMENTS OF ODOT CMS 703.02.
3. THE SAND SHALL NOT CONTAIN ANY ORGANIC OR OTHER DELETERIOUS MATERIALS AND SHALL NOT BE FROZEN WHEN PLACED.
4. IF DENSE SAND, GRAVEL OR HARD SOIL LAYERS ARE ENCOUNTERED BELOW THE GROUND SURFACE AND CANNOT BE PENETRATED WITH REASONABLE EFFORT, THE CONTRACTOR SHALL BE REQUIRED TO PRE-DRILL THE WICK DRAIN LOCATIONS.
5. WICK DRAINS SHALL BE INSTALLED FROM THE WORKING SURFACE TO THE DEPTH SHOWN IN THE PLANS, OR TO COMPLETELY PENETRATE THE COMPRESSIBLE FOUNDATION SOILS AT SUCH A DEPTH EITHER SHALLOWER OR DEEPER THAN PLAN DEPTH WHERE THE SOIL RESISTS A REASONABLE EFFORT AT FURTHER PENETRATION.
6. SETTLEMENT PLATES SHALL BE GEOKON MODEL 4600 OR EQUIVALENT.
7. VIBRATING WIRE PIEZOMETERS SHALL BE SLOPE INDICATOR MODEL 52611099 OR EQUIVALENT.
8. THE NUMBER OF WICKS IS ESTIMATED TO BE 494,000 AND THE AVERAGE WICK DRAIN DEPTH IS ESTIMATED TO BE 20 FEET FOR THE ENTIRE INTERCHANGE. THE TOTAL WICK DRAIN FOOTAGE AT THIS INTERSECTION IS ESTIMATED TO BE 9,880,000 LINEAR FEET.
9. THE MAINLINE EMBANKMENT AND RAMPS A, B, C, AND D EMBANKMENTS AT THE SHUMWAY HOLLOW INTERCHANGE SHALL BE CONSTRUCTED IN STAGES AND THE FOUNDATION PORE PRESSURES SHALL BE MONITORED. THE MAXIMUM HEIGHT OF THE INITIAL STAGE SHALL BE 25 FEET. IF AT ANY TIME, FOUNDATION PORE WATER PRESSURE HEAD IS HIGHER TAHN 10 FEET BELOW THE GROUND SURFACE IN THE INITIAL STAGE, THEN EMBANKMENT CONSTRUCTION SHALL STOP. IT IS ESTIMATED THAT THE INITIAL STAGE OF EMBANKMENT CONSTRUCTION SHALL NEED TO CONSOLIDATE THE FOUNDATION SOILS FOR SIXTY DAYS BEFORE THE SUBSEQUENT STAGE OF THE EMBANKMENT IS PLACED.
10. THE ACTUAL WICK DRAIN TREATMENT AREA AND DEPTH MAY DIFFER FROM THE PROPOSED LIMITS DUE TO SOIL VARIATIONS AT THE SITE AND THEREFORE SHOULD BE CONFIRMED IN THE FIELD BY THE CONTRACTOR

DETAIL "A"
WICK DRAIN TYPICAL LAYOUT-PLAN VIEW
(NOT TO SCALE)

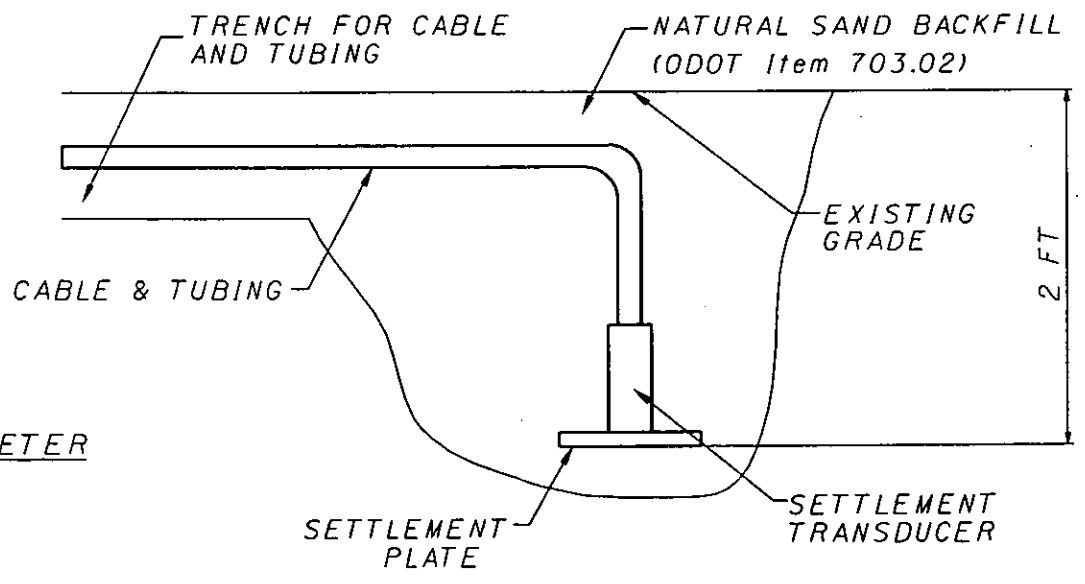


DETAIL "B"
INSTRUMENTATION DETAILS
(NOT TO SCALE)

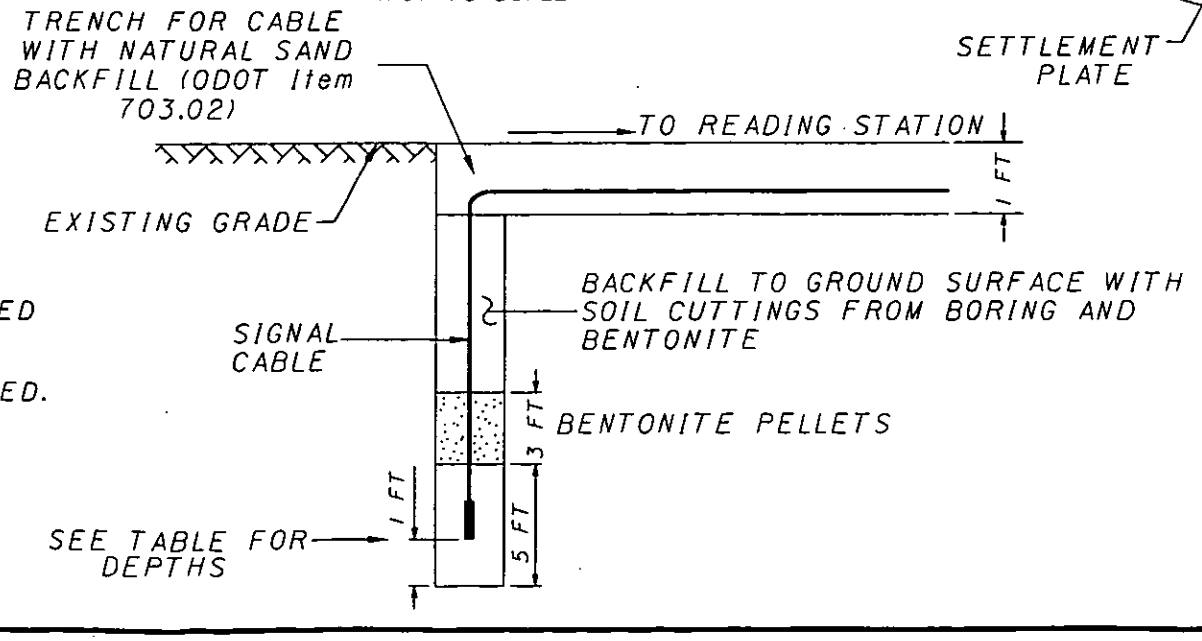


SEE VIBRATING WIRE PIEZOMETER DETAIL
OR SETTLEMENT PLATE DETAIL

SETTLEMENT PLATE DETAIL
(NOT TO SCALE)



VIBRATING WIRE PIEZOMETER
(NOT TO SCALE)



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INSTRUMENTATION DETAILS
SHUMWAY-HOLLOW INTERCHANGE

SCI-823-6.81

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APPENDIX F

Geotechnical Design Checklists

III.A. Centerline Cuts Checklist

C-R-S:SCI-823-6.81	PID: 19415	Reviewer: Wael Alkasawneh	Date: 11/29/2006

If you do not have a centerline cut on the project, you do not have to fill out this checklist.

Soil Cuts			
(Y) N X	1	Does drilling provide continuous stratigraphic sections for the range of elevations that represent proposed cut slope areas?	
(Y) N X	2	Do the cut slopes have a minimum stability F.S. of 1.30 and are not steeper than 2:1?	
		Check stability calculation method used:	
		(◘) STABL or equivalent software	
		◘ hand calculations	
Y (N) X	3	If there is a "red bed" or other historically unstable soil or rock layer through the cut slopes, was this layer considered as a possible failure zone?	
Y (N) X	4	Have erosion protection measures been addressed for backslopes, side slopes, and ditches (including riprap recommendations or special slope treatments)?	
Y N (X)	5	Have issues related to any special usage of excavated soils been addressed?	
	6	If the cut is not completely above the water table,	
Y N (X)		a Did the design consider the construction or long term ramifications of cutting below the water table?	
Y N (X)		b Did the design consider additional drainage in the cut slope (springs / seeps) and roadway base?	
Rock Slopes			
		For rockfall and additional design considerations, see the "Rockfall Corrections Checklist."	
(Y) N X	7	Has the subsurface exploration adequately characterized the rock in accordance with the Geotechnical Bulletin 3: Rock Cut Slope and Catchment Design (GB 3)?	7. to 10. See Rock Cut Report for details.
(Y) N X	8	Have the slope angles, benching scheme, rockfall catchment design, and drainage controls been determined as prescribed in GB 3?	
(Y) N X	9	In accordance with GB 3, are the rock cut slopes, benches, and catchment areas indicated on all appropriate cross-sections?	

III.A. Centerline Cuts Checklist

(Y)	N	X	10	In accordance with GB 3, has the rockfall catchment software analysis output and the cost analysis comparing catchment configurations been provided?	

Notes:

Stage 1:

III.B. Embankments Checklist

C-R-S: SCI-823-6.81	PID: 19415	Reviewer: Wael Alkasawneh	Date: 11-29-06

Settlement

(Y) N X 1	If soil conditions and project requirements warrant, have settlement issues been addressed?		
	If not applicable (X), go to Question **14**		
(Y) N X 2	Have consolidation properties of the foundation soils been determined?		
	Check methods used:		
	(□) laboratory consolidation tests		
	(□) empirical correlations with moisture content and Atterberg values		
	□ other		
(Y) N X 3	Have calculations been performed to estimate the total expected embankment settlement and the time of consolidation?		
	Check method used:		
	□ EMBANK or equivalent software		
	(□) hand calculations		
(Y) N X 4	If differing foundation soil and/or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate consolidation at locations representative of the most critical conditions?		
Y (N) X 5	Have the total settlement and the time of consolidation analyses indicated acceptable values at all locations for the scope of the embankment work?		
(Y) N X 6	If total settlement or time of consolidation is unacceptable, have the stations and lateral extent of the problem areas been defined?		
(Y) N X 7	Has a method been chosen as a solution to the settlement issues?		
	Check methods used:		
	(□) waiting periods with monitoring		
	(□) drainage blanket and wick drains		
	□ surcharge (preloading)		
	□ removal and replacement of weak soil		
	□ lowering proposed grade / change alignment		
	□ lightweight fill		
	□ other List Other items:		

III.B. Embankments Checklist

(Y)	N	X	8	Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)?	
Y	(N)	X	9	Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others?	
(Y)	N	X	10	Have all necessary notes, specifications, and details for the chosen solution been determined?	
(Y)	N	X	11	Have the need, locations, type, plan notes, and reading schedule for settlement platforms been determined?	
(Y)	N	X	12	Have the effects of the predicted settlement and the chosen solution been determined and accounted for on the construction schedule?	
Y	N	(X)	13	Has the effect of any foundation soil consolidation (including differential settlement) been evaluated with regard to adjacent structures (e.g., bridges, buildings, culverts, utilities) which will also undergo settlement and be subject to stresses induced by the consolidation of the surrounding soil?	

Notes :

Stage 1:

III.B. Embankments Checklist

Stability			
(Y) N X	14	If soil conditions and project requirements warrant, have stability issues been addressed? If not applicable (X), go to Question **27**	
(Y) N X	15	Has the total (short term) and effective (long term) shear strength of the foundation soils been determined? Check method used: (◘) laboratory shear tests (◘) estimation from SPT or field tests	
Y (N) X	16	Have the OGE's recommended values of shear strength for proposed embankment fill material (total: c = 2000 psf, phi = 0; effective: c = 300 psf, phi = 28) been used in the stability analyses?	16.) Due to the large amount of rock to be excavated from adjacent cut sections, it is assumed that excavated rock will be used as fill to construct the embankments. The values selected are as follows; Total and Effective: cohesion = 0, friction angle = 35 degrees. Please refer to section 5.4.1 in the report for more information.
(Y) N X	17	Have calculations been performed to determine the F.S. for stability? Check method used: (◘) STABL, XSTABL, or equivalent software ◘ hand calculations	
	18	Have the following F.S. been met or exceeded, as determined by the calculations, for the given stability conditions:	
(Y) N X		a 1.30 for short term condition	
(Y) N X		b 1.30 for long term condition	
Y N (X)		c 1.10 for rapid drawdown, flood condition	
Y N (X)		d 1.50 for embankment supporting bridge abutments (not on deep foundations)	
(Y) N X	19	When differing soil or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate the stability at locations representative of the most critical conditions?	
(Y) N X	20	If the F.S. was not met or exceeded, have the stations and lateral extent of the problem areas been defined?	
(Y) N X	21	Has a method been chosen as a solution to the stability issues? Check the method(s) used: ◘ flattening slopes ◘ counterberm ◘ lightweight embankment	

III.B. Embankments Checklist

				☐ reinforced soil slope ☐ soil nailing (☐) drainage blanket and wick drains ☐ removal of soft soil, adding shear key ☐ reduced grade / change alignment (☐) stage construction (☐) controlled rate of fill placement ☐ drilled shaft slope stabilization ☐ other List Other items:	
(Y)	N	X	22	Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)?	
Y	(N)	X	23	Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others?	
(Y)	N	X	24	Have all necessary notes, specifications, and details for the chosen solution been determined?	
(Y)	N	X	25	Have the need, location, type, plan notes, and reading schedule for piezometers and inclinometers been determined?	
(Y)	N	X	26	If piezometers will be used, has the critical pressure value been determined and the appropriate information included in the plans?	
(Y)	N	X	27	Have the effects of the stability solution been determined and accounted for on the construction schedule?	
(Y)	N	X	28	Has the effect of the stability solution been evaluated with regard to structures (e.g., bridges, buildings, culverts, utilities) which may be subject to unusual stresses or require special construction considerations?	

Notes:

Stage 1:

III.B. Embankments Checklist

Sidehill Fills				
(Y) N X	29	If soil conditions and project requirements warrant, have sidehill fill issues been addressed? If not applicable (X), go to Question **34**		
(Y) N X	30	In accordance with Geotechnical Bulletin 2: Special Benching and Sidehill Embankment Fills (GB 2), have sidehill fills been evaluated to determine if special benching or shear keys are needed?		
	31	In accordance with GB 2, if special benching or shear keys are required, has		
(Y) N X		a Plan Note G110 from L&D3 been included in the General Notes?		31 a & c.) Information, Plan Notes, and Cross Section have been provided to TranSystems Corporation.
Y N (X)		b quantities for both excavation and embankment been calculated for the benched areas and added to the plan General Quantities?		
(Y) N X		c the special benching or shear keys been indicated on the appropriate cross sections?		
(Y) N X	32	Have water bearing zones been identified and their impact addressed?		
(Y) N X	33	Have subsurface drainage controls been adequately addressed?		

Notes:

Stage 1:

III.B. Embankments Checklist

Special			
Y N (X)	34	Have all of the environmental factors, including wetlands, stream mitigation, and landfills, been considered and incorporated prior to design and analysis of embankment settlement and stability, including EPA or other government agencies' involvement, mitigation, or special design or construction considerations?	
	35	If an embankment is to be placed through standing water or over weak, wet soils (with or without a fabric separator), the fill should be placed by the method of end dumping to a given height above the standing water or until compaction is achievable over the soft soil. If end dumping is to be specified,	
(Y) N X		a has the material type for the fill to be end dumped been specified?	
Y (N) X		b has the need for a fabric separator or filter layer been determined?	
(Y) N X		c has the height of fill to be end dumped been determined?	
Y (N) X		d have all notes and specifications for end dumping been developed?	

Notes:

Stage 1: