TEAM *Services*

Geotechnical and Construction Material Consultants

SUBSURFACE EXPLORATION
GRAND ILLINOIS TRAIL
SILVIS AND EAST MOLINE, ILLINOIS
TEAM NO. 1-4414
OCTOBER 16, 2018

TEAM *Services*

Geotechnical and Construction Material Consultants

October 16, 2018

IMEG Corp.
623 26th Avenue
Rock Island, IL 61201

Attn: Brett Fetter

Re: Subsurface Exploration
Grand Illinois Trail
Silvis and East Moline, Illinois
TEAM No. 1-4414

Dear Mr. Fetter:

We have completed the subsurface exploration for critical wall areas along the Grand Illinois Trail project. This report presents the findings of the subsurface exploration and our geotechnical recommendations concerning the design and construction of the wall areas. Slope stability analyses are included for select areas where new fill weight is planned to be placed atop existing, relatively steep slopes.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, please do not hesitate to contact us.

Sincerely yours,
TEAM Services

Clinton Halverson
Sr. Project Engineer

Robert E. Doss, P.E.
Principal Engineer
License Expires 11/30/19

LICENSED PROFESSIONAL ENGINEER
ROBERT E. DOSS
062-050381
10/16/18
OF ILLINOIS

Cc: Morgan A. Mays, P.E., IMEG

260-C 33rd Ave SW • Cedar Rapids, IA 50404 • ph: 319-366-0759 • fx: 319-366-0793 • email: staff@teamservices.com
Des Moines • Council Bluffs • Fort Dodge • Spirit Lake • Mason City • Cedar Rapids • Waterloo • Davenport • Dubuque
Peosta • Keota

TABLE OF CONTENTS

PROJECT INFORMATION

Project information has been provided by Morgan A. Mays, P.E. of IMEG through telephone and email correspondence. The project will consist of construction of about 3 miles of new trail for the Grand Illinois Trail which will run alongside existing roads in Silvis and East Moline, Illinois. Documents provided to our office include a RFP letter as well as plan views, profile views, contour maps, and cross sections of the subject trail segments.

Soil retention structures are planned for 15 stretches of trail. Based on the provided documents, soil retention heights of up to about 9 feet are planned. However, a few retaining structures have a maximum height of only 3 or 3½ feet. Wall types initially considered were reportedly gabion basket, modular block, cast-in-place reinforced concrete, permanent sheet-pile, or soldier-pile walls. However, the additional subsurface exploration and analysis required to design sheet-pile or soldier-pile walls was not requested and is outside the scope of this report.

Some soil retention structures are to be used to retain newly placed soil that will extend the new trail out over an existing downhill slope. Review of the provided cross sections shows that there are five such areas where the new fill and wall will be placed atop slopes which are currently steeply inclined. Placing new fill weight atop relatively steep slopes risks subsidence of the new trail and wall or even slope failure. Slope stability analyses for these five areas are presented in this Report.

The preliminary scope of soil borings tabulated in the RFP letter for the project totals 51 borings, each to 15 feet, spread out across 14 wall segments. This preliminary scope was developed before it was decided that slope stability is warranted, which resulted in additional borings and boring depths. Consideration of reducing or eliminating borings had been requested of TEAM Services where wall heights are relatively short (less than 7 feet). The result was subsurface exploration at 11 wall areas totaling 40 borings with a drill rig and 10 borings with a hand auger. Borings depths were varied to reflect the heights of the nearby wall sections and applicability to slope stability analyses. The 11 wall areas explored were labeled Areas A through K as shown on the Overall Site

Location Plan in the Appendix of this report. Area locations are also tabulated on the following table. These area designations are referenced throughout this report and Appendix documents.

TABLE A
EXPLORATION AREA DESIGNATIONS BY STATION NUMBER

Area	Approx. Beginning Station No.	Approx. Ending Station No.	Street
A	19+70	20+50	21st Ave
B	22+20	25+75	21st Ave
C	28+90	31+80	21st Ave
D	36+45	39+20	21st Ave
E	54+90	59+20	Archer Dr
F	72+50	76+25	Archer Dr
G	79+50	81+75	Archer Dr
H	86+25	88+75	Archer Dr
I	99+10	100+90	30th Ave
J	108+50	109+75	30th Ave
K	138+20	141+10	Crosstown

The scope of this report is to address critical soils retention structures along the trail, not the trail pavement itself. Although some discussion and recommendations are provided concerning the trail, such as expansive soil separation for the trail (since expansive soil characteristics were explored in our wall evaluation) and backfill compaction (since pavement subgrade often overlaps with wall backfill), this report should not be interpreted as addressing the various geotechnical issues related to the trail pavement.

SITE CONDITIONS

Areas where subsurface exploration was performed spanned from the intersection of 8th Street and 21st Avenue to the intersection of 19th Street and 30th Avenue. Drill rig borings were drilled at easily accessible areas on or alongside the existing roadways. Hand auger borings were completed

near some the proposed walls where significant cuts are planned (Areas A and E) or at the bottom of slopes where slope stability analyses are performed (Areas F, H, I, J, and K). The steepness of the slopes and the presence of trees at hand auger boring locations prohibited access with a drill rig. Significant erosion was observed on the slopes at Areas H and I.

FIELD EXPLORATION

A total of 40 borings were performed with a geotechnical drill rig and 10 borings were drilled with a hand auger. Hand auger borings were drilled in areas inaccessible to our drill rig as discussed in the previous report section. Two borings areas were drilled multiple times. The second drill-rig boring at Area F (Boring F2) was drilled at two locations (Borings F2A and F2B) due to the initial attempt to drill the boring being further west than desired. The hand auger boring at Area A (Boring HA-A1) was attempted four times due to early hand auger refusal, with each attempt moving further down-hill to profile the soils at different elevations (Borings HA A1-1 through HA A1-4).

The boring locations were determined by TEAM Services using approximate offsets from existing site features. Ground surface elevations at the drill rig borings conducted at slope stability analysis areas were interpolated from contour maps provided by IMEG. Hand auger boring elevations were determined a variety of ways. Some elevations were determined using survey-grade Topcon GPS equipment utilizing the Iowa Real-Time Network. At some locations the approximate elevations were visually referenced to a nearby location where elevations could be estimated from contour maps or determined by GPS equipment. Visual elevation estimates were assisted with the use of a hand-level. Elevations at boring locations and the means to determine the elevations are noted on their respective Boring Logs. Approximate boring locations are displayed on the attached Boring Plans. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

Our auger drill rig was truck-mounted. The borings were made by mechanically twisting a continuous flight hollow stem steel auger into the soil. At assigned intervals, the center drive bit of the auger was removed and soil samples were obtained.

Representative samples were obtained in the drill rig borings using thin-walled (Shelby) tube and split-barrel sampling procedures in general accordance with ASTM Specifications D 1587 and D 1586, respectively. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge is pushed hydraulically into the ground to obtain relatively undisturbed samples of cohesive or moderately cohesive soils. In the split-barrel sampling procedure, a standard 2-inch O.D. split-barrel sampling spoon is driven into the ground with a 140-pound hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the standard penetration resistance value. These values are indicated on the Boring Logs at the depths of occurrence. The samples were tagged for identification, sealed and returned to the laboratory for testing and classification.

An automatic hammer was used to perform the Standard Penetration Tests. In the automatic hammer system, the cathead and rope used traditionally in the manual test procedure is replaced with an automatic lifting mechanism for the 140-pound driving weight. The reduction in system friction with the automatic hammer system results in a significant increase in the driving energies. This results in significantly greater driving efficiencies and a corresponding decrease in the number of blows in the Standard Penetration Test results. We have taken the driving efficiency of the automatic hammer system into account when analyzing this data.

Hand auger borings were performed by manually twisting a sharpened steel auger into the ground. The soils encountered were identified, in the field, from cuttings brought to the surface by the augers. Samples of auger cuttings were placed in jars. At selected intervals, the auger was removed and the soil consistency was measured with a dynamic cone penetrometer or a field vane shear (described below). At choice locations in slope stability borings, Shelby tube samples were obtained by hammering the tube into the soils and hammering the tube up to retrieve it.

In the dynamic cone penetrometer test a conical point was first seated to penetrate any loose cuttings, then driven additional increments of 1¾ inches with blows from a 15-pound hammer falling 20 inches. The number of hammer blows required to achieve this penetration was recorded, and is an index to the soil strength and consistency. This specific dynamic cone penetrometer was designed to approximate SPT N-values with each 1¾ inch blow count. Blow counts are recorded on the Boring Logs at the depths of occurrence.

Field vane shear tests were performed on the in-situ cohesive soils at selected locations in general accordance with ASTM D-2573. In this test, a four-bladed vane is advanced into the undisturbed in-situ subgrade soils and rotated to determine the torsional force required to cause a cylindrical surface to be sheared by the vane. This torsional force is then converted to the shear strength of the soil. Shear strengths are recorded on the Boring Logs at the depths of occurrence.

Field logs of the borings were prepared by the drill crew. These logs included visual classifications of the materials encountered during drilling, as well as the driller's interpretation of the subsurface conditions between samples. Final Boring Logs included with this report represent an interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

LABORATORY TESTING

Based on the field records and examination of the samples in the laboratory, a soil testing program was developed to collect more information about the soil conditions at the site. The following is a brief description of the specific tasks completed for this project.

Natural Moisture Content -- The natural moisture content of selected samples was determined in general accordance with ASTM D 2216. The moisture content of the soil is the ratio, expressed as a percentage, of the weight of water in a given mass of soil to the weight of the soil particles. The results are presented on the Boring Logs at the depths from which the samples were obtained.

Unit Weight -- In the laboratory, selected undisturbed samples of the site soils were measured and weighed to determine gross weight and volume of the samples. Where possible, the samples are placed in a template and trimmed at each end to fit the template. The moisture content of each specimen was then determined, and the dry unit weight was calculated. The results of these tests are also presented on the Boring 1 at the appropriate sample depths.

Unconfined Compressive Strength -- A calibrated hand penetrometer was used to estimate the approximate unconfined compressive strength of select cohesive soil samples. The calibrated hand penetrometer has been correlated with unconfined compression tests and provides a better estimate of soil consistency than visual examination alone.

Plasticity (Atterberg Limits) Test -- Selected soil samples were tested for Plastic Index. The soils' Plastic Index (PI) is bracketed by the Liquid Limit (LL) and the Plastic Limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid. The PL is the moisture content at which the soil begins to crumble when rolled into a small thread. These tests are conducted in general accordance with ASTM D 4318. The results are indicated on the Boring Logs at the depth where the sample was obtained.

Direct Shear Test -- Direct shear testing was conducted to determine the drained shear strength parameters ϕ' and C' in general accordance with ASTM D 3080. The procedures of this test are as follows. Undisturbed samples were extruded from a sampling tube and cut to size using an approximate 2½ inch diameter by 1 inch height cutting ring. The resulting disc shaped undisturbed soil samples were then extruded from the cutting ring into a shearing ring. The shear ring is an assembly of two rings stacked atop each other which can move laterally independently of each other, shearing the soil. Inside the shearing ring, normal (vertical) pressures were applied to the sample, first to "seat" the sample with a low pressure and then consolidate the sample with a higher pressure. After completion of sample primary consolidation, the consolidation deflection results were interpreted to produce an acceptable shearing rate for the soil samples. Shearing was conducted on each sample at the computed strain rate to control the speed of the tests while monitoring the shear resistance and volume change of the specimen. Shearing was halted after the

sample's peak strength was obtained. After three samples were sheared, each using a different consolidation stress, the results of the shearing were evaluated to determine the undrained shear strength parameters of the soil. The results of the direct shear testing are detailed on the attached Direct Shear Test Report(s).

As part of the testing program, the samples were classified in the laboratory based on visual observation, texture and plasticity. The descriptions of the soils indicated on the Boring Logs are in accordance with the enclosed *General Notes* and the *Unified Soil Classification System.* Estimated group symbols according to the *Unified Soil Classification System* are given on the Boring Logs. A brief description of this classification system is attached to this report.

SUBSURFACE CONDITIONS

Subsurface conditions encountered during this exploration are indicated on the individual Boring Logs. Based on the results of the borings, subsurface conditions on the project site can be generalized as follows.

Some borings were drilled though the pavement. Existing fill was encountered below any pavement and subbase material or otherwise at the ground surface in all the borings with exceptions of most of the borings in Area E. The fill was generally lean clay with varying sand and gravel content although zones of sand, silt, lean to fat clay, and gravel were not uncommon. Based on the results of our field and laboratory testing, the existing fill appears to generally be moderately to well compacted. Zones of fill which appeared poorly compacted were uncommon in the drill rig borings. Hand auger borings conducted at the base of the slopes for slope stability analysis were often near culverts and the water table and encountered fill soils which appeared to be poorly to moderately compacted at some intervals. It should be noted that some soils are described as possible fill. Possible fill is used to describe soil layers which may be natural but have a characteristic such as color or soil texture that raises suspicion that the soil could be fill.

Natural soils below the fill (and at the ground surface in most borings near Area E) were generally loess (Areas E, F, G, H and K) or glacial till (Areas A, B, C, D, and J). Borings near Area I did not encounter soils which appeared to be definitively natural. The loess (wind deposited soils) were typically medium stiff to very stiff lean clay and silt. Glacial till (deposits from melting glaciers) was very stiff sandy lean clay. Topsoil and alluvium (water deposited soil) was also encountered just below the fill at some locations, generally in hand auger borings at the base of slopes. Topsoil was very stiff lean clay. Granular alluvium was clayey sand. Cohesive alluvium was soft to stiff lean clay.

The above descriptions provide a general summary of the subsurface conditions encountered. The attached Boring Logs contain detailed information recorded at each boring location. These Boring Logs represent our interpretation of the field logs based on engineering examination of the field samples. The lines designating the interfaces between various strata represent approximate boundaries and the transition between strata may be gradual. Where strata changes occur between sample depths, the strata change elevation is typically estimated based on interpolation, and is approximate. Soil conditions will vary between boring locations.

GROUNDWATER CONDITIONS

The borings were monitored while drilling and shortly after the completion of drilling operations for the presence and level of groundwater accumulation. Groundwater levels observed in the borings are noted on the Boring Logs. Where water seepage or accumulation was observed in slope stability areas, they generally correlated well with the flow elevations of the stream/culvert. The highest water seepage/accumulation relative to the proposed trail elevation was encountered at Boring B4 where seepage was encountered about 4½ feet below existing grades.

Fluctuation of groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, surface drainage, subsurface drainage, site topography, irrigation practices, ground cover (pavement or vegetation) and other factors not evident at the time the borings were conducted.

Normally, the highest groundwater levels occur in late winter and spring time while the lowest levels occur in late summer and fall time. The fluctuation of the groundwater levels should be considered when developing the design and construction plans for this project.

CONCLUSIONS AND RECOMMENDATIONS

Existing Fill Considerations

As discussed in the **Subsurface Conditions** section of this report, existing fill was encountered in all the borings with exceptions of most of the borings in Area E. The fill was generally lean clay with varying sand and gravel content although zones of sand, silt, lean to fat clay, and gravel were not uncommon. Based on the results of our field and laboratory testing, the compaction level of the existing fill appears to generally be moderately to well compacted. Zones of fill which appeared to be poorly compacted were uncommon in borings drilled near the proposed trail alignment. Exceptions that are near the proposed wall or trail subgrades include existing fill encountered in Borings A2 and I2 which are evidenced by relatively low SPT N values and penetrometer resistance. Some mitigation of existing soil should be expected, pending inspection results during construction inspection.

Man-made fills have an inherently high risk of variability and careful construction inspection will be necessary to assure adequate support performance. In areas where fill is encountered, we recommend that additional testing be conducted after site stripping prior to earthwork and pavement construction. New fill, pavements, and walls may be placed on existing fill where testing confirms suitability. If unsuitable soils are encountered, these soils are to be removed and replaced with engineered compacted and tested backfill. It should be noted that the most conservative approach in dealing with unknowns within the existing fill would be to completely remove the fill and replace it with engineered compacted and tested fill.

Contract allowances should be made for some remedial work at the site related to subgrade preparation. This may include over-excavation and backfilling of unsuitable fill soils. The amount of such work cannot be defined at this time; therefore, the owner should be informed of these cost variables.

Hand auger borings conducted at the base of the slopes for the purpose of slope stability analysis were often drilled near culverts and encountered wet soils. At some intervals in these hand auger borings fill soils which appeared to be poorly to moderately compacted were encountered. However, these hand auger borings were performed well away from proposed walls and trails. Thusly, their influence on wall and trail settlement and bearing should be negligible. The presence of poorly to moderately compacted soils has been considered in modeling the slope stability analyses for this project.

Expansive Soil Considerations

Moderately expansive lean to fat clay soils were not typical but were encountered in some borings at the site. These expansive soils will experience volume changes with changes in soil moisture content. Trail pavements and walls would be susceptible to swelling pressures that can cause movement, cracking, and structural distress when near these soils. To eliminate the risk associated with these expansive soils, it would be necessary to remove the expansive soils at the site and replace them with suitable, compacted and tested non-expansive engineered fill material. However, the risks of expansive soil movements are relatively low in areas where borings were performed. With the exception of Area H, borings did not encounter thick layers of consistently moderately expansive soils but rather some zones of potentially moderately expansive soils among relatively non-expansive soils. In areas near Area H or any other areas where significant amounts of shallow expansive soils are present beneath the trail pavement, mitigation is recommended. TEAM Services can assist in delineating areas with moderately expansive soils during construction inspection.

Concerning wall foundations; no overexcavation of soils for expansive soil considerations is expected beneath the walls due to the weight of the foundations resisting swelling movements from moderately expansive soils. However, expansive soils can exert excessive pressures on below-grade walls. In general, expansive soils should not be present within 3 feet alongside below-grade walls.

Mitigation depths below pavement for expansive soil concerns are typically shallow. This is for economic reasons and since some movement of pavement is considered acceptable, such as the movement which can occur seasonally from frost action. Mitigation of significant moderately expansive soils is therefore recommended to only a depth of 1 foot beneath the proposed bottom-of-pavement elevation. We recommend that the overexcavated expansive soils be replaced with suitable compacted and tested, low plasticity select cohesive fill soils or well-graded granular material, with at least 6% passing the No. 200 sieve so that the minimum required separation can be provided. As an alternative, fly ash, cement or lime stabilization techniques can be considered for stabilizing the moderately expansive soils at the site. If chemical stabilization is desired, TEAM Services should be retained to perform additional laboratory testing to determine adequate quantities for stabilization. As previously mentioned, it appears that most areas of the trail will not warrant mitigation for expansive soil concerns.

Site Preparation

Site preparation should begin with the removal of any organic-laden soils, vegetation and any loose, soft or otherwise unsuitable materials. This should include removal of root balls and stumps from cleared trees. Any apparent unsuitable existing fill or expansive soils (as discussed in the previous report sections) could be delineated and removed at this time as well. The actual depth of stripping may vary depending on vegetation cover and stability of the subgrade and the actual depth should be determined in the field in consultation with TEAM Services personnel. The site strippings and any near surface soils with organics should be used for landscaping purposes in non-critical areas where support for structures and pavements is not required. Any abandoned utility lines should be completely removed along with their associated backfill material and

replaced with engineered compacted fill. Slopes should be benched prior to placing fill as discussed in the following report section. Erosion areas should be repaired as discussed in the **Slope Stability** section of this report.

The exposed grade in both cut and fill areas should be proofrolled and inspected by TEAM Services personnel. Proofrolling should be performed at the lowest cut grade, prior to fill placement. Proofrolling should be conducted with a fully loaded tandem axle dump truck having a minimum gross weight of 25 tons. Where proofrolling is not possible due to poor access or excessive disturbance to the existing soils, these soils should be probed and visually inspected by TEAM Services to determine the suitability of the subgrade. Any unsuitable soils identified during this process should be removed and replaced with suitable engineered compacted and tested fill which meets or exceeds the Class 1 Construction Application requirement in Table B in the following **Fill Placement** report section.

It should be noted that initial subgrade preparation for some soil types may not be suitable under repeated heavy construction vehicle loads, such as the loess soils or loess-derived fill soils encountered at the site, and may require stabilization to greater depths or stabilization with fly ash, cement or lime. The use of crushed rock with or without geogrid could also be considered in-lieu of the additional stabilization methods. Contract allowances should be made for some remedial work at the site related to subgrade preparation. The amount of such work cannot be defined at this time; therefore, the owner should be informed of these cost variables.

Fill Placement

Fill and backfill placed for support of the proposed trail pavement and walls should consist of approved materials which are free of organic matter and debris. Brick, concrete, rocks or other solid pieces with a maximum dimension of 3 inches or larger should not be placed in the newly placed fill sections. We recommend that low-plasticity cohesive soil or granular material be used for general fill placement. By our definition, low-plasticity cohesive soil would have a liquid limit of 45 or less and a plasticity index of 25 or less. It is our opinion that many of the onsite soils meet

these criteria and may be used as fill and backfill. The moderately expansive lean to fat clay soils may be used below the buffer zone referenced in the **Expansive Soil Considerations** section of this report. Any off site potential borrow materials should be evaluated by TEAM Services prior to their use as engineered compacted and tested fill.

The following Table B lists recommended minimum compaction requirements for cohesive and cohesionless fill materials for specific applications. For low-plasticity (CL and ML) cohesive soils, moisture contents within a range of -2 to +3 percent of the material's optimum moisture content (as determined by Standard Proctor ASTM D 698) are necessary to achieve the desired fill qualities for general grading, shallow foundation support, and utility backfill while granular soils should be placed within 3 percent of the material's optimum moisture content. Moderately expansive lean to fat clay and fat clay soils should be placed at a moisture content between the material's optimum moisture content and 4 percent above optimum.

The on-site soils can be excavated utilizing conventional excavation equipment. Granular soils can generally be suitably compacted with vibratory compaction equipment. Proper compaction of cohesive soils can be achieved with sheepsfoot or pneumatic type compactors within the above moisture content ranges. The soils should be placed in a maximum loose thickness of 12 inches and at a thickness compatible with the equipment being utilized. Sufficient density tests should be performed on each lift of engineered compacted fill placed to verify that adequate compaction is achieved. Care should be taken to prevent unnecessary disturbance of subgrade soils. Disturbed areas should be removed and replaced with engineered compacted and tested fill in accordance with the recommendations of this report.

Where new fills are placed adjacent to slopes steeper than 5H:1V, the new fill should be benched into the existing slope in order to create a more homogeneous fill layer and inhibit the formation of a slip plane that may promote future slope movements. It is recommended that the bench be cut a minimum of 6 feet horizontally into the existing slope for every 3 vertical feet of new fill placed. It should be noted that proper benching may require excavating into the existing slope during repair of slope erosion.

TABLE B
RECOMMENDED DEGREE OF COMPACTION GUIDELINES

Construction Application		Standard Proctor (ASTM D698) Cohesive Soil	Standard Proctor (ASTM D698) Cohesionless Soil	Relative Density (ASTM D4253 & D4254) Cohesionless Soil [1]
Class 1	Subgrade preparation for foundations or pavements, where soil strength is needed to resist slope movements, or other critical backfill areas	95%	98%	70%
Class 2	Backfill adjacent to and not supporting structures or pavements, outside areas concerned with slope stability Minor subsidence possible.	90%	93%	45%
Class 3	Backfill in non-critical areas. Moderate subsidence possible.	85%	88%	20%

1. Use Relative Density technique (ASTM D4253 & D4254) where Standard Proctor technique (ASTM D698) does not result in a definable maximum dry density and optimum moisture content.

Upon completion of the filling operation, care should be taken to maintain the subgrade moisture content prior to construction of walls and pavements. If the subgrade should become desiccated, frozen or otherwise disturbed, the affected material should be removed or these materials should be scarified, moistened, recompacted and retested prior to concrete or asphalt placement. As a general guideline, fills which dry to a moisture content less than 2/3 of their optimum moisture content as determined by the Standard Proctor Test (ASTM D 698) in their upper 2 inches are candidates for reconditioning as described above.

Deep Fill Considerations

Based on the plans provided to our office, there are numerous stretches of trail where fill will be placed to reach the trail subgrade elevation. Fills appear to be on the order of 7 feet or less. Settlement of the underlying soils will result from the weight of this new fill mass. Additional

settlement will also occur within the new fill itself. Settlement sensitive elements such as the trail pavement will settle accordingly. Since the trail is planned to have varying depths of fill placed beneath it (greater fill depth close to the retaining walls), the settlement will be largely differential. The duration and magnitude of this settlement will depend on the depth of fill materials placed, the soil conditions beneath the new fill, and fill material types utilized.

We recommend that project areas receiving 6 feet or more of fill be allowed a settlement period prior to supporting settlement sensitive elements on or within the fill. It is estimated that the majority of settlement should be dissipated within 2 to 4 weeks of completion of fill placement. Where areas receive 8 feet or more of fill; it is expected that settlement within and below the new fill section could total an inch or more. Where 8 feet or more of fill is placed; TEAM Services recommends that installation of settlement plates below the new fill and/or installation of settlement monuments at the finished grade be considered to monitor the settlement period. These settlement plates and/or monuments should be monitored periodically, using a high-precision leveling instrument. The geotechnical engineer would determine at what time settlement of the fill has slowed sufficiently that pavement construction may begin.

If the owner wishes to avoid or reduce construction delays resulting from the settlement period or if it is desired that settlement be minimized; it is recommended that constructing walls and placing deep fill sections be sequenced as early in the project as possible.

Slope Stability

The stability of a slope is a function of driving (acting) forces versus the resisting forces. Driving forces are typically the weight of the soil and any pressure from elevated groundwater within the slope. Resisting forces include the shear strengths of the soils and any of various improvements installed to increase the slope's capacity. The ratio of the resisting force to the driving force is called the factor of safety. When the factor of safety is less than 1.0, resisting forces are less than the driving (acting) forces, resulting in shearing slope movements. Factors of safety just greater

than one are at risk of slow movements (creep) over time. Typically, new slopes are designed for a factor of safety on the order of 1.5 or greater.

Slope stability analyses were performed on areas F, H, I, J, and K where new fill and a wall will be placed atop slopes which are already steeply inclined. Placing new fill weight atop relatively steep slopes risks slope failure. Slope stability models were creating using the site geometry provided to us by IMEG in the form of elevation contour maps, the soil layers encountered in the soil borings at the tops and bottoms of the slopes, and laboratory test results. Material parameters and site geometry were input into SLOPE/W, a computer slope stability analysis program. The models and the resultant computed factors of safety are shown on the attached slope stability profiles. Profiles in the Appendix are organized alphabetically by their area designations (which is also in order of station number). Figures depict our models with and without their computed lowest factor of safety values and associated slope failure geometries. All slope models achieved a factor of safety of 1.5 or greater, indicating that the post-construction slopes should be appropriately stable. However, the following qualifications should be understood:

- The existing slopes may have areas where soils have eroded, resulting in undermining of the slope's stability. Erosion tends to progress up slopes over time, heightening the risks to pavements or structures above. During our exploration, moderate erosion was noted near the culvert pipe at Area H. More extreme erosion was noted near a pipe and along a drainageway for Area I. The eroded soils from these areas should be backfilled with suitable cohesive backfill that is compacted and benched into the existing soils as described in the **Fill Placement** section of this report.
- Analyses utilized approximate groundwater elevations which were predicted from our subsurface exploration. However, if new construction results in a significant rise in the groundwater table, the factor of safety of the slopes would be diminished, potentially resulting is slope movements. Therefore it is imperative that water shed rapidly away from the trail, wall, and existing road and that proper drainage be employed for areas which may pool water (such as any granular fill placed beneath the pavement or behind the wall). Additionally, any pipe/culverts installed should have their influence on the water table

considered. Any water which could be released from pipes needs to be drained to outside the slope area without saturating the slope.

- Five areas were identified for slope stability analysis. However, this does not mean that other areas are without risk. Most notably, analyses were not performed where a wall will be constructed to retain soils in a deep cut area (such as Areas A and E) or where a tall wall will be constructed and relatively little slope remains below the wall (such as Areas B, C, and D). This is because slope stability will be provided by the wall, not just relying on the shear strengths of the existing soils along the slope. These walls will need to consider global stability in their design. Global stability is a function of the wall height, wall design, nearby soil shear strength parameters, and the embedment of the wall foundation. TEAM Services can assist in evaluating global stability once a wall design is proposed. Field inspections will also be needed to evaluate if existing soils meet or exceed the quality of materials assumed in the global stability analyses.
- Slope stability analyses for the five areas assume that the wall foundations will extend to frost depth. If shallower foundations are proposed, they should be analyzed in the slope models to determine if a global stability movement could develop beneath the wall. The analyses also assume that the walls, including foundations, will be rigid enough to resist shearing of the walls themselves.
- Any changes in grading that could reduce the computed factors of safety, such as raising the proposed trail elevations or extending the trail further out over the slopes, should be submitted to TEAM Services to update the slope stability models and results.

It should be mentioned that slopes steeper than 3:1 pose soil concerns beyond slope stability. Mowing may not be feasible and risks of erosion are heightened. Slope stability analysis is intended to compute the global stability of a slope, not the risk of shallow, mostly cosmetic slope movements which may be caused by loss of strength from effects such as thawing frost, cracks from dry conditions, etc. The design team should give consideration to protecting the slope from risks associated with these concerns.

Wall Type and Foundation Design (Soil Cut, Areas A and E)

The trail at Areas A and E will be constructed where an existing slope extends up from the street elevation, requiring a cut into the slope to accommodate the new trail. Walls are proposed to retain the soil cut bank. Gravity walls or cast-in-place walls should be well suited for these areas. A modular block wall which requires reinforcement extending behind the wall (such as for geogrid placed into the retained soil to stabilize an MSE wall) may be undesirable for these areas since construction would require significant additional excavation into the existing slopes.

Retaining walls for Area A will likely bear on existing fill while Area E will likely bear on the native loess soils. In our opinion, most of these existing soils can provide adequate support for the proposed walls with the exception of the soils encountered near the expected foundation bearing elevation at Boring A2. At Boring A2 a layer of existing fill was sampled that appeared to be unsuitably compacted. Additional discussion concerning risks involved with placing foundations on existing fill is presented in the **Existing Fill Considerations** section of this report. Any unsuitable soils should be mitigated as discussed in the **Shallow Foundation Construction** section of this report. The wall foundations may be designed for a maximum net allowable soil bearing pressure of 2,000 pounds per square foot when bearing on the above-referenced suitable soils which are inspected and approved during construction.

The net bearing pressure is the pressure in excess of the minimum adjacent overburden pressure at the foundation level. These bearing capacities may be increased by 33% for the total foundation load, which considers transient forces such as wind. We estimate maximum settlements will be less than 1 inch and differential settlement may be on the order of 2/3 of the total settlement.

Poured foundations should be adequately reinforced to limit deflections caused by non-uniform soil support characteristics. To prevent frost effects, we recommend that foundations (or granular fill placed beneath foundations) should extend to a minimum depth of 42 inches below the lowest adjacent grade.

Wall Type and Foundation Design (Fully Retained Slope, Areas B, C, and D)

The trail at Areas B, C, and D will be constructed where an existing slope extends down from the street elevation. The proposed walls extend to the bottoms of the slopes. Gravity walls or cast-in-place walls should be well suited for these areas. Although the wall at Area B is distanced somewhat from the top of the existing slope, Areas C and D are planned to cut out some of the existing slope and retain the height of the existing soil. Since much of the retained soils are existing, a modular block wall which requires reinforcement extending behind the wall (such as for geogrid placed into the retained soil to stabilize an MSE wall) is not well suited for these areas.

Based on the borings drilled near the road elevation; retaining walls for Areas B, C and D will likely bear on existing glacial till soils, although some lengths of wall may be placed on existing fill such as the relatively deep fill encountered at Borings B4 and C2. The fill encountered appeared to be well compacted and the glacial till was very stiff. However, it should be noted that walls will bear in or alongside an existing drainageway. It is possible that layers of soil (such as alluvium or poorly compacted fill) may be present along the wall alignment which were not sampled by the nearby borings. Care should be taken during construction inspection to evaluate any unexpected and potentially unsuitable soils. In our opinion, the existing soils which are similar to those encountered in the soil borings can provide adequate support for the proposed walls. Additional discussion concerning risks involved with placing foundation on existing fill is presented in the **Existing Fill Considerations** section of this report. Any unsuitable soils should be mitigated as discussed in the **Shallow Foundation Construction** section of this report. The wall foundations may be designed for a maximum net allowable soil bearing pressure of 3,000 pounds per square foot when bearing on the above-referenced suitable soils which are inspected and approved during construction.

The net bearing pressure is the pressure in excess of the minimum adjacent overburden pressure at the foundation level. These bearing capacities may be increased by 33% for the total foundation load, which considers transient forces such as wind. We estimate maximum settlements will be less than 1 inch and differential settlement may be on the order of 2/3 of the total settlement.

Poured foundations should be adequately reinforced to limit deflections caused by non-uniform soil support characteristics. To prevent frost effects, we recommend that foundations (or granular fill placed beneath foundations) should extend to a minimum depth of 42 inches below the lowest adjacent grade.

Wall Type and Foundation Design (Wall on Slope, Areas F through K)

The trail at Areas F through K will be constructed where an existing slope extends down from the street elevation. The walls bear on the sloping ground. These walls do not contain a great height of soil, typically 5 feet or less. Gravity walls or cast-in-place walls should be well suited for these areas. It may be feasible to place stabilizing reinforcement behind these relatively short walls if desired, especially if some of the existing soils alongside the street can be excavated to allow placement of any required stabilizing reinforcement. As noted in the **Slope Stability** section of this report, the foundations should be rigid and deep enough to resist allowing a shallow slope movement. A shear resistance of 1 kip per linear foot was used in the slope stability analysis and the foundations were assumed to be placed at frost depth.

Retaining walls for Areas F through K will likely bear on existing fill soils. At area F, some lengths of the wall may bear on native loess soils. The fill encountered generally appeared to be well compacted although some poorly to moderately compacted fill was encountered at Boring I2 near the expected wall foundation bearing elevation. Additional discussion concerning risks involved with placing foundation on existing fill is presented in the **Existing Fill Considerations** section of this report. Any unsuitable soils should be mitigated as discussed in the **Shallow Foundation Construction** section of this report. The wall foundations may be designed for a maximum net allowable soil bearing pressure of 2,000 pounds per square foot when bearing on the above-referenced suitable soils which are inspected and approved during construction.

The net bearing pressure is the pressure in excess of the minimum adjacent overburden pressure at the foundation level. These bearing capacities may be increased by 33% for the total foundation load, which considers transient forces such as wind. We estimate maximum settlements will be less than 1 inch and differential settlement may be on the order of 2/3 of the total settlement.

Poured foundations should be adequately reinforced to limit deflections caused by non-uniform soil support characteristics. To prevent frost effects and to help prevent shallow slope movements where slope stability is a concern, we recommend that foundations should extend to a minimum depth of 42 inches below the lowest adjacent grade.

Shallow Foundation Construction

We recommend that the base of all foundation excavations be observed and tested by the geotechnical engineer prior to placement of concrete or any foundation-supporting granular material. During this process, if loose, soft, organic, or otherwise unsuitable materials are encountered at foundation elevations, we recommend that the foundations extend through the unsuitable soils and bear on undisturbed, suitable soils below or an overexcavation and replacement procedure be performed. The overexcavation and backfill procedure would include removal of these unsuitable materials and replacement with suitable engineered compacted fill soils prepared in accordance with the recommendations in Table B in the **Fill Placement** section of this report. The following Figure 1 shows a typical cross-sectional view of this overexcavation and backfill procedure.

In general, the overexcavation is widened 2/3 of a foot laterally on each side of the foundation per each foot of excavation that is below the foundation bearing elevation. The depth of overexcavation (shown as "D" in Figure 1) should be determined in consultation with the geotechnical engineer. Backfill materials should be suitable cohesive or granular soil, prepared and compacted in accordance with the recommendations in Table B in the **Fill Placement** section of this report. Another option would be to remove the unsuitable soils down to suitable soils and replace the excavated area with lean concrete (minimum 50 psi compressive strength), in which case widening of the excavation would not be required.

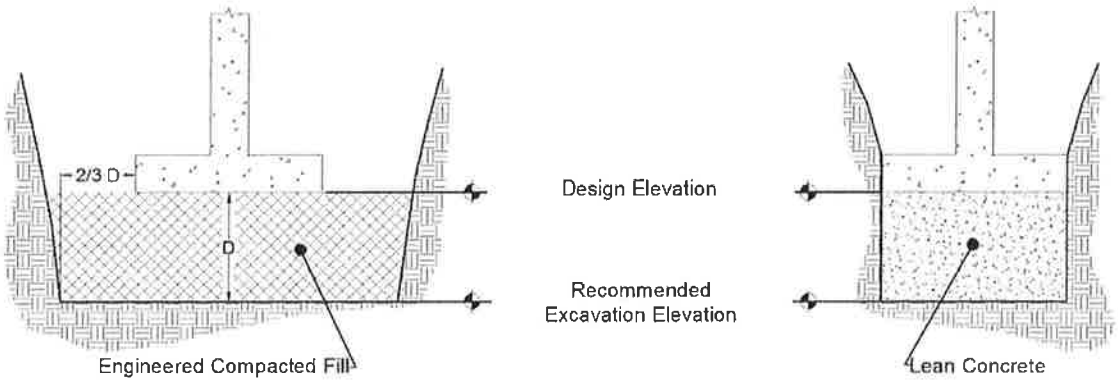


Figure 1.

Special considerations for foundation construction are warranted where walls are constructed in areas where slope stability is a concern. Influence on global stability should be considered where excavations for the foundations could undermine the existing road, any light or power poles, buried utilities, etc. If there is a concern for undermining then excavation may require shoring. Any materials which may pool water should be designed to drain rapidly to avoid saturating and potentially destabilizing the slope. For example, granular materials placed below foundations should have a subdrain installed at the bottom of the granular material if there is a chance that water could seep into the granular material. Backfill which is not planned to be drained should be cohesive soils, concrete, or lean concrete.

Footing excavations should be kept free of water accumulation to prevent softening of subgrade soils and conducted in a manner which avoids disturbance of soils beneath existing foundations. The loess soils expected along some lengths of wall are highly susceptible to disturbance. Any disturbed soils may require additional removal or compaction prior to concrete placement. Concrete should be placed as soon as possible after excavating to minimize bearing soil disturbance. Should the soils at bearing level become excessively dry, saturated, or otherwise disturbed, the affected soil should be removed prior to placing concrete.

Lateral Earth Pressures

The retaining walls must be capable of resisting the lateral earth pressures due to the unbalanced soil heights. Therefore, the wall should be designed to accommodate these unbalanced lateral soil pressures. The following Table C lists the estimated lateral earth pressures for cohesive and cohesionless (granular) backfill.

Cohesionless (granular) backfill lateral earth pressure parameters may be used where granular backfill is installed behind the subsurface wall in general accordance with Figure No. 2 enclosed in the Appendix. The granular backfill should have a minimum width of 2 feet and be wide enough to accommodate the back slope limit line of 1:2 (horizontal to vertical) or flatter. The area between the required minimum zone of granular material and the actual limits of excavation may be backfilled with either cohesive or granular soils. The granular material should be a free draining material (preferably less than 3 percent passing the No. 200 sieve) and hydraulically connected to a suitable drainage system. An acceptable drainage system may be constructed using perforated rigid pipe encased in coarse clean granular material graded to prevent the intrusion of fines or an alternative free draining granular material encapsulated with a suitable filter fabric. The drain lines should be sloped to provide positive gravity drainage to a suitable outlet such as a sump pump, a storm drain, or frost-free outfall if sufficient topographic relief is available at the site. If wall drains are not provided, then the design groundwater elevation should be considered equal to the ground surface. Proper drainage is paramount where walls are designed along slopes where slope stability is a concern.

If the top of the wall is able to deflect approximately 0.2% to 0.4% of the wall height, then active earth pressures can develop with granular backfill. However, if the wall is rigidly fixed or otherwise restricted from deflecting, then at-rest pressure parameters should be used for design.

Lateral pressure arising from surcharge loads, sloped backfill loads and earthquake loads should be added to the above values to determine the total lateral earth pressures. In addition, transient loads imposed on the walls by construction equipment during backfilling should be taken into

consideration during design and construction. Excessively heavy grading equipment (that could impose temporary excessive pressures or long-term excessive residual pressures against the constructed walls) should not be allowed within about 5 feet horizontally of the walls. Increased earth pressures can also develop from restricted soil drainage and compaction of the adjacent backfill. Expansive materials, either natural or backfill, should not be within 3 feet of below grade walls.

TABLE C
ESTIMATED LATERAL EARTH PRESSURE PARAMETERS [1]

	Cohesive Soil (non-expansive)	**Cohesionless Soil (granular or sand)**
Approximate Total Density	130 pcf	120 pcf
Approximate Friction Angle	15° - 20°	30° - 35°
Active Pressure Coefficient, K_a	0.5	0.3
At-Rest Pressure Coefficient, K_o	0.7	0.5
Passive Pressure Coefficient, K_p	2	3.3
Coefficient of Friction for Sliding at base of Concrete Footing	0.3	0.6
Active Earth Pressures – Design Equivalent Fluid Pressures – No Factor of Safety		
Drained Undrained[2]	65 pcf 95 pcf	35 pcf 80 pcf
At-Rest Earth Pressures – Design Equivalent Fluid Pressures – No Factor of Safety		
Drained Undrained[2]	90 pcf 110 pcf	60 pcf 90 pcf
Passive Earth Pressures [4] – Design Equivalent Fluid Pressures		
Drained Undrained[3]	130 pcf 70 pcf	200 pcf 100 pcf

1. Assumes negligible wall friction, a vertical wall, level backfill, and zero surcharge loads. Excludes cohesion shear strength and sliding friction effects.
2. Combined factored buoyant backfill unit weight and hydrostatic water head (62.4 pcf).
3. Excludes hydrostatic loading (62.4 pcf).
4. Passive pressure to be ignored in the upper 2 feet of finished grades due to frost and desiccation effects. Factor of safety 2.0 has been applied to limit the amount of lateral deformation required to mobilize the passive resistance.

Temporary Excavation Support

All excavations should comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, "Excavations and Trenches" and other applicable codes. This document states that excavation safety is the responsibility of the contractor. Reference to this OSHA requirement should be included in the job specifications.

Construction Dewatering

During construction activities, care should be taken to ensure that drainage is directed away from excavations whenever possible. We expect that groundwater seepage will be encountered where walls bear at the bottom of slopes in or alongside an existing waterway and would also be possible elsewhere, especially during wet weather seasons. Where dewatering is required due to anticipated or observed seepage, we recommend that construction groundwater control be established prior to excavating the final 2 feet of soil above the final desired excavation elevation. Enough time should be allowed for groundwater to be lowered a minimum of 2 feet below the excavation depth at all times. Where excavations extend into cohesive soils requiring dewatering, groundwater control can be performed by digging drainage trenches leading to sump pits with pump along the side of the excavation area. Dewatering in water bearing granular soils may be accomplished with sand points and/or wells.

If groundwater control is lost during construction, disturbance of the upper few inches or even feet is possible in the soils for this project. In these circumstances, it will be necessary to reestablish groundwater control and remove the disturbed soils. TEAM Services should be consulted regarding the extent of remedial action which is necessary.

If excavations for a wall cannot be deepened (such as to provide groundwater control or removed disturbed soils which have been softened from groundwater exposure) due to risk of undermining nearby features, there are approaches which can help avoid overexcavations. In most cases, water bearing soils can have a layer of gravel, concrete, or lean concrete placed immediately after

excavation and inspection approval to protect the exposed grade from further water exposure. If gravel is placed where slope stability is a concern, the gravel should have permanent drainage installed to avoid saturation of the slope with pooled water. Practical removal of all water should be achieved prior to attempting placement of any lean concrete or concrete. If these methods are not deemed feasible, shoring may be required to stabilize the overexcavation.

QUALIFICATION OF REPORT

The scope of this report is to address critical soils retention structures along the trail, not the trail pavement itself. Although some discussion and recommendations are provided concerning the trail, such as expansive soil separation for the trail (since expansive soil characteristics were explored in our wall evaluation) and backfill compaction (since pavement subgrade often overlaps with wall backfill), this report should not be interpreted as addressing the various geotechnical issues related to the trail pavement.

Our evaluation of subgrade conditions has been based on our understanding of the site and project information and the data obtained in our exploration. The general subsurface conditions utilized in our evaluation have been based on interpolation of subsurface data between the borings. In evaluating the boring data, we have examined previous correlations between soil properties observed in soil conditions similar to those at your site. The discovery of any site or subsurface conditions during construction which deviate from the data outlined in this exploration should be reported to us for our evaluation. The assessment of site environmental conditions or the presence of pollutants in the soil, rock, and groundwater of the site was beyond the scope of this exploration.

Support on existing fill is discussed in this report. The existing fills present at this site are potentially much more inconsistent than natural soil deposits. Support upon existing fills carries with it a degree of risk that unsuitable materials may be buried within the fill and not be detected in the inspection and testing program recommended herein. Unsuitable materials in the fill may experience settlement and cause distress to structures and pavements supported on the fill.

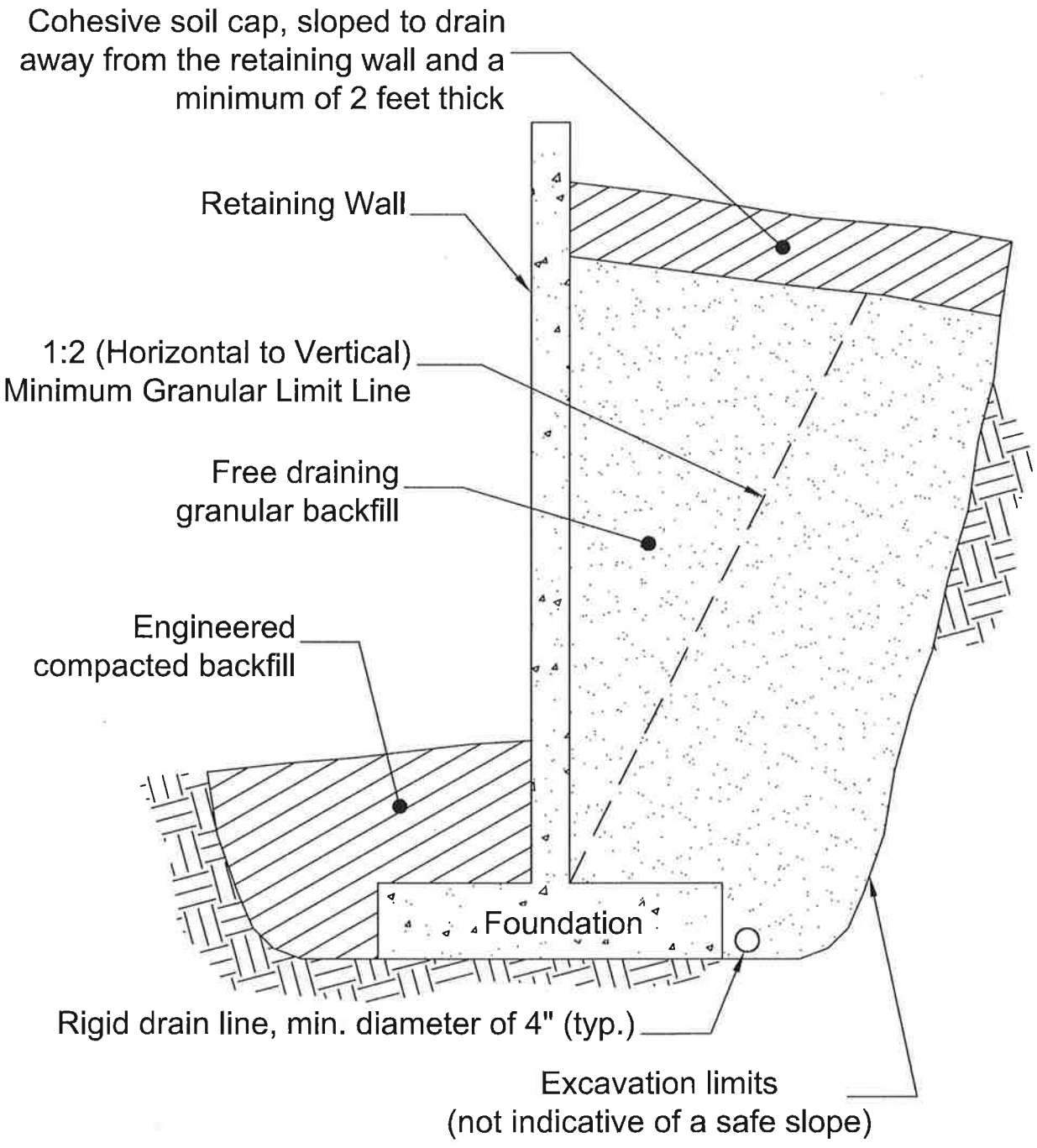
Elimination of the risk would require removal of the existing fill. While TEAM Services does not believe this extent of mitigation is warranted for this project where construction inspection indicates the fill is suitable, the risk would need to be assumed by the owner to allow existing fill to remain beneath new pavement, utilities, walls, and other settlement-sensitive structures.

Potentially expansive soils were encountered at this site. These soils experience volume changes in response to soil moisture content changes. These volume changes can cause movement, cracking and other distress for structures and pavements supported above them. Measures to help reduce the degree of soil volume change have been discussed. These measures can reduce the risks associated with the potentially expansive soils, but they do not eliminate this risk. Elimination of the risks associated with expansive soils would require removal of the expansive soils and replacement with a more suitable soil type. This measure is not believed to be practical. A degree of risk must be accepted to support development at this site.

Slope stability analysis results are included in this report. Additional qualifications concerning slope stability are listed in the **Slope Stability** section.

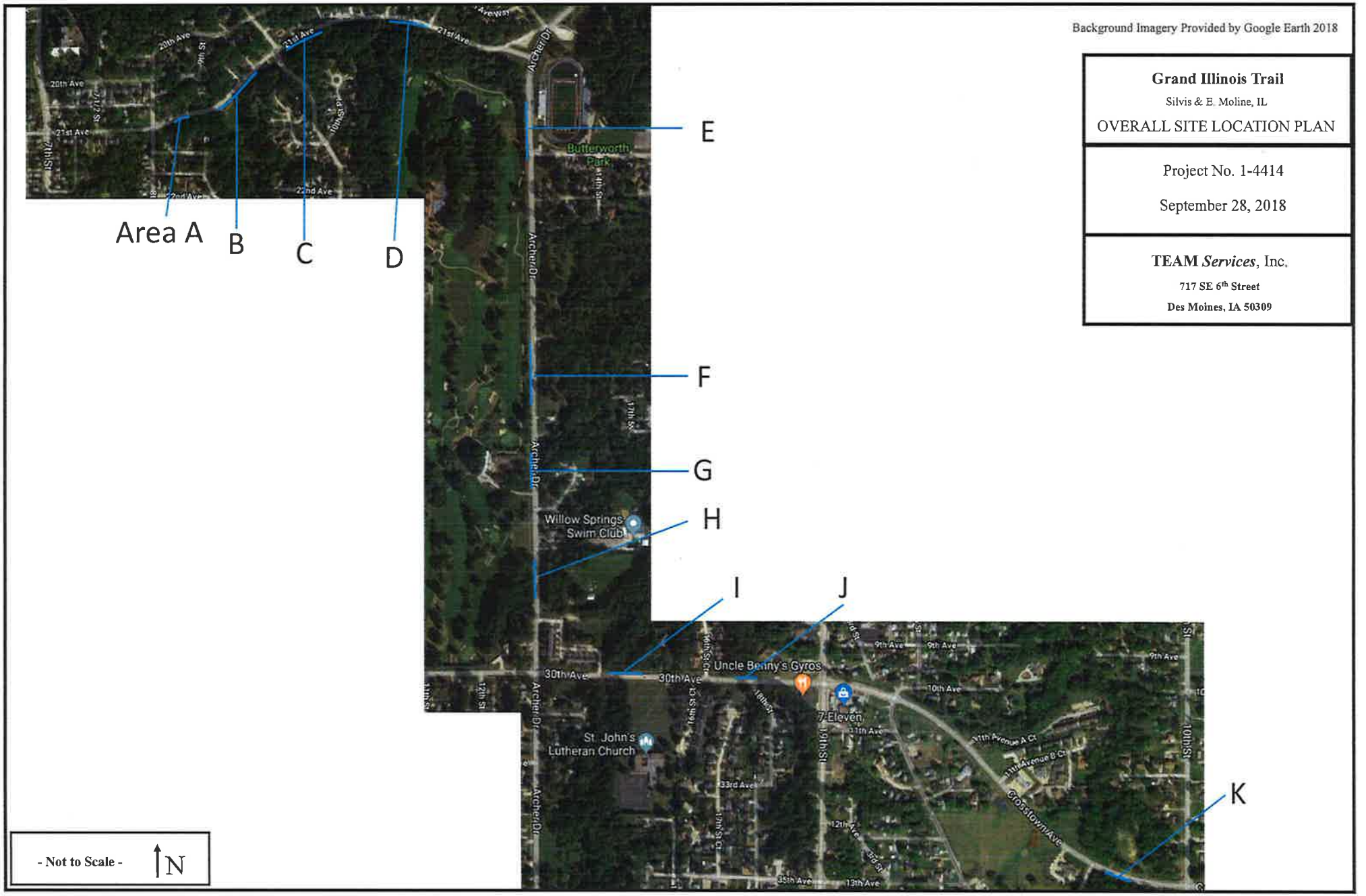
It is recommended that the geotechnical engineer be retained to review the plans and specifications so that comments can be provided regarding the interpretation and implementation of the geotechnical recommendations in the design and specifications. It is further recommended that the geotechnical engineer be retained for testing and observation during the construction phase to help determine that the design requirements are fulfilled.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranty is provided. In the event that any changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing by the geotechnical engineer.



Typical Retaining Wall Section

TEAM Services 717 SE 6th Street Des Moines, IA 50309	**Retaining Walls**	**Figure No. 2**



Background Imagery Provided by Google Earth 2018

Grand Illinois Trail

Silvis & E. Moline, IL

OVERALL SITE LOCATION PLAN

Project No. 1-4414

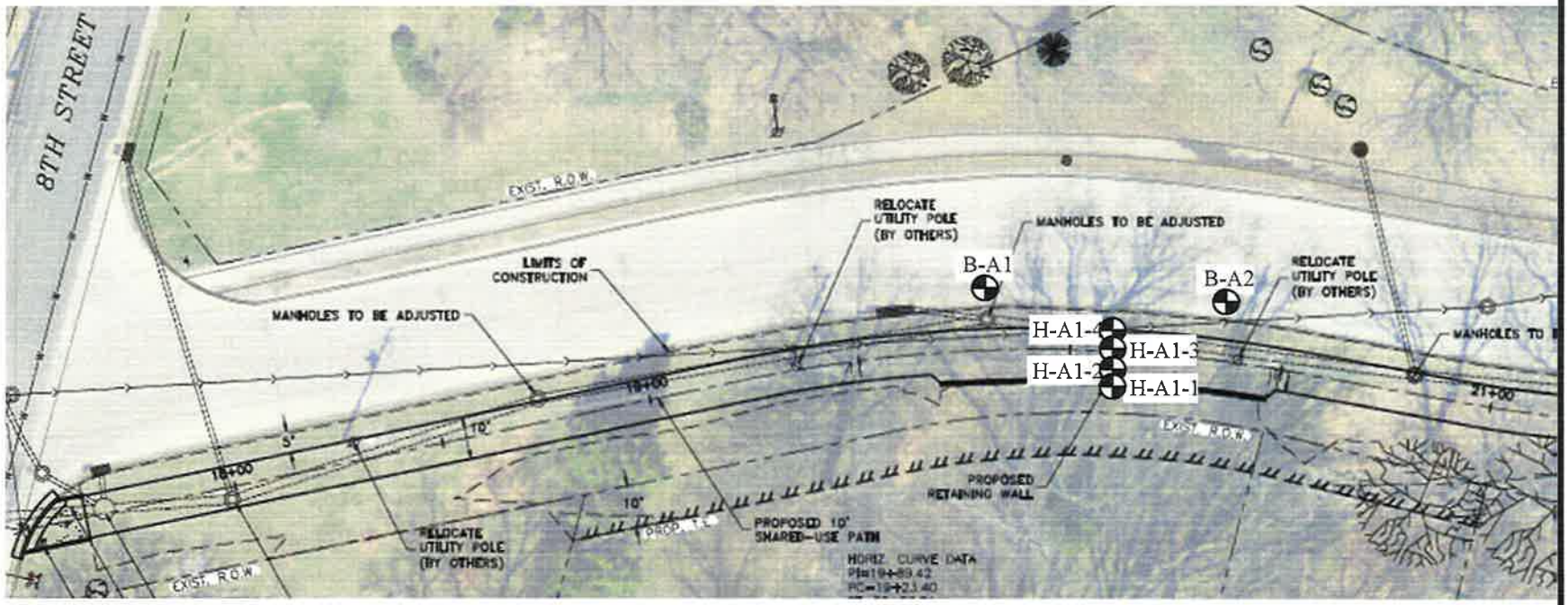
September 28, 2018

TEAM *Services*, Inc.

717 SE 6th Street

Des Moines, IA 50309

Background Imagery Provided by IMEG



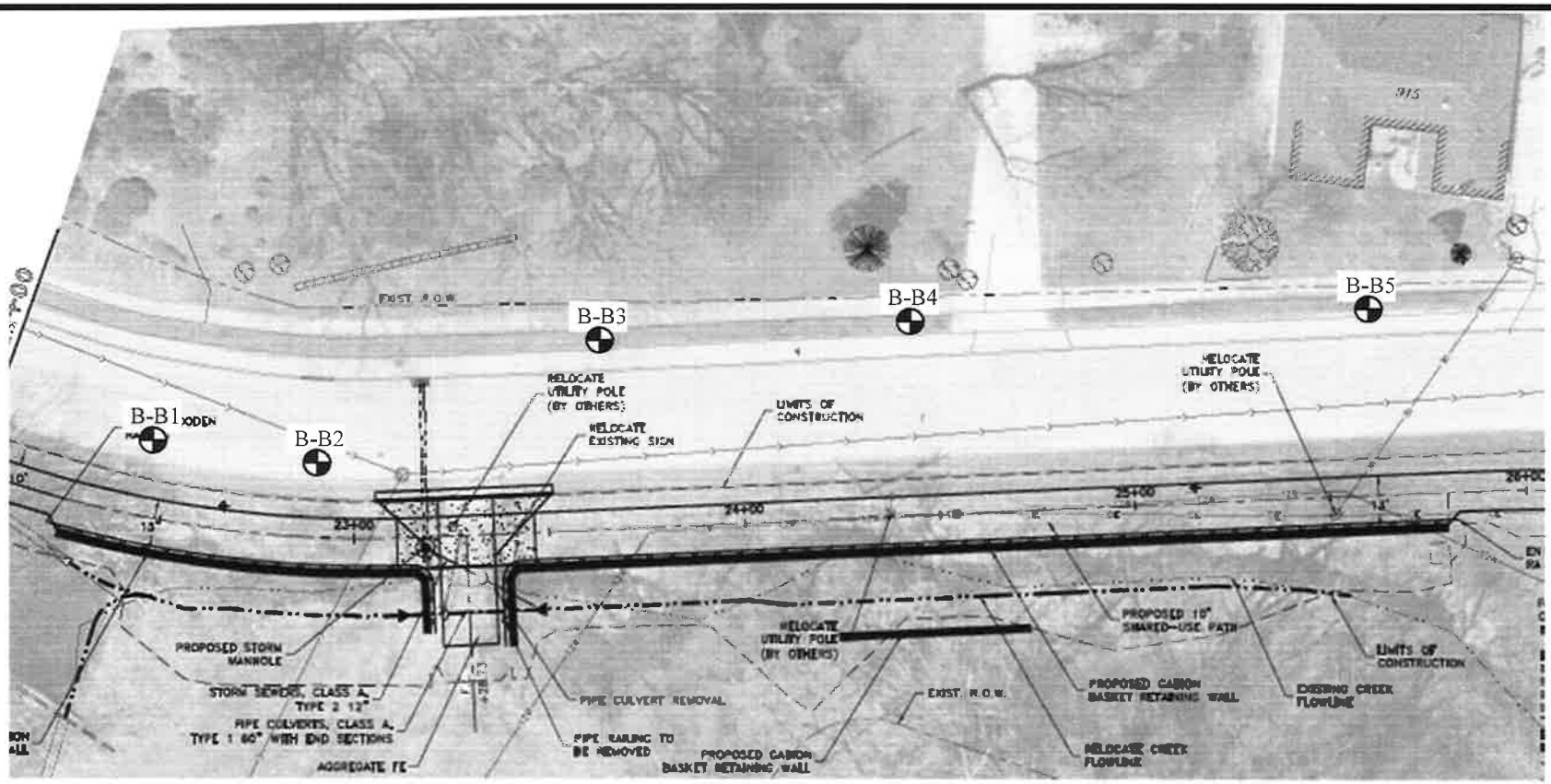
- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **21st Ave Sta. 19+70 to 20+50** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



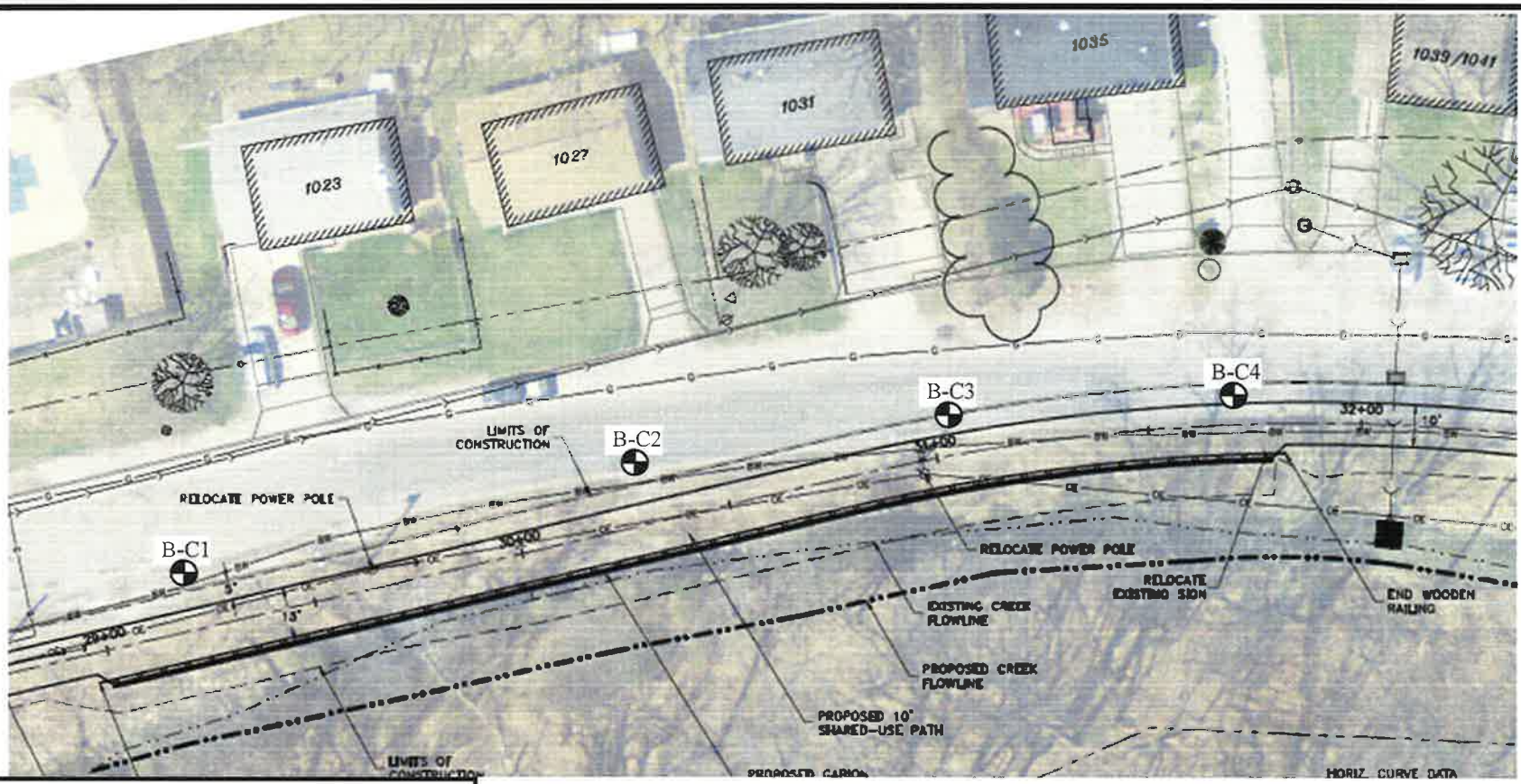
- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **21st Ave Sta. 22+20 to 25+75** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



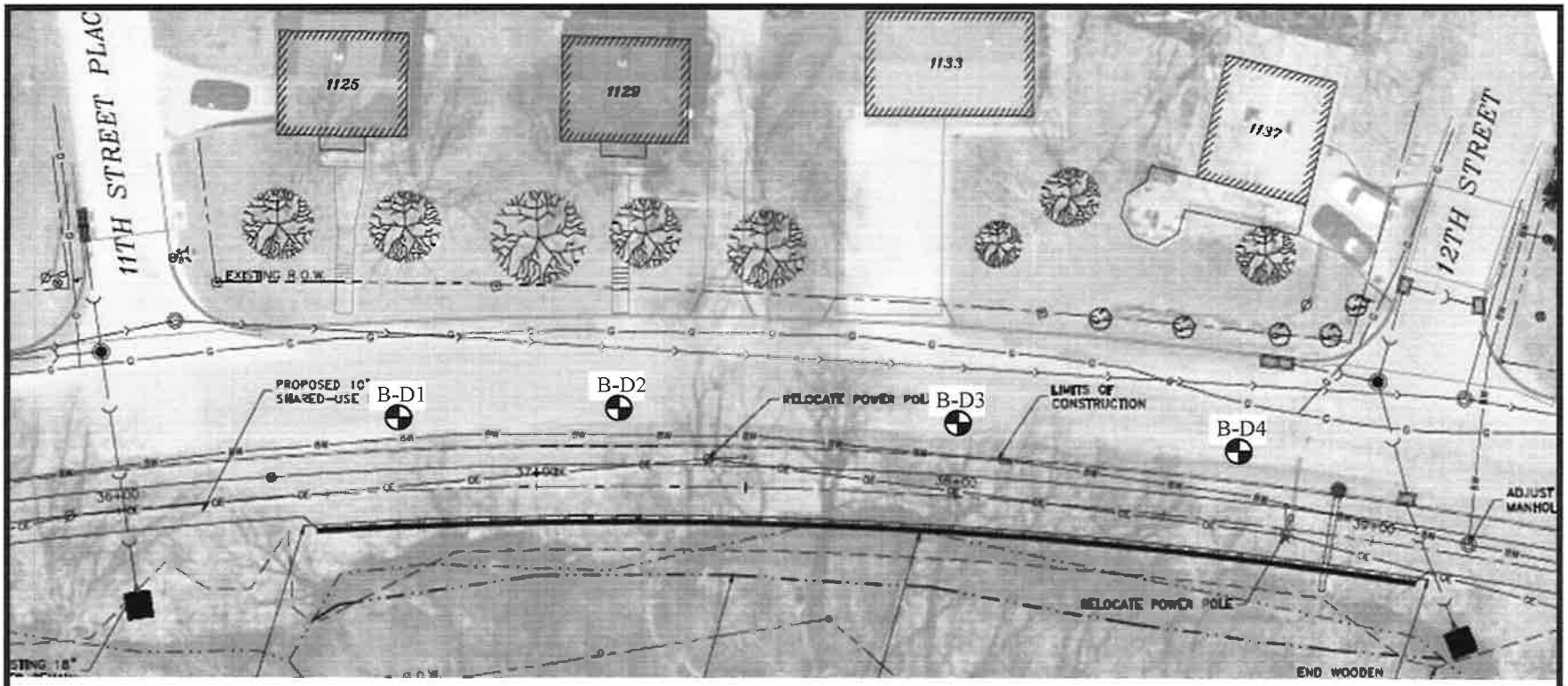
- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **21st Ave Sta. 28+90 to 31+80** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



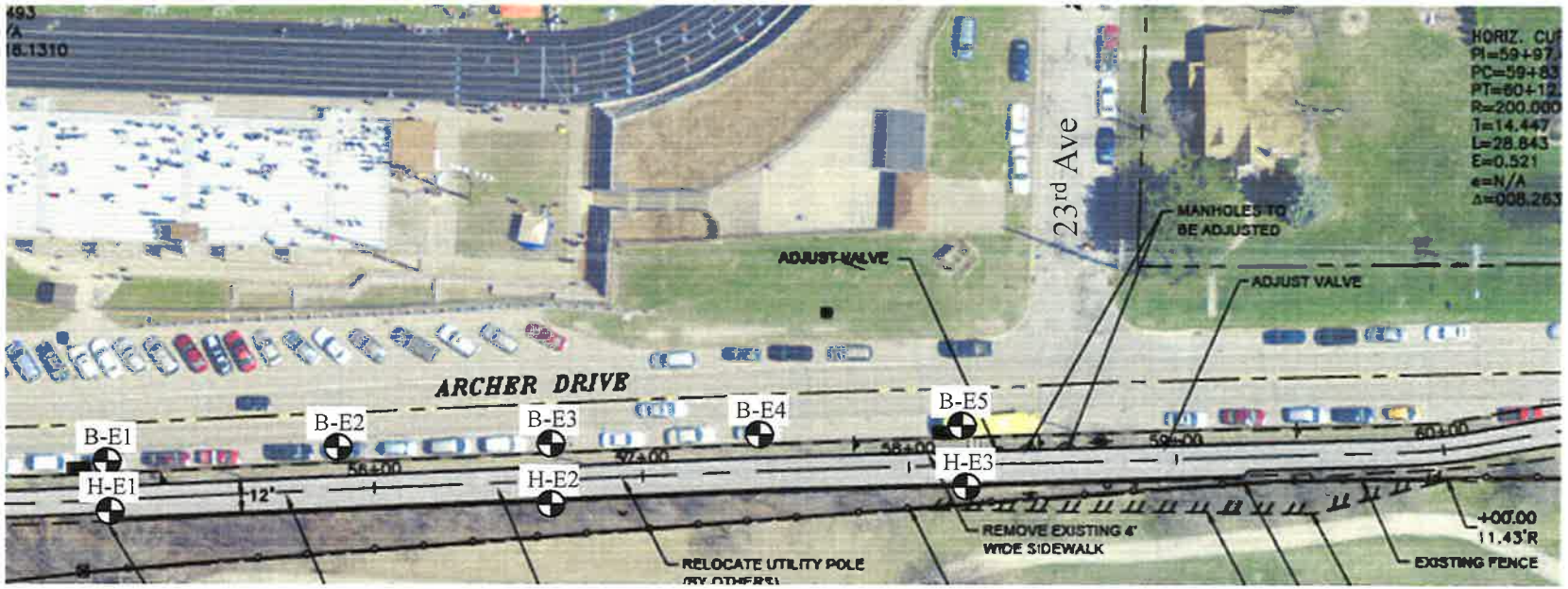
- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **21st Ave Sta. 36+45 to 39+20** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



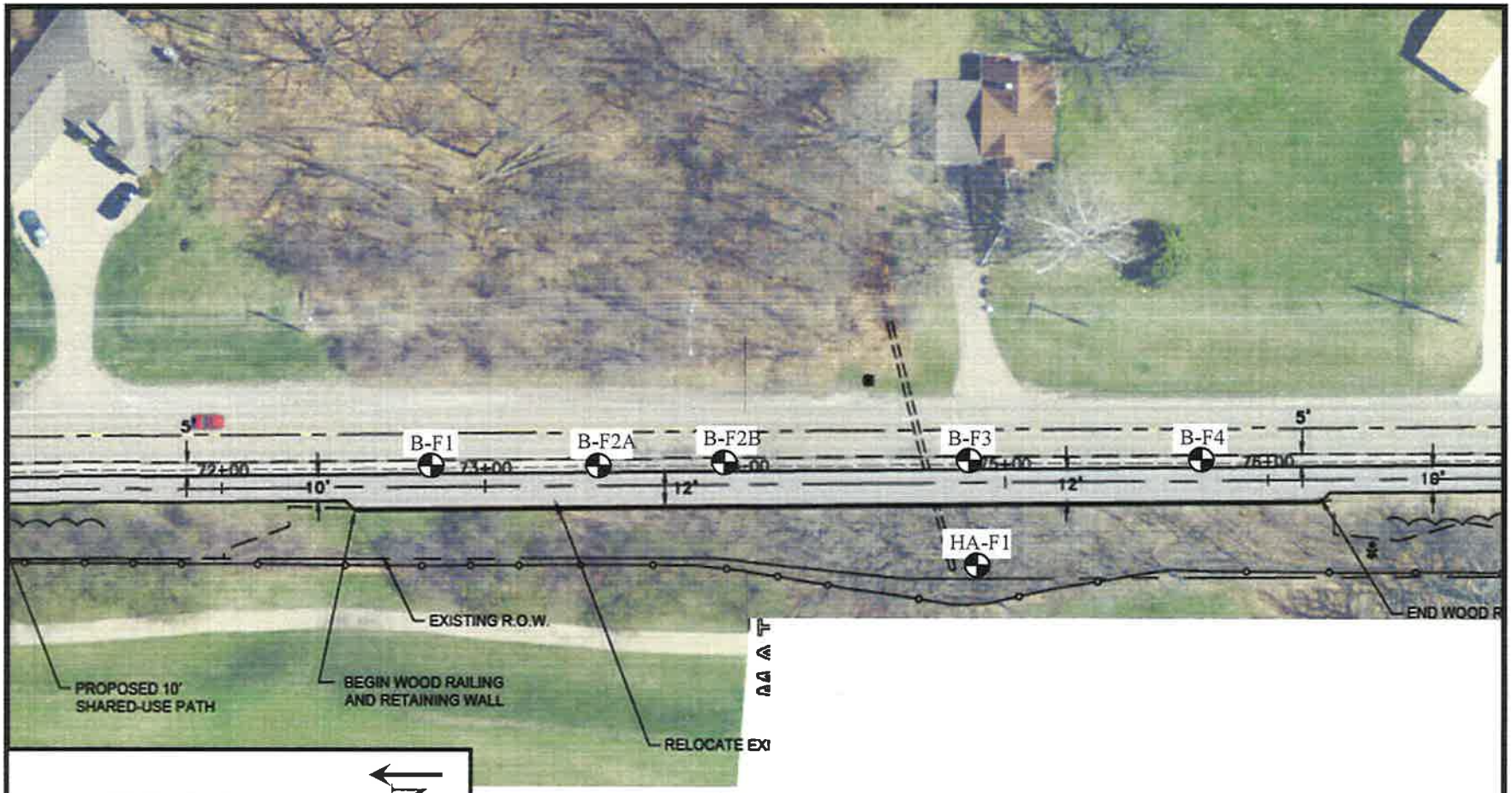
- Not to Scale -

N

Approximate boring location

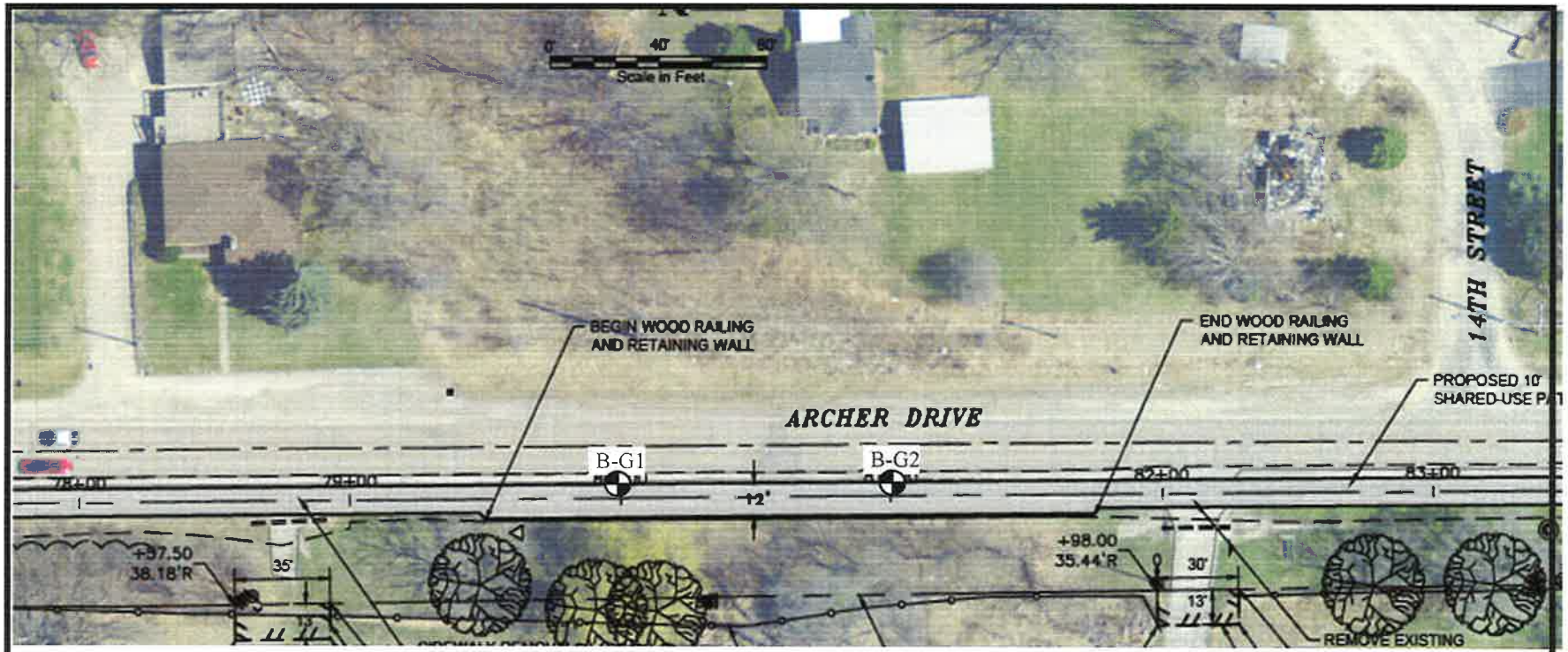
TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **Archer Drive Sta. 54+90 to 59+20** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **Archer Drive Sta. 72+50 to 76+25** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



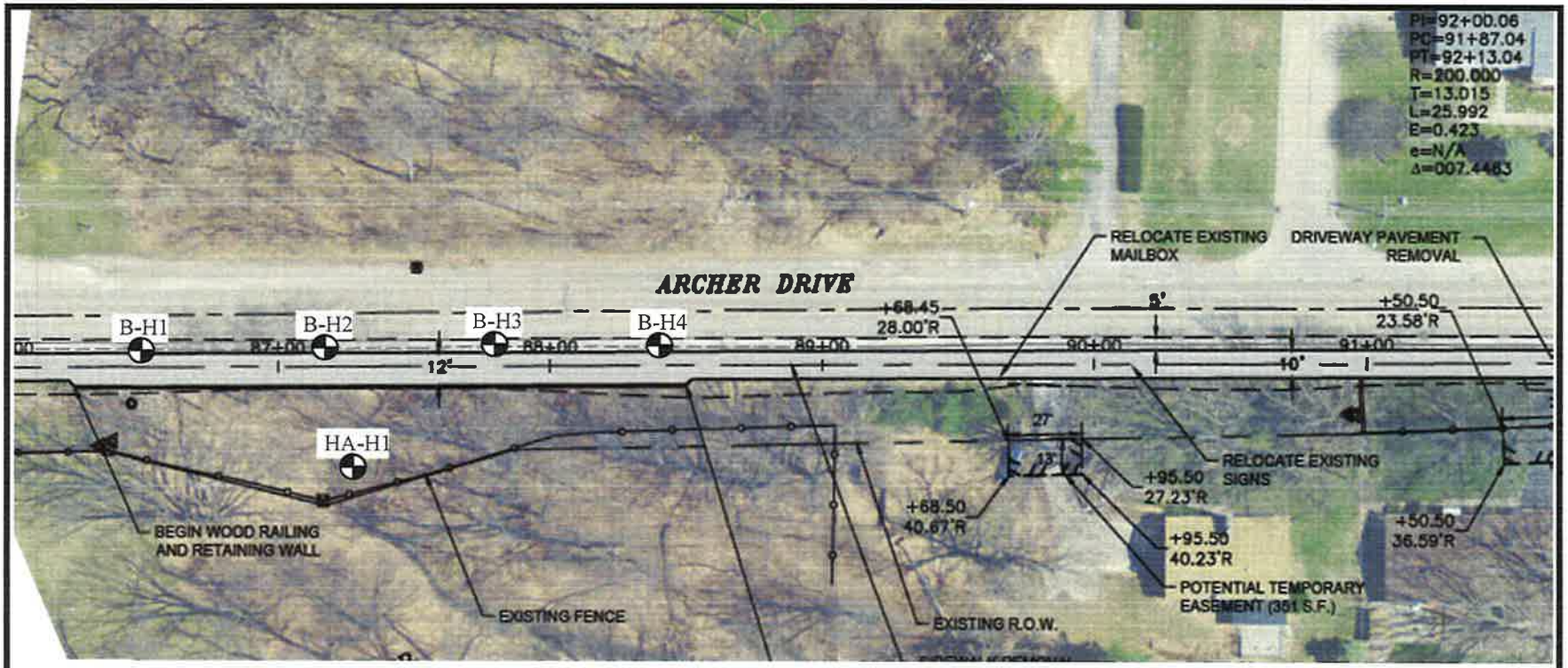
- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **Archer Drive Sta. 79+50 to 81+75** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



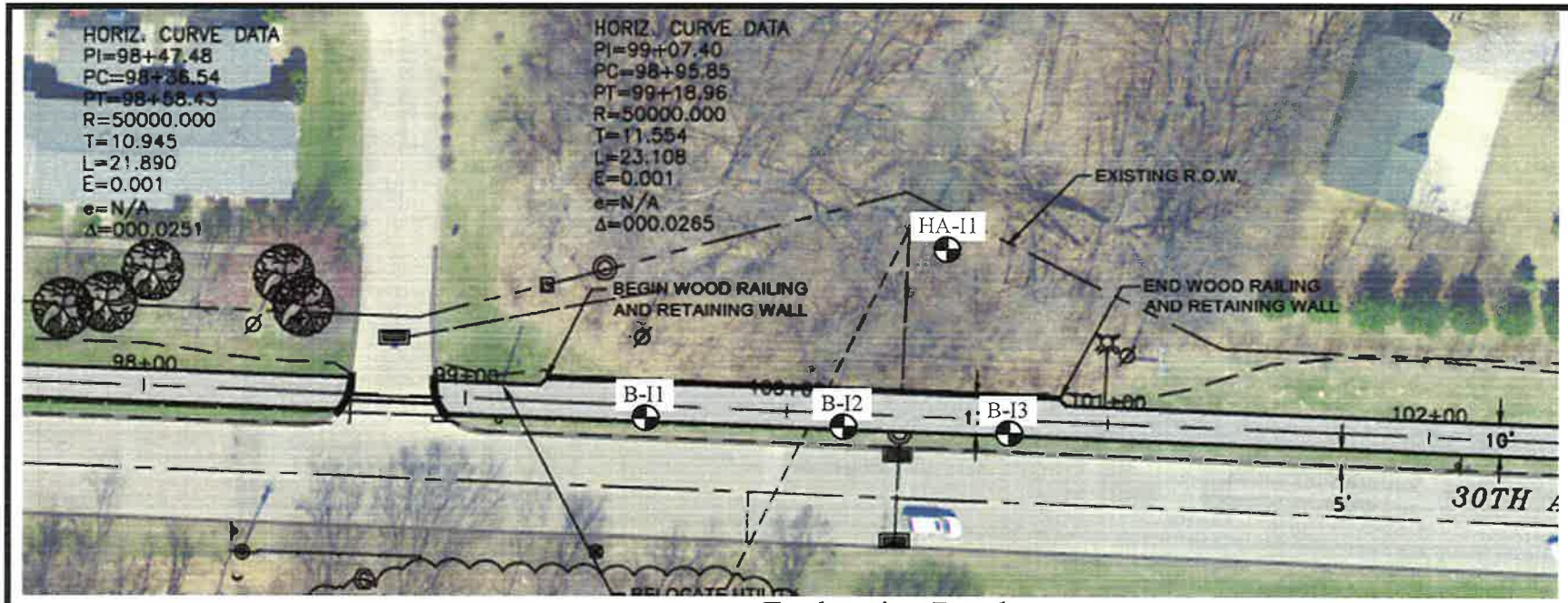
- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **Archer Drive Sta. 86+25 to 88+75** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



Exploration Depths

Borings 1, 3: 10’ Borings 2: 25’

Hand Auger 1: 8’

At deepest plunge, Auger near bottom of slope

- Drill on grass. If on pavement then long site distance road so hopefully no flaggers

- Not to Scale -

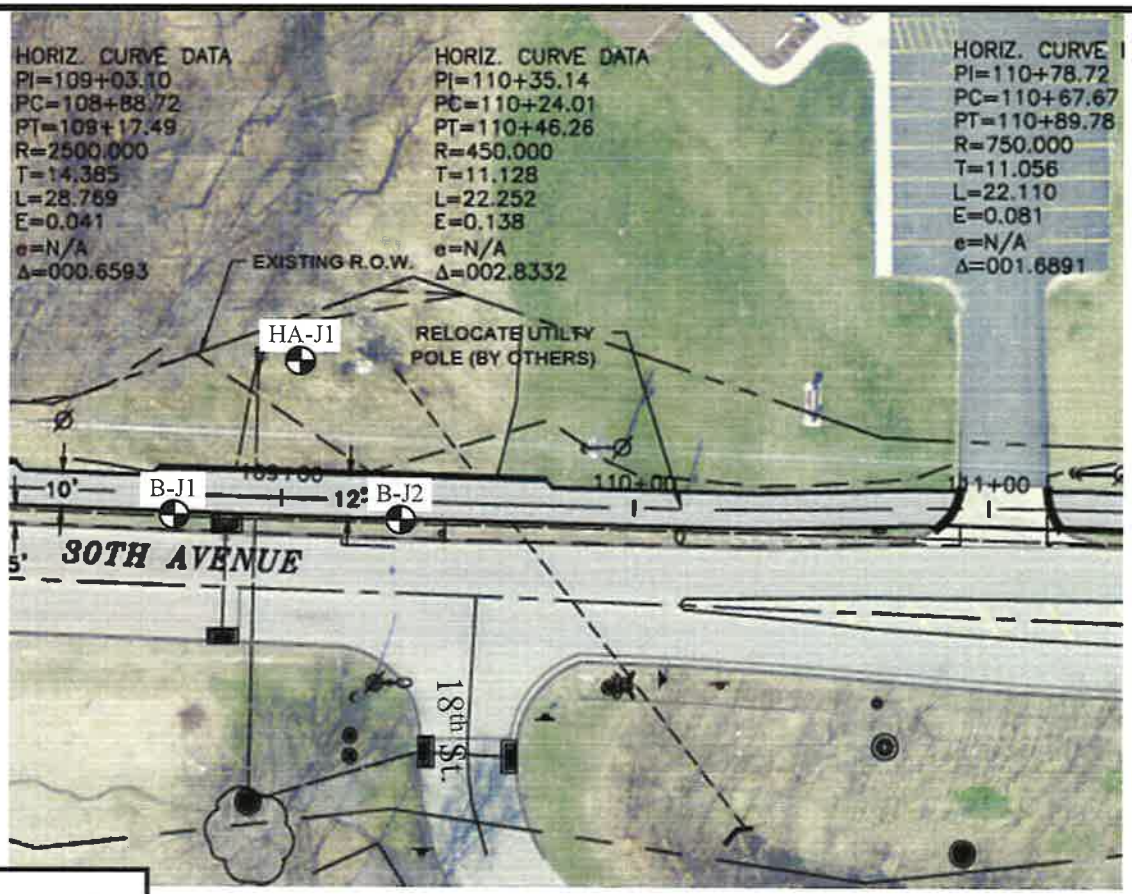
N

Approximate boring location

Approx. benchmark location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **30th Ave Sta. 99+10 to 100+90** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



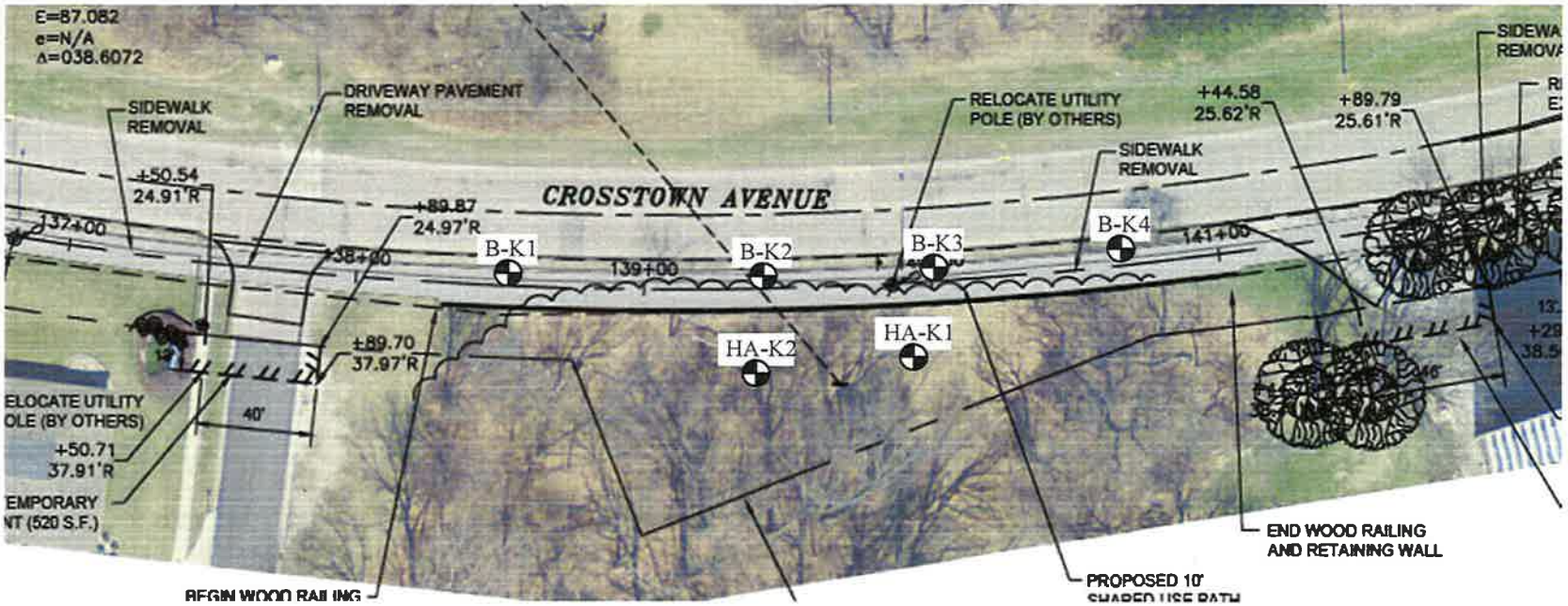
- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **30th Ave Sta. 108+50 to 109+75** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

Background Imagery Provided by IMEG



- Not to Scale -

N

Approximate boring location

TEAM *Services*, Inc. **717 SE 6th Street** **Des Moines, IA 50309**	**Grand Illinois Trail** **Crosstown Ave Sta. 138+20 to 141+10** Silvis & E. Moline, IL BORING PLAN	Project No. 1-4414 May 9, 2018

BORING LOG No. A1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION		USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	0.6 CONCRETE (7.5"±)	-0.6		0								
	Fill - Sandy Lean CLAY, trace gravel, very dark gray		CL		1	AS			6.6			
					2	SS	12	15	3.2			
	-- very dark gray and yellowish brown after 3'			4	3	SS	14	5	18.6			
				8	4	ST	7.5		19.5		6500*	
	10.0	-10.0										
	Bottom of Boring											

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None	Ft.	While Drilling
None	Ft.	After Drilling
	Ft.	

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-30-2018
Boring Completed: 5-30-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gec TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL

BORING LOG No. A2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	0.7 CONCRETE (8"±) -0.7		0								
	Fill - Sandy lean CLAY, trace gravel, gray, very dark gray and light olive brown	CL		1	SS	14	3	19			
	-- very dark gray and yellowish brown after 3.5' ▽		4	2	ST	14.5		27	96	1000*	
	7.0 -7.0										
	Glacial Till - Sandy Lean CLAY, trace gravel, yellowish brown and gray, very stiff	CL	8								
	10.0 -10.0			3	SS	17	13	13		8000*	
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

▽ None Ft. While Drilling

▽ 4' Ft. After Drilling

▼ Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-30-2018

Boring Completed: 5-30-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. B1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	0.7 CONCRETE (8"±) -0.7		0								
	Fill - Sandy lean CLAY, with gravel, very dark brown	CL		1	SS	10	14	18.8			
	3.5 -3.5										
	Fill - Lean CLAY, with sand, trace gravel, very dark gray and dark grayish brown	CL	4	2	ST	13		24.2	101	3000*	
	7.0 -7.0										
	Glacial Till - Sandy lean CLAY, trace gravel, brown and gray, very stiff	CL	8	3	ST	20		14.2	122	7000*	
	12.0 -12.0		12								
	Glacial Till - Sandy lean CLAY, trace gravel, dark gray, very stiff	CL		4	SS	17	12	13.8		9000*	
	15.0 -15.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

9' Ft. While Drilling

12' Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-30-2018

Boring Completed: 5-30-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE15.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. B2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.7 CONCRETE (8"±) -0.7		0								
Fill - Clayey SAND, with gravel, very dark brown and brown	SC		1	SS	10	5	41.8			
-- split spoon pushed after poor recovery in shelby tube sample in Sample No.2		4	2	SS	14		30.2			
7.0 -7.0										
Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff	CL	8	3	SS	14	13	13		6000*	
		12	4	SS	17	14	13		7500*	
15.0 -15.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

10' Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-30-2018

Boring Completed: 5-30-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. B3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
Fill - Sandy lean CLAY, very dark brown	CL	0	1	AS			20.1			
2.0 -- trace gravel at 1.5' -2.0										
Fill - Gravel	GW		2	SS	8	7	24.8			
3.5 -3.5							2.2			
Fill - Sandy Lean CLAY, trace gravel, brown and dark grayish brown	CL	4	3	SS	10	4	20.9			
7.0 -7.0										
Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff	CL	8	4	SS	17	9	0.3		7000*	
		12								
			5	SS	17	15	13			
15.0 -15.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

8.5'	Ft.	While Drilling
5'	Ft.	After Drilling
	Ft.	

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-31-2018
Boring Completed: 5-31-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. B4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.7 CONCRETE (8"±) -0.7		0								
Fill - Sandy lean CLAY, trace gravel, yellowish brown, very dark brown and brownish gray	CL		1	SS	12	7	22			
3.5 -3.5										
Fill - Lean CLAY, olive brown and gray ▽	CL	4	2	SS	17	8	25.6			
7.0 -7.0										
Fill - Sandy lean CLAY, brown and dark grayish brown	ML	8								
-- piece of corrugated plastic pipe in Sample No. 3 ▽			3	SS	8	13	27.6			
12.0 -12.0		12								
Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff	CL		4	SS	17	13	13.8		8000*	
15.0 -15.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

▽ 4.5' Ft. While Drilling

▽ 10' Ft. After Drilling

▽ _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-31-2018

Boring Completed: 5-31-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdf 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. B5

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION		USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.7	CONCRETE (8"±) -0.7		0								
1.0	GRAVEL (not sampled) -1.0	GP									
	Fill - Sandy Lean CLAY, very dark gray	CL		1	SS	14	7	17.6			
3.5	-3.5										
	Fill - Sandy Lean CLAY, trace gravel, gray, dark gray and yellowish brown	CL	4	2	ST	17		20	108	2500*	
	-- sand seam in Sample No. 2										
7.0	-7.0										
	Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff ▽	CL	8	3	ST	15		13.3	123	4000*	
			12								
				4	SS	17	11	13.6		8000*	
15.0	-15.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

▽	8'	Ft. While Drilling
▽	None	Ft. After Drilling
▼		Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-31-2018
Boring Completed: 5-31-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gpj TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. C1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.6 CONCRETE (7"±) -0.6		0								
1.0 GRAVEL (not sampled) -1.0										
Fill - Sandy lean CLAY, trace gravel, very dark brown, yellowish brown and gray	CL		1	SS	10	9	19.2			
		4	2	ST	15		17.5	115	2500*	
7.0 -7.0										
Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff	CL	8	3	SS	17	12	14.2		7000*	
		12								
15.0 -15.0			4	SS	17	10	13.8		9000*	
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-31-2018

Boring Completed: 5-31-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdl 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. C2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.7 CONCRETE (8"±) -0.7		0								
1.0 GRAVEL (not sampled) -1.0										
Fill - Lean CLAY, with sand, very dark gray	CL		1	ST	10		23.1	102	5000*	
3.5 -3.5										
Fill - Sandy lean CLAY, trace gravel, yellowish brown and dark gray	CL	4	2	SS	12	3	23.6			
7.0 -7.0										
Fill - Sandy lean CLAY, trace gravel, light olive brown, dark gray and gray	CL	8	3	SS	17	8	15.1		7000*	
12.0 -12.0		12								
Fill - Lean CLAY, dark gray and gray, very stiff	CL		4	SS	17	15	19.6		9000*	
15.0 -15.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

8.5' Ft. While Drilling

12' Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-31-2018

Boring Completed: 5-31-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. C3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.6 CONCRETE (7"±) -0.6		0								
1.0 GRAVEL (not sampled) -1.0										
Fill - SILT, dark gray	ML		1	SS	10	5	24.2			
3.5 -3.5										
Fill - Lean CLAY, dark gray and very dark gray	CL	4	2	ST	17.5		23.2	100	2500*	
7.0 -7.0										
Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff ▽	CL	8	3	SS	17	11	13.6		8000*	
		12								
15.0 -15.0			4	SS	17	12	13.2		8500*	
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

▽ 8.5' Ft. While Drilling

▽ None Ft. After Drilling

▽ Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-31-2018

Boring Completed: 5-31-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL

BORING LOG No. C4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION		USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	0.6 CONCRETE (7"±)	-0.6		0	1	AS			2.5			
	1.0 Fill - Silty GRAVEL, with sand, white	-1.0	GW									
	Fill - Lean CLAY, with sand, very dark gray		CL		2	SS	10	6	26.1			
	3.0	-3.0										
	Fill - Sandy Lean CLAY, gray and dark brown		CL	4	3	ST	16		27	97	1500*	
	7.0	-7.0										
	Glacial Till - Sandy lean CLAY, trace gravel, brown, very stiff		CL	8	4	SS	17	9	15.8		7000*	
	-- gray after 12'			12	5	SS	17	11	13.3		7000*	
	15.0	-15.0										
	Bottom of Boring											

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 5-31-2018

Boring Completed: 5-31-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. D1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION			USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.6	CONCRETE (8"±)	-0.6		0	1	AS			2.5			
1.0	Fill - Silty GRAVEL, with sand, white	-1.0	GW									
	Fill - Clayey SAND, dark grayish brown		CL		2	SS	10	6	15.7			
3.5		-3.5										
4.5	Fill - Sandy lean CLAY, dark gray, dark brown, brown and very dark brown	-4.5	CL	4	3	ST	15		21.9	103	3500*	
	Fill - SAND, with clay, yellowish brown and dark gray		SP						12.8			
7.0		-7.0										
	Glacial Till - Sandy lean CLAY, trace gravel, gray, stiff		CL	8	4	SS	17	9	14.8		4000*	
	-- becomes very stiff after 12'			12	5	SS	17	11	14			
15.0		-15.0										
	Bottom of Boring											

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- 8.5' Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-1-2018
Boring Completed: 6-1-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. D2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION		USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.6	CONCRETE (7.5"±) -0.6		0								
1.0	GRAVEL (not sampled) -1.0										
	Fill - Lean CLAY, very dark gray and yellowish brown	CL		1	SS	10	5	24.9			
3.5	-3.5										
	Fill - SILT, trace gravel, dark grayish brown and dark yellowish brown and very dark gray	ML	4	2	SS	14	2	25.3			
7.0	-7.0										
	Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff	CL	8	3	ST	18.5		15.2	121	5500*	
			12								
				4	SS	17	12	14		6500*	
15.0	-15.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- 8.5' Ft. While Drilling
- 12' Ft. After Drilling
- _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-1-2018
Boring Completed: 6-1-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

1-4414.gpj TSBORE16.tdt 4/25/2017

BORING LOG No. D3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.7 CONCRETE (7.5"±) -0.7		0								
1.0 Fill - Silty GRAVEL, with sand, white -1.0	GW									
Fill - Sandy lean CLAY, trace gravel, very dark gray	CL		1	ST	12		5.8 / 21.2	103	4500*	
-- dark gray and very dark gray after 3'		4	2	SS	10	3	19.3			
7.0 -7.0										
Glacial Till - Sandy Lean CLAY, trace gravel, gray, very stiff	CL	8	3	ST	16.5		14.6	121	7500*	
		12								
15.0 -15.0			4	SS	17	11	15		8000*	
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- 8.5' Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-1-2018
Boring Completed: 6-1-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. D4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.7 CONCRETE (7.5"±) -0.7		0								
1.0 GRAVEL (not sampled) -1.0										
Fill - Sandy lean CLAY, trace gravel, dark grayish brown	ML		1	SS	10	5	24			
3.5 -3.5										
Fill - SAND, with clay, trace gravel, yellowish brown and dark dray	SW	4	2	ST	20		11.9			
7.0 -7.0										
Glacial Till - Sandy lean CLAY, trace gravel, gray, very stiff	CL	8	3	SS	17	13	14.4		6000*	
		12								
15.0 -15.0			4	SS	17	13	16		8000*	
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- 8.5' Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-1-2018
Boring Completed: 6-1-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL

BORING LOG No. E1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3.5"±) -0.3		0								
0.9 CONCRETE (8"±) -0.9										
1.0 GRAVEL (not sampled) -1.0	ML		1	AS			8.8			
Loess - SILT, yellowish brown, stiff			2	SS	14	8	20.1		8000*	
-- yellowish brown and gray, medium stiff after 3.5'		4	3	SS	14	5	27.7		1500*	
-- becomes stiff after 6'		8	4	ST	24		29.7	95	3500*	
10.0 -10.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-4-2018

Boring Completed: 6-4-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.gpj TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. E2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3.5"±) -0.3		0								
0.9 CONCRETE (8"±) -0.9										
1.0 GRAVEL (not sampled) -1.0	ML									
Loess - SILT, light olive brown, very stiff			1	ST	15		16.2			
-- yellowish brown, dark brown and gray, stiff at 3.5'		4	2	SS	14	7	21.3		5000*	
7.0 -7.0										
Loess - SILT, gray, medium stiff	ML	8	3	SS	15	4	23.2		1500*	
10.0 -10.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-4-2018
Boring Completed: 6-4-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. E3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3.5"±) -0.3		0								
0.9 CONCRETE (8"±) -0.9										
1.0 GRAVEL (not sampled) -1.0	ML									
Loess - SILT, yellowish brown, very stiff			1	SS	10	17	15		9000*	
-- becomes stiff after 3.5'		4	2	SS	14	8	19.9		4000*	
		8	3	ST	24		25.6	101	3500*	
10.0 -10.0 Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-4-2018

Boring Completed: 6-4-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. E4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±) -0.3		0								
CONCRETE (8"±)										
1.5 -1.5										
Loess - SILT, dark yellowish brown, stiff	ML		1	SS	14	8	19.2		2000*	
-- gray and yellowish brown after 3'		4	2	ST	18		17.7			
		8	3	SS	14	4	22.4		4000*	
10.0 -10.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-4-2018

Boring Completed: 6-4-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.gpj TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. E5

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	0.3 ASPHALT (3.5"±) -0.3		0								
	CONCRETE (8"±)										
	1.5 -1.5										
	Loess - Lean CLAY, dark yellowish brown and gray, medium stiff	CL		1	SS	12	4	23.8			
	3.5 -3.5										
	Loess - SILT, yellowish brown and gray, stiff	ML	4	2	SS	1	7	20.6		4500*	
			8	3	ST	15		22.2	104	3000*	
	10.0 -10.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-4-2018
Boring Completed: 6-4-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gec TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. F1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 664.5
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±) 664.2		0								
0.5 Fill - Clayey GRAVEL, with sand, dark grayish brown 664.0	GC		1	AS			6.5			
Fill - Lean CLAY, yellowish brown and gray	CL		2	SS	10	8	22.3		6000*	
-- layer of very dark brown lean clay, with organics in Sample No. 3		4	3	ST	14		20.9	106	9000*	
									7000*	
7.0 657.5										
Loess - SILT, yellowish brown and gray, stiff	ML	8	4	SS	17	6	28		4000*	
10.0 654.5										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018
Boring Completed: 6-5-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gpj TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. F2A

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 663
Site Datum: TOPO
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	0.3 ASPHALT (3"±) 662.7		0								
	0.5 Fill - Clayey GRAVEL, with sand, dark grayish brown 662.5	GC									
	Fill - Lean CLAY, gray and yellowish brown	CL		1	SS	14	11	21.1			
			4	2	SS	17	8	21.1			
	7.0 656.0										
	Loess - SILT, yellowish brown and gray, stiff	ML	8	3	SS	17	6	22.5		3000*	
			12	4	SS	14	7	21.2		2000*	
	15.0 648.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018
Boring Completed: 6-5-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. F2B

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 663
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±) 662.7 Fill - Lean CLAY, yellowish brown and gray	CL	0								
			1	SS	11	9	19.7			
-- Seam of dark gray sandy lean clay, trace gravel in Sample No. 2		4	2	ST	13		26.8	99	5500*	
-- dark gray and gray after 8'		8	3	SS	14	10	19.9			
		12								
-- trace roots in Sample No. 6			4	ST	12.5		23.5	103	3500*	
17.0 646.0 Loess - SILT, yellowish brown and gray, very stiff	ML	16								
			5	ST	19		22.2	105	5000*	
20.0 643.0 Bottom of Boring		20								

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- NONE Ft. While Drilling
- 16 Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6/28/2018
Boring Completed: 6/28/2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. F3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 662.5
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES: NUMBER	TYPE	RECOVERY	SPT - N (BLOWS / FT.)	TESTS: MOISTURE, %	DRY DENSITY (PCF)	UNCONFINED STRENGTH (PSF)	OTHER
0.3 ASPHALT (3"±) 662.2		0								
1.0 Fill - Clayey fine to coarse SAND, with gravel, yellowish brown 661.5	ML		1	AS			3.3			
Fill - SILT, yellowish brown and gray	ML		2	SS	14	11	17.4			
4.0 -- trace asphalt encountered in Sample No. 3 658.5		4								
Fill - Lean CLAY, yellowish brown and gray	CL		3	ST	12.5		19.7	106	9000*	
		8	4	SS	17	8	19.8			
-- yellowish brown, gray and very dark brown after 12'		12								
			5	SS	14	3	28.5		1000*	
15.0 647.5										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018
Boring Completed: 6-5-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. F4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 664
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±) 663.7		0								
0.5 Fill - Clayey fine to coarse SAND, with gravel, yellowish brown 663.5	SC									
Fill - Lean CLAY, gray and yellowish brown	CL		1	SS	10	8	18.7			
-- trace gravel and asphalt in Sample No. 2		4	2	SS	14	8	16.4			
7.0 657.0										
Loess - SILT, yellowish brown and gray, very stiff	ML	8	3	ST	19		24.6	104	4500*	
10.5 653.5										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018
Boring Completed: 6-5-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. G1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION		USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3	ASPHALT (3"±) -0.3		0								
	Fill - Lean CLAY, brown	CL		1	AS			15			
1.5	-1.5										
	Fill - SILT, yellowish brown, trace dark brown	ML		2	SS	14	10	16.8			
3.5	-3.5										
	Fill - Lean CLAY, yellowish brown, trace dark brown	CL	4	3	SS	15	8	22.1			
7.0	-7.0										
	Fill - Lean CLAY, trace sand, cinders and roots, dark gray	CL	8								
9.0	-9.0										
	Loess - SILT, gray, stiff	ML		4	ST	19		23.3 23.8	102 105	5500* 2500*	
10.5	-10.5										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018

Boring Completed: 6-5-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. G2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft):
Site Datum:
Drilling Method: HS

DESCRIPTION		USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±)	-0.3		0								
0.5 Fill - GRAVEL	-0.5	SP		1	AS			5.5			
Fill - SILT, yellowish brown and gray		ML		2	SS	14	12	14.7		9000*	
3.5	-3.5										
Fill - Lean CLAY, yellowish brown, trace gray		CL	4	3	SS	14	8	19.2		8000*	
- dark gray and yellowish brown after 7'			8	4	SS	17	6	19.6		8500*	
10.5	-10.5										
Bottom of Boring											

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018

Boring Completed: 6-5-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. H1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 682
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±) 681.7		0								
0.8 GRAVEL (not sampled) 681.2										
Fill - Lean CLAY, yellowish brown and gray	CL		1	SS	12	9	22.7			
		4	2	ST	11		19.4	109	9000*	
		8	3	SS	14	6	20.7		8000*	
10.0 672.0										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None	Ft.	While Drilling
None	Ft.	After Drilling
	Ft.	

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018
Boring Completed: 6-5-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. H2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 683
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±) 682.7		0								
0.5 GRAVEL (not sampled) 682.5	CL-CH									
Fill - Lean to fat CLAY, yellowish brown and gray, trace very dark gray			1	SS	10	7	20.5		8000*	LL=47 PI=26
		4	2	SS	14	6	22.1			
7.0 676.0										
Fill - Lean CLAY, yellowish brown and gray, trace very dark gray	CL	8								
-- with sand near top of sample number 3			3	ST	14		20.8	110	9000*	LL=44 PI=22
							24.5	100	5000*	
		12	4	SS	14	5	26.1			
-- yellowish brown and dark gray after 17'		16								
			7	ST	11	4	26.5	97	3500*	
			5	SS	17		24		3000*	
		20								
23.5 659.5										
Loess - SILT, gray, stiff	CL	24	8	ST	17	4	23.2	100	3000*	LL=32 PI=8
25.0 658.0			6	SS	17		25.3		2200*	
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018
Boring Completed: 6-5-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. H3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 684
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION			USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3	ASPHALT (3"±)	683.7		0								
0.9	GRAVEL (not sampled)	683.1										
	Fill - Lean CLAY, trace gravel, gray and dark gray		CL		1	SS	14	7	21.2			
3.0		681.0										
	Fill - Lean CLAY, gray and yellowish brown		CL	4	2	SS	14	7	23.7			
	-- trace sand in sample number 3			8	3	SS	17	6	20.7			
12.0		672.0		12								
	Loess - SILT, yellowish brown and gray, stiff		ML		4	SS	17	5	20.9		4500*	
15.0		669.0										
	Bottom of Boring											

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018

Boring Completed: 6-5-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. H4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 685
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
0.3 ASPHALT (3"±) 684.7		0								
0.5 GRAVEL (not sampled) 684.5	CL									
Fill - Lean CLAY, yellowish brown and gray			1	SS	12	8	19.2			
		4	2	SS	14	7	20.5		6500*	
8.0 677.0		8								
Loess - SILT, yellowish brown and gray, stiff	ML		3	ST	19		22.3	92	3500*	
10.5 674.5										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-5-2018
Boring Completed: 6-5-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gpj TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. I1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 682
Site Datum: TOPO
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	Fill - Lean CLAY, yellowish brown and gray	CL	0	1	AS			12.4			
				2	SS	14	8	15.5			
			4	3	SS	10	5	21.5		3000*	
			8	4	ST	18		23.4	102	7000*	
	10.0 672.0 Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-6-2018
Boring Completed: 6-6-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gec TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. I2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 681.5
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
Fill - Lean CLAY, gray and yellowish brown	CL	0								
			1	SS	12	10	17.6		9000*	
		4	2	ST	8		25.6	99	3000*	
		8	3	SS	14	3	24.8		2000*	
-- voids noted in sample number 4		12	4	ST	17		21.7	105	5000*	LL=31 PI=8
17.0 664.5		16								
Fill - Lean CLAY, dark gray and light olive brown	CL		5	SS	15	9	17.6		4000*	
21.0 660.5		20								
Possible Fill - Sandy Lean CLAY, trace gravel, dark gray and yellowish brown , very stiff	CL		6	SS	17	11	18.3		4500*	
25.0 656.5		24								
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-6-2018
Boring Completed: 6-6-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE15.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. I3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 680
Site Datum: TOPO
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	Fill - Lean CLAY, gray and yellowish brown	CL	0	1	AS			14.1			
				2	SS	14	8	16.4			
			4	3	SS	14	9	22.5		7000*	
			8	4	ST	16		18.6	108	4500*	
	10.0 670.0 Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-6-2018
Boring Completed: 6-6-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gec TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. J1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 672
Site Datum: TOPO
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	Fill - Lean CLAY, gray and yellowish brown	CL	0	1	AS			10			
				2	SS	14	9	21.5		9000*	
			4	3	ST	17		17.3	114	9000*	
			8	4	SS	14	6	21.1		4500*	
	13.0 659.0		12								
	Buried Topsoil - Lean CLAY, trace organic, very dark grayish brown, very stiff	CL		5	SS	14	7	23.4		6000*	
	16.0 656.0		16								
	Glacial Till - Sandy Lean CLAY, trace gravel, gray and yellowish brown, very stiff	CL		6	SS	15	7	19.3		6000*	
	-- yellowish brown after 22'		20								
	25.0 647.0		24	7	SS	17	10	13		8000*	
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None	Ft.	While Drilling
18'	Ft.	After Drilling
	Ft.	

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-6-2018
Boring Completed: 6-6-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. J2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 671
Site Datum: TOPO
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	Fill - Lean CLAY, yellowish brown and gray	CL	0								
				1	SS	12	8	15.9			
			4	2	ST	16		23.5	104	5000*	
	-- trace gravel in sample number 2										
			8	3	SS	14	6	23.6		4500*	
			12								
				4	SS	15	6	20.7		4000*	
	15.0 656.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

None Ft. While Drilling

None Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-6-2018

Boring Completed: 6-6-2018

Rig: 112 **Foreman:** BS

Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. K1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 688
Site Datum: TOPO
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	Fill - Lean CLAY, trace gravel and sandy zones, yellowish brown and dark gray	CL	0	1	AS			13.8			
				2	SS	12	4	17.4			
	4.0 684.0		4								
	Fill - Lean CLAY, dark gray	CL		3	ST	18		14.1	112	5500*	
								26.1	101	9000*	
			8	4	SS	15	10	17.9			
	12.0 676.0		12								
	Fill - Lean CLAY, gray and yellowish brown	CL		5	SS	14	9	19.6		8500*	
	15.0 673.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-6-2018
Boring Completed: 6-6-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.gec TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. K2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 688.5
Site Datum: TOPO
Drilling Method: HS

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
	Fill - Lean CLAY, trace sand and gravel, yellowish brown and dark grayish brown	CL	0								
				1	SS	12	7	18.3			
	-- very dark grayish brown, gray and yellowish brown after 3'		4	2	SS	14	9	20.9		8000*	
			8	3	ST	22		19.2	110	4000*	
	-- end trace gravel and sand after 12'		12	4	ST	19		23.5	103	7500*	LL=35 PI=12
	-- dark gray, gray and yellowish brown after 17'		16								
				5	SS	12	6	24.6		3500*	
	22.0 666.5		20								
	Loess - Lean CLAY, dark gray, stiff	CL									
	25.0 663.5		24	6	SS	14	3	26.7		5000*	
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- _____ Ft. After Drilling
- _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-6-2018
Boring Completed: 6-6-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.tdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. K3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 689
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY	SAMPLES SPT - N (BLOWS / FT.)	TESTS MOISTURE, %	TESTS DRY DENSITY (PCF)	TESTS UNCONFINED STRENGTH (PSF)	TESTS OTHER
Fill - Lean CLAY, trace sand and gravel, yellowish brown and dark grayish brown (1.0 / 688.0)	CL	0								
Fill - Lean CLAY, trace sand and gravel, dark gray, gray and yellowish brown (3.0 / 686.0)	CL		1	SS	10	7	10.2			
Fill - Lean CLAY, with sand and gravel, very dark brown, dark gray and yellowish brown -- sandy seam with cinders in sample number 2 (6.0 / 683.0)	CL	4	2	ST	16		9.7	120	9000*	
Fill - Lean CLAY, trace gravel and roots, gray and yellowish brown (12.0 / 677.0)	CL	8	3	SS	14	11	25.1			
Loess - SILT, gray and yellowish brown, medium stiff	ML	12	4	SS	14	4	25.3		1200*	
-- becomes stiff after 17'		16								
			5	SS	17	6	23.2		5500*	
-- dark gray after 23'		20								
(25.0 / 664.0)		24	6	SS	14	9	25.1			
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-7-2018
Boring Completed: 6-7-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. K4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elevation (ft): 690.5
Site Datum: TOPO
Drilling Method: HS

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES: NUMBER	TYPE	RECOVERY	SPT - N (BLOWS / FT.)	TESTS: MOISTURE, %	DRY DENSITY (PCF)	UNCONFINED STRENGTH (PSF)	OTHER
Fill - Lean CLAY, dark gray and yellowish brown	CL	0	1	AS			13.8			
			2	SS	12	8	18.3			
3.0 687.5										
Fill - SILT, trace gravel, dark gray and gray	ML	4	3	SS	14	15	13.6			
7.0 683.5										
Loess - SILT, yellowish brown and gray, stiff	ML	8	4	SS	13	5	23.2		4500*	
-- becomes medium stiff after 12'		12								
			5	SS	17	4	23.4		1000*	
15.0 675.5										
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Automatic

Water Level:

- None Ft. While Drilling
- None Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6-7-2018
Boring Completed: 6-7-2018
Rig: 112 **Foreman:** BS
Approved: CH **Job #:** 1-4414

1-4414.geo TSBORE16.fdt 4/25/2017

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA A1-1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 635
Site Datum: Visual from road (626'+/-)
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Reading	OTHER
	FILL -- Lean to fat CLAY, trace sand, gravel, and organic matter, very dark brown	CL-CH	0	1	AS	34.1					
	1.0 634.0		1.5	2	AS	13.4					Field Vane = 2600 psf shear strength
	FILL -- Sandy lean CLAY, trace gravel, yellowish brown, gray, and trace very dark gray	CL	3	3	AS	13.7		3000*			
	4.0 631.0										
	POSSIBLE FILL -- Sandy lean CLAY, trace gravel, yellowish brown	CL	4.5	4	AS	11.5		3000*			
	5.5 629.5										
	Auger Refusal										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

_____ Ft. While Drilling

_____ Ft. After Drilling

_____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 8/23/18

Boring Completed: 8/23/18

Rig:

Foreman: NG

Approved: CH

Job #: 1-4414

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA A1-2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 634
Site Datum: Visual from road (626'+/-)
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
	Upper soils not sampled, field logged as similar to HA A1-1 drilled 3 feet away		0								
			1.5								
			3								
			4.5								
	6.0 628.0										
	POSSIBLE FILL -- Sandy lean CLAY, trace gravel, yellowish brown	CL	6								
				5	AS	9.5					
	7.0 627.0										
	Auger Refusal										Field Vane = 5200+ psf shear strength

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

▽ _____ Ft. While Drilling

▽ _____ Ft. After Drilling

▼ _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 8/23/18
Boring Completed: 8/23/18
Rig: **Foreman:** NG
Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.geo TS-HANDA.tdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA A1-3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 631
Site Datum: Visual from road (626'+/-)
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
	FILL -- Sandy lean CLAY, dark gray (not sampled)	CL	0								
			1.5								
	3.0 628.0 Auger Refusal (likely rocks)		3								

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

▽ _____ Ft. While Drilling

▽ _____ Ft. After Drilling

▼ _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 8/23/18

Boring Completed: 8/23/18

Rig: | **Foreman:** NG

Approved: CH | **Job #:** 1-4414

1-4414 Hand Augers.gpj TSHANDA.fdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA A1-4

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 629
Site Datum: Visual from road (626'+/-)
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
	FILL -- Sandy lean CLAY, trace gravel, dark olive brown, trace yellowish bown and gray	CL	0								
				1	AS	14					
			1.5								
	3.0 626.0 Auger Refusal		3						25+		

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

_____ Ft. While Drilling

_____ Ft. After Drilling

_____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 8/23/18

Boring Completed: 8/23/18

Rig: **Foreman:** NG

Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.geo TSHANDA.tdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA E1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 650.5
Site Datum: Visual from road (645.5'+/-)
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
	FILL -- Lean CLAY, dark gray and yellowish brown	CL	0	1	AS	17.9					
	1.0 649.5										
	LOESS -- SILT, gray and yellowish brown, stiff to very stiff	ML		2	AS	13					
			1.5						6-7-8		
			3	3	AS	16.7					
									9-23-25+		
			4.5								
			6	4	AS	20.8		3500*			
			7.5	5	AS	23.1		2500*			Field Vane = 1900 psf shear strength
				6	AS	21.9					
	9.0 641.5		9								
	Bottom of Boring										Field Vane = 2000 psf shear strength

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

_____ Ft. While Drilling

_____ Ft. After Drilling

_____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 8/23/18

Boring Completed: 8/23/18

Rig: **Foreman:** NG

Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.gpj TSHANDA.fat 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA E2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 661.5
Site Datum: Visual from road (652.5'+/-)
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Reading	OTHER
	FILL -- Lean CLAY, trace organic matter, very dark gray	CL	0	1	AS	21.6					
	1.0 660.5										
	FILL -- Lean CLAY, yellowish brown and trace very dark gray	CL		2	AS	17.3					
	2.5 659.0		1.5						10-13-21		
	LOESS -- SILT, gray and yellowish brown, stiff to very stiff	ML	3	3	AS	13					
			4.5								
				4	AS	11.2					
			6								Field Vane = 2600+ psf shear strength
			7.5								
			9	5	AS	15.3					Field Vane = 3600 psf shear strength
	9.5 652.0										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

▽ _____ Ft. While Drilling

▼ _____ Ft. After Drilling

▼ _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 8/23/18

Boring Completed: 8/23/18

Rig:

Foreman: NG

Approved: CH

Job #: 1-4414

1-4414 Hand Augers.geo TSHANDA.fdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA E3

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 670
Site Datum: Visual from road (666'+/-)
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Reading	OTHER
	FILL -- Lean CLAY, trace organic matter, yellowish brown and very dark gray	CL	0	1	AS	21.7					
	1.0 669.0										
	LOESS -- Lean CLAY, yellowish brown and gray, very stiff	CL	1.5	2	AS	15			12-12-25		
	3.0 667.0										
	LOESS -- SILT, gray and yellowish brown, very stiff	ML	3								
				3	AS	14.1					Field Vane = 2600+ psf shear strength
			4.5								
			6	4	AS	15.6					Field Vane = 2080 psf shear strength
			7.5								
				5	AS	17.9					Field Vane = 2600+ psf shear strength
	9.0 661.0		9								
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

▽ _____ Ft. While Drilling

▼ _____ Ft. After Drilling

▼ _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 8/23/18

Boring Completed: 8/23/18

Rig:

Foreman: NG

Approved: CH

Job #: 1-4414

1-4414 Hand Augers.geo TSI-ANDA.fdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA F1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 648.5
Site Datum: Approx. Topo
Drilling Method: HA

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
FILL -- Lean CLAY, trace sand and gravel, dark grayish brown	CL	0	1	AS	25.3					
1.0 / 647.5										
FILL -- Lean CLAY, brown, gray and very dark brown	CL		2	AS	25.6		1500*			
2.0 / 646.5		1.5								
FILL -- Lean CLAY, trace gravel, gray and dark gray	CL							6-5-6		
			3	AS	25.6		1500*			
3.5 / 645.0 ▽		3								
ALLUVIUM -- Clayey SAND, dark gray and yellowish brown	SC		4	AS	21.8					
4.0 / 644.5										
LOESS -- Lean CLAY, yellowish brown and gray, very stiff	CL		5	AS	24.2		5000*			
		4.5						4-4-4		
5.5 / 643.0										
LOESS -- Lean CLAY, yellowish brown and gray, medium stiff	CL						1500*			
-- color change to gray and dark gray after 6'		6	6	AS	27.9		1000*			
										Field Vane = 920 psf
		7.5								
8.0 / 640.5							750*			
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

- 3.5 Ft. While Drilling
- Ft. After Drilling
- Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 7/24/18
Boring Completed: 7/24/18
Rig: Hand Auger **Foreman:** CH
Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.gpj TSHANDA.fdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA H1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 665.8
Site Datum: Topcon GPS
Drilling Method: HA

DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
FILL -- Lean CLAY, trace gravel, yellowish brown and dark grayish brown	CL	0	1	AS	25.3		2500*			
		1.5						10-10-11		
-- color change to yellowish brown, gray, and trace very dark brown			2	AS	19.2		6500*			
		3								
		4.5	3	AS	25.5		2500*			
		6								
6.3 659.6										
6.5 ALLUVIUM -- Clayey SAND, dark gray 659.3	SC		4	AS	31.9					
ALLUVIUM -- Lean CLAY, trace gravel, dark gray and gray, soft to medium stiff	CL		5	ST	32.3	96	750*			
		7.5								
			6	AS	38.3		500*			Field Vane = 840 psf
9.0 656.8		9								
Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

▽ _____ Ft. While Drilling

▼ _____ Ft. After Drilling

▼ _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 7/24/18

Boring Completed: 7/24/18

Rig: Hand Auger | **Foreman:** CH

Approved: CH | **Job #:** 1-4414

1-4414 Hand Augers.gpj TSHANDA.fdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA I1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 654.8
Site Datum: Eye level to Topcon
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
	FILL -- Lean CLAY, trace gravel, yellowish brown	CL	0	1	AS	19.6					
			1.5					4000*			
				2	AS	18.7		5000*			
	-- color change to yellowish brown and gray after 3.5'		3								
			4.5	3	AS	18.7					
				4	AS	23.2		4000*			
	-- color change to gray after 6'		6								
	6.5 648.3			5	AS	21.6		2500*			
	ALLUVIUM -- Clayey SAND, dark gray	SC		6	AS	29.8					
	7.0 647.8										
	ALLUVIUM -- Sandy lean CLAY, trace gravel and silt seams, gray and dark gray, stiff	CL	7.5	7	AS	26.0		3000*			
	8.8 646.1								6-6-6		
	GLACIAL TILL -- Sandy lean CLAY, trace gravel, light olive brown and gray, very stiff	CL	9	8	AS	13.6		4500*			
	9.5 645.3										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

6.5 Ft. While Drilling

Ft. After Drilling

Ft.

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 7/24/18
Boring Completed: 7/24/18
Rig: Hand Auger **Foreman:** CH
Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.gpj TSHANDA.fdt 4/9/2018

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA J1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 654.3
Site Datum: Topcon
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
	FILL -- Sandy lean CLAY, trace gravel, yellowish brown and very dark brown	CL	0	1	AS	21.1					
	-- end gravel, color change to gray and yellowish brown after 1'		1.5	2	AS	24.4		2500*			
	-- trace gravel and very dark brown color after 2.5'		3					5000*			
	3.8 650.6							1500*			
	FILL -- Sandy lean CLAY, trace gravel, gray, yellowish brown, and very dark brown	CL		3	AS	27.6		1000*			Field Vane = 540 psf
	4.5 649.8		4.5								
	FILL -- Lean CLAY, trace gravel, gray and dark gray	CL		4	AS	29.5					
				5	AS	28.7		500*			
	5.5 648.8										
	FILL -- Sandy lean CLAY, trace gravel, yellowish brown, gray, and very dark brown	CL	6	6	ST	25.2	96	2000*			Field Vane = 920 psf LL=39 PI=18
	6.8 647.6							1500*			
	Glacial Till - Sandy lean CLAY, trace gravel, gray and yellowish brown, very stiff	CL	7.5	7	AS	11.7		8000*			
	8.0 646.3										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

▽ _____ Ft. While Drilling

▽ _____ Ft. After Drilling

▼ _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6/24/2018
Boring Completed: 6/25/2018
Rig: Hand Auger **Foreman:** CH
Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.geo TSHANDA.fdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA K1

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 676.4
Site Datum: Topcon
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Reading	OTHER
	Fill -- Sandy lean CLAY, trace gravel, dark grayish brown	CL	0	1	AS	27					
	1.0 675.4										
	Fill -- Lean CLAY, trace sand and gravel, yellowish brown, gray, and trace very dark brown	CL	1.5	2	AS	21.9		4000*			
			3					3500*			
								5000*			Field Vane = 3480 psf
			4.5	3	AS	20.4		3500*			
								2500*			
	5.8 670.7		6								
	FILL -- Lean CLAY, gray and yellowish brown, medium stiff	CL		4	AS	23.5		1500*			
	6.5 669.9										
	FILL -- SILT, gray and dark gray, medium stiff	ML		5	AS	28.5		1000*			
			7.5	6	ST	29.5		3500*			
	8.3 668.2										Field Vane = 840 psf
	LOESS -- Lean CLAY, gray, dark gray, and yellowish brown, stiff	CL		7	AS	24		3000*			
	-- color change to gray and dark gray after 9'		9								
	10.0 666.4										
	Bottom of Boring										

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

- 9.5 Ft. While Drilling
- _____ Ft. After Drilling
- _____ Ft. _____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6/25/18
Boring Completed: 6/25/18
Rig: Hand Auger **Foreman:** CH
Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.gpj TS-HAND.fdt 4/9/2018

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

BORING LOG No. HA K2

PROJECT Grand Illinois Trail

SITE Silvis & E. Moline, IL

Approx. Surface Elev.: 675.5
Site Datum: Topcon
Drilling Method: HA

GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	DEPTH (ft.)	SAMPLES NUMBER	SAMPLES TYPE	LAB TESTS MOISTURE, %	LAB TESTS DRY DENSITY (PCF)	LAB TESTS UNCONFINED STRENGTH (PSF)	FIELD TESTS DCP - Dynacone (Blows)	FIELD TESTS Static Cone Readiing	OTHER
	FILL -- Lean CLAY, trace sand and gravel, gray, yellowish brown, and dark gray	CL	0	1	AS	25.1		2000*			
	-- color change to yellowish brown, gray, and trace very dark gray after 1.25'		1.5	2	AS	22.8		2500*			
	-- color change to gray, yellowish brown, and dark gray after 2'		3					3500*			
	4.0 671.5										
	FILL -- Lean CLAY, yellowish brown and gray	CL		3	AS	23.3		4500*			
	-- trace very dark gray after 5'		4.5								
	-- trace cinders near 5'		6					1500*			
	7.0 668.5										
	LOESS -- Lean CLAY, gray and olive brown, stiff	CL		4	ST	32.1	89	1000*			
	-- color change to dark gray after 7.5'		7.5	5	AS	26.2		2500*			Field vane = 1600 psf
	9.0 666.5		9								
	Bottom of Boring							2500*			

Notes:

* Calibrated hand penetrometer

Hammer Type: Dynacone

Water Level:

8.5 Ft. While Drilling

____ Ft. After Drilling

____ Ft. ____

TEAM Services
Geotechnical and Construction Material Consultants

Boring Started: 6/25/18
Boring Completed: 6/25/18
Rig: Hand Auger **Foreman:** CH
Approved: CH **Job #:** 1-4414

1-4414 Hand Augers.geo TSHANDA.tdt 4/8/2016

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES; IN-SITU, THE TRANSITION MAY BE GRADUAL.

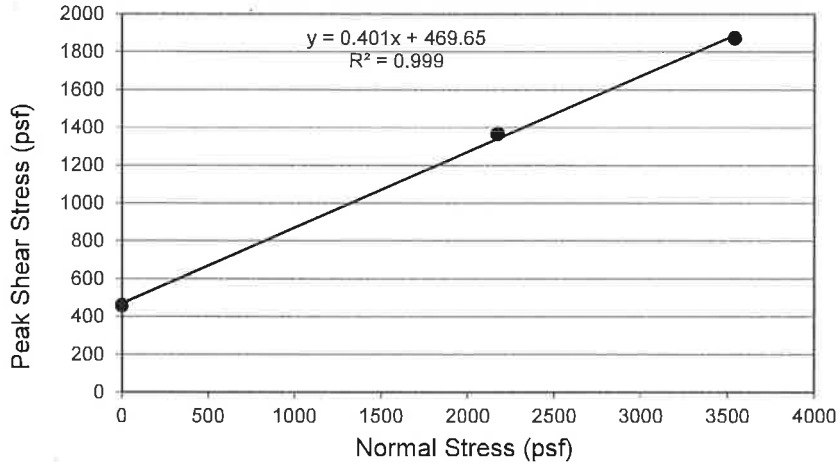
Direct Shear Test Report

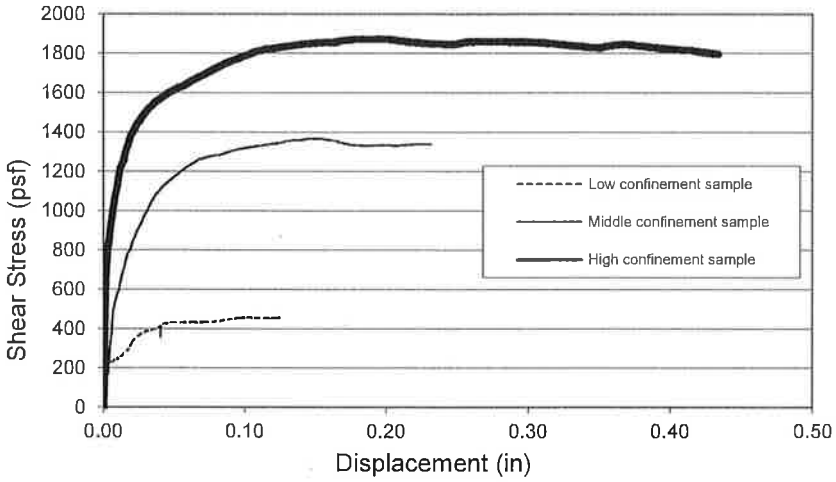
TEAM Services

Boring H2 9-10 Feet	Direct Shear Data		TEAM No. 1-4414
Sample preparation	Undisturbed, carved to size		
Soil classification	CL		
Liquid limit, Plasticity index	44, 22		
Specific gravity	2.7	(assumed)	
Sample height (in)	0.996		
Sample diameter (in)	2.502		
Initial moisture content (%)	25.6	23.9	24.7
Initial DUW (pcf)	99.0	101.6	101.3
Initial void ratio	0.70	0.66	0.66
Initial saturation (%)	98	98	100
Final moisture content (%)	25.1	24.6	24.8
Final DUW (pcf)	98.7	105.7	105.0
Final void ratio	0.71	0.59	0.61
Final saturation (%)	96	100	100
Displacement rate (.0001 inch/min)	9	9	9
50% primary consolidation (sec)	NA	130	170
Maximum Shear Stress (psf)	460	1368	1874
Normal Stress at Failure (psf)	0	2176	3542

Effective Drained Friction Angle, ϕ' : **21.9** °

Effective Drained Cohesion, C' : **470** psf





717 SE 6th Street
Des Moines, Iowa 50309

P: 515-282-8818
F: 515-282-8741

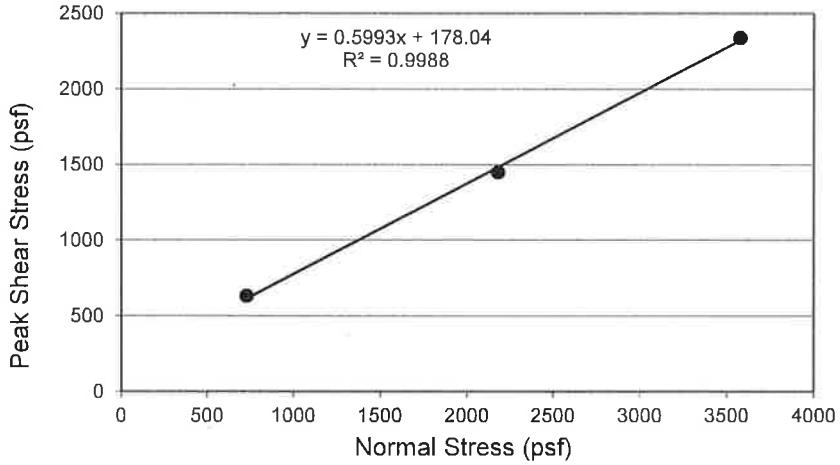
9/26/2018

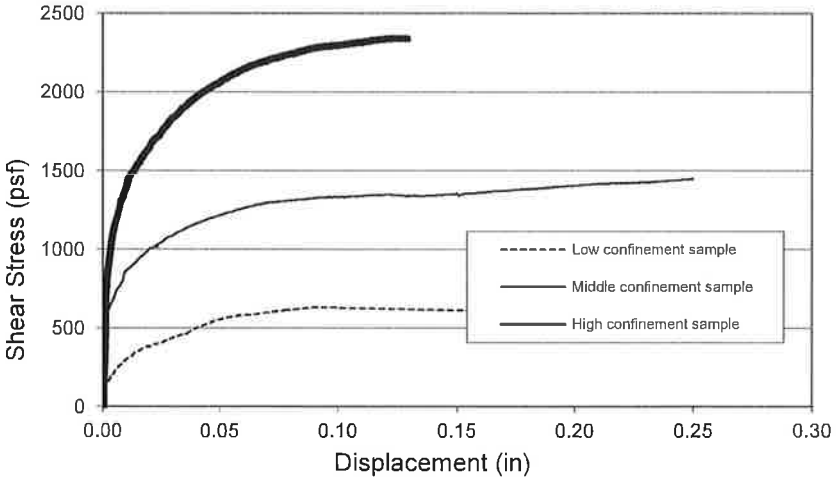
Direct Shear Test Report

TEAM Services

Boring H2 S8 23-25 Feet	Direct Shear Data		TEAM No. 1-4414
Sample preparation	Undisturbed, carved to size		
Soil classification	ML		
Liquid limit, Plasticity index	32, 8		
Specific gravity	2.7	(assumed)	
Sample height (in)	0.996		
Sample diameter (in)	2.502		
Initial moisture content (%)	26.2	26.3	25.2
Initial DUW (pcf)	96.6	96.4	96.6
Initial void ratio	0.75	0.75	0.75
Initial saturation (%)	95	95	91
Final moisture content (%)	26.0	25.8	25.8
Final DUW (pcf)	97.7	100.3	100.9
Final void ratio	0.73	0.68	0.67
Final saturation (%)	97	100	100
Displacement rate (.0001 inch/min)	20	20	20
50% primary consolidation (sec)	23	43	18
Maximum Shear Stress (psf)	633	1450	2340
Normal Stress at Failure (psf)	730	2180	3578

Effective Drained Friction Angle, ϕ' :	**30.9** °
Effective Drained Cohesion, C' :	**178** psf





717 SE 6th Street
Des Moines, Iowa 50309

P: 515-282-8818
F: 515-282-8741

9/26/2018

Direct Shear Test Report

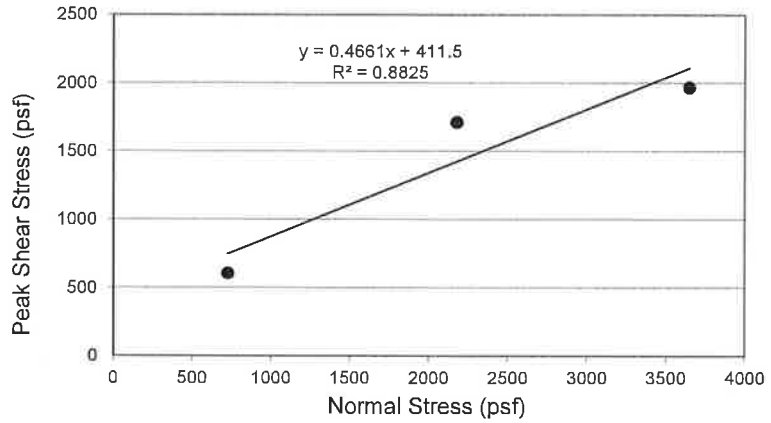
TEAM Services

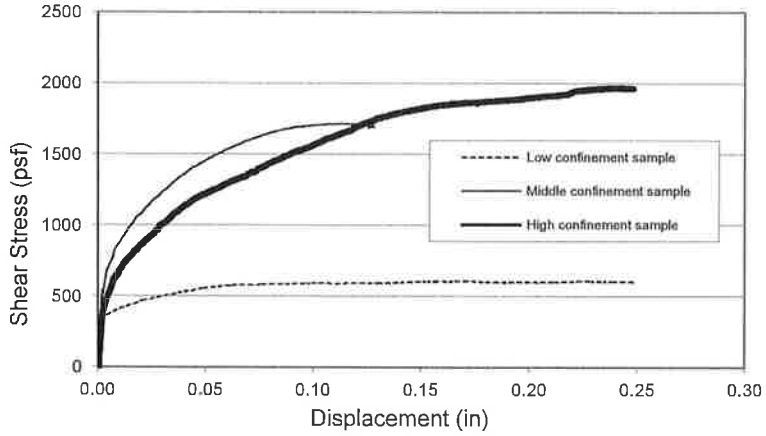
HA J1 S6 5.5-6 Feet Direct Shear Data TEAM No. 1-4414

Sample preparation	Undisturbed, carved to size		
Soil classification	CL		
Liquid limit, Plasticity index	39, 18		
Specific gravity	2.7	(assumed)	
Sample height (in)	0.996		
Sample diameter (in)	2.502		
Initial moisture content (%)	34.4	23.1	34.5
Initial DUW (pcf)	88.3	101.1	85.9
Initial void ratio	0.91	0.67	0.96
Initial saturation (%)	100	93	97
Final moisture content (%)	33.0	23.2	34.2
Final DUW (pcf)	94.8	106.9	96.4
Final void ratio	0.78	0.58	0.75
Final saturation (%)	100	100	100
Displacement rate (.0001 inch/min)	10	15	8
50% primary consolidation (sec)	110	28	180
Maximum Shear Stress (psf)	605	1713	1968
Normal Stress at Failure (psf)	725	2178	3646

Effective Drained Friction Angle, ϕ' : **25.0** °

Effective Drained Cohesion, C' : **411** psf





Note: Fill sample was variable. Low and high confinement samples were a similar, most very dark material which the Atterberg limits test was conducted on. The middle confinement sample was more yellowish brown and exhibited higher density, lower moisture content, and plotted higher on the shear stress vs. normal stress table. If this different material type is excluded form the data, the resultant cohesion is **267 psf** which the friction angle stays the same at **25.0 degrees**.

717 SE 6th Street
Des Moines, Iowa 50309

P: 515-282-8818
F: 515-282-8741

9/26/2018

Direct Shear Test Report

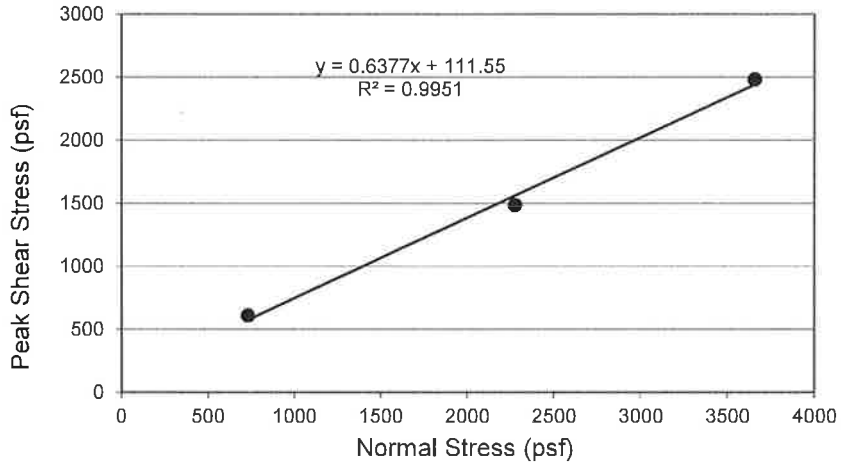
TEAM Services

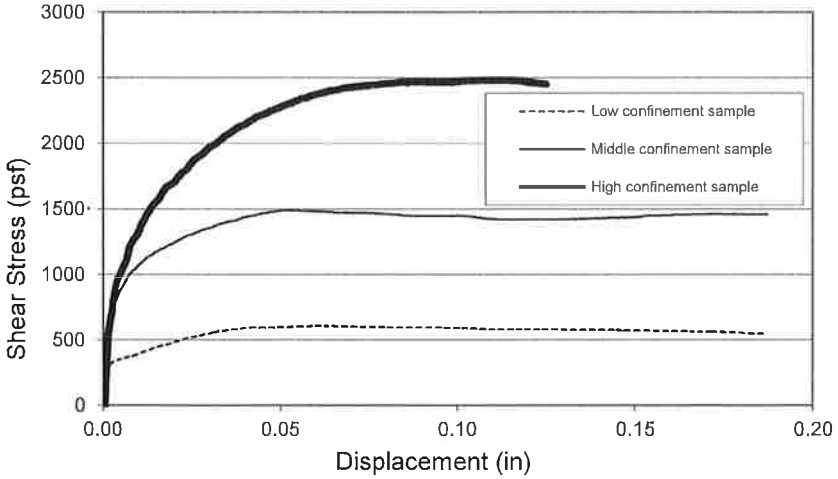
Boring I2 13.5-15.5 Feet Direct Shear Data TEAM No. 1-4414

Sample preparation	Undisturbed, carved to size		
Soil classification	CL		
Liquid limit, Plasticity index	31, 8		
Specific gravity	2.7	(assumed)	
Sample height (in)	0.996		
Sample diameter (in)	2.502		
Initial moisture content (%)	21.8	19.6	19.6
Initial DUW (pcf)	105.4	109.8	110.1
Initial void ratio	0.60	0.53	0.53
Initial saturation (%)	98	99	100
Final moisture content (%)	22.6	20.6	18.9
Final DUW (pcf)	107.2	112.3	114.3
Final void ratio	0.57	0.50	0.47
Final saturation (%)	100	100	100
Displacement rate (.0001 inch/min)	10	20	20
50% primary consolidation (sec)	85	35	43
Maximum Shear Stress (psf)	612	1488	2484
Normal Stress at Failure (psf)	729	2277	3657

Effective Drained Friction Angle, ϕ' : **32.5** °

Effective Drained Cohesion, C' : **112** psf





717 SE 6th Street
Des Moines, Iowa 50309

P: 515-282-8818
F: 515-282-8741

9/26/2018

Direct Shear Test Report

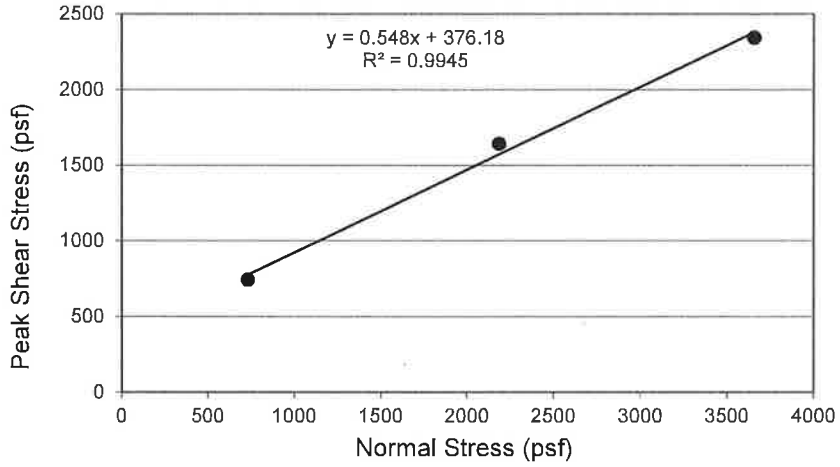
TEAM Services

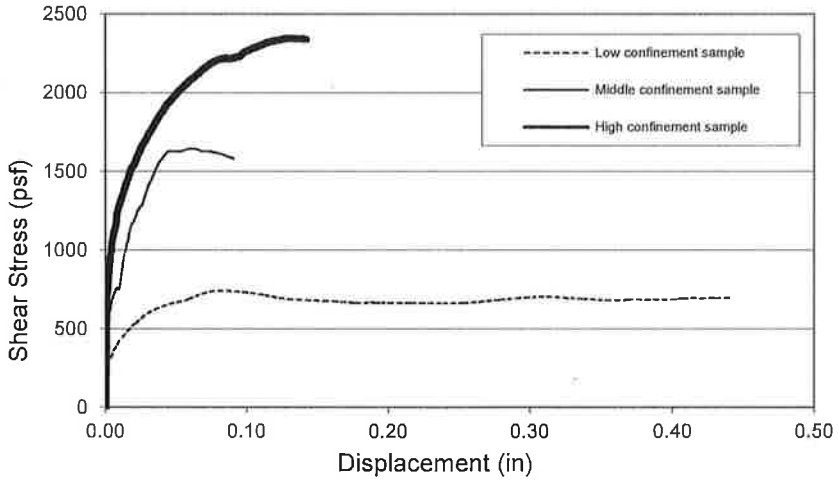
Boring K2 13.5-15.5 Feet Direct Shear Data TEAM No. 1-4414

Sample preparation	Undisturbed, carved to size		
Soil classification	CL		
Liquid limit, Plasticity index	35, 12		
Specific gravity	2.7	(assumed)	
Sample height (in)	0.996		
Sample diameter (in)	2.502		
Initial moisture content (%)	22.9	21.5	22.9
Initial DUW (pcf)	99.1	103.7	103.5
Initial void ratio	0.70	0.62	0.63
Initial saturation (%)	88	93	98
Final moisture content (%)	24.2	22.3	22.6
Final DUW (pcf)	98.8	105.3	108.2
Final void ratio	0.71	0.60	0.56
Final saturation (%)	93	100	100
Displacement rate (.0001 inch/min)	10	10	10
50% primary consolidation (sec)	5	100	100
Maximum Shear Stress (psf)	744	1643	2346
Normal Stress at Failure (psf)	734	2187	3657

Effective Drained Friction Angle, ϕ' : **28.7** °

Effective Drained Cohesion, C' : **376** psf



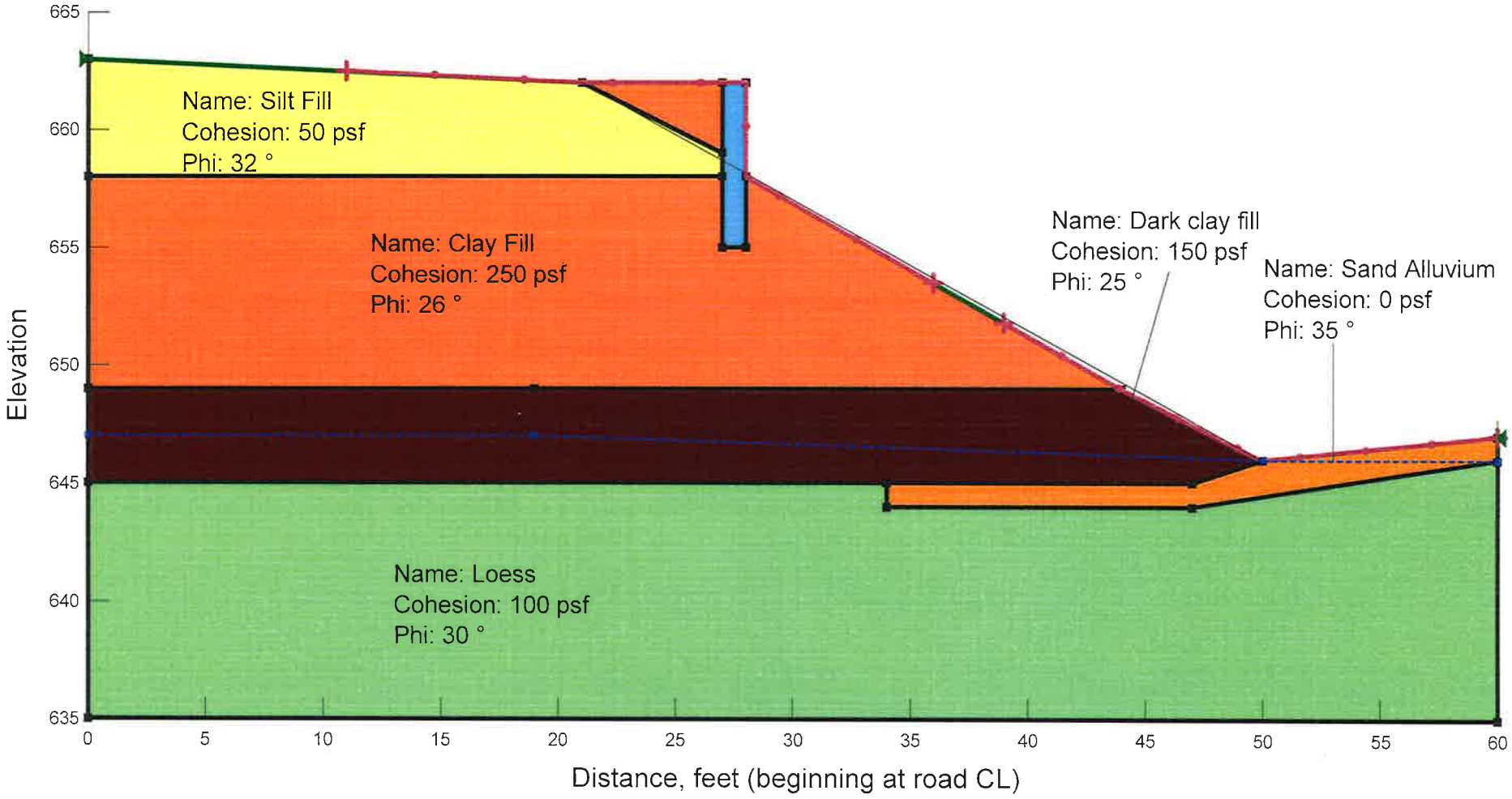


717 SE 6th Street
Des Moines, Iowa 50309

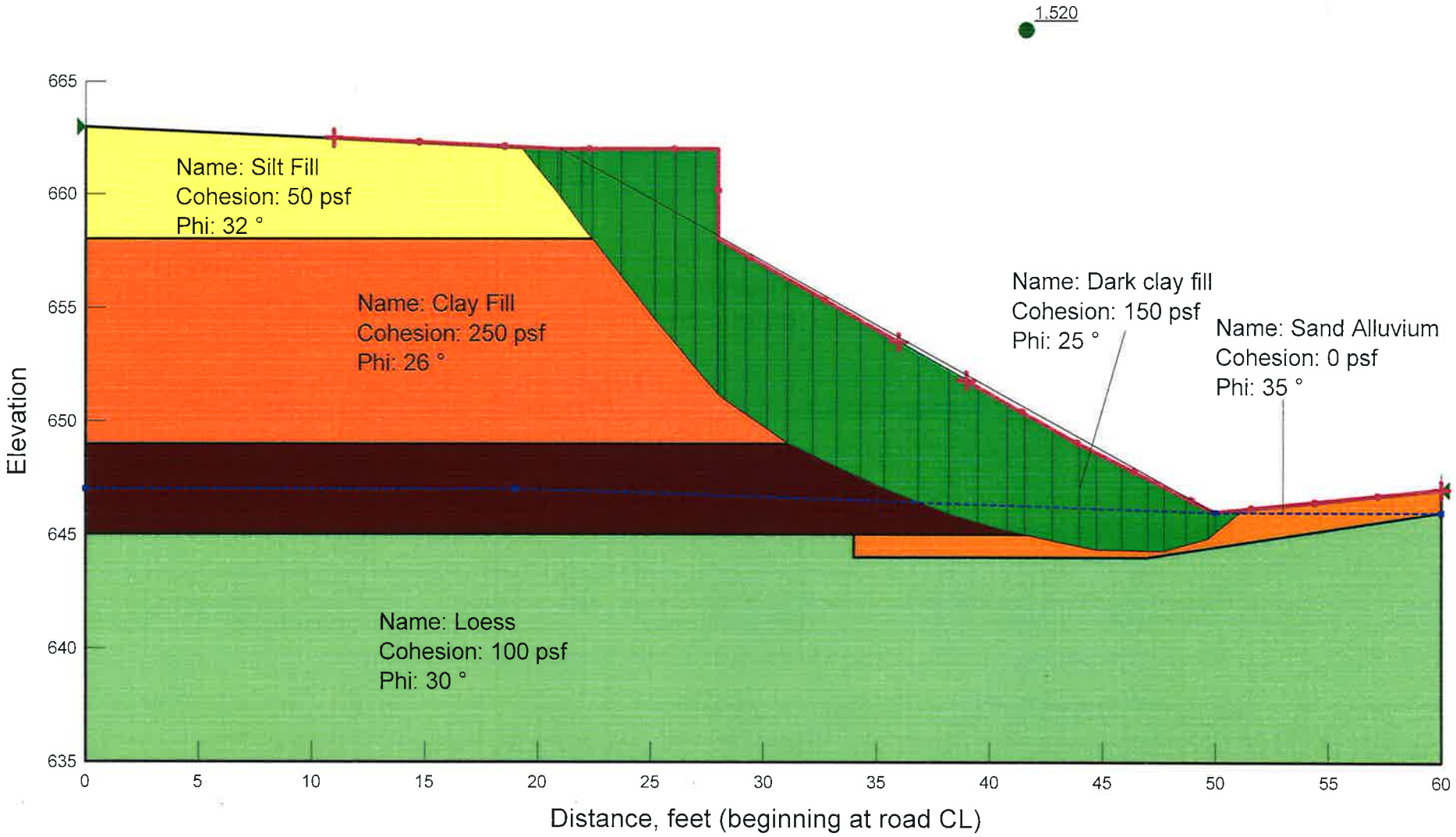
P: 515-282-8818
F: 515-282-8741

9/26/2018

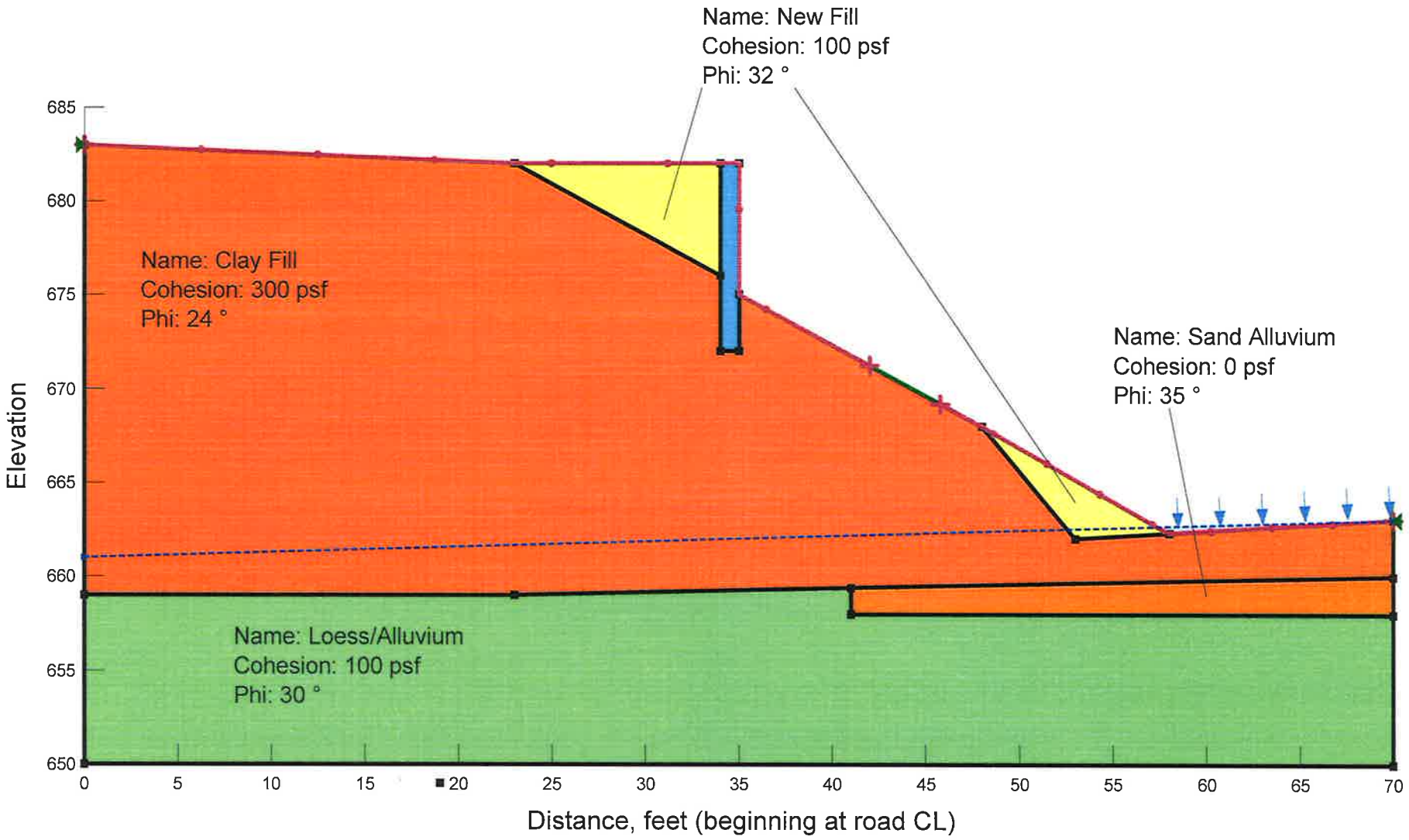
Area F: Station 74+80



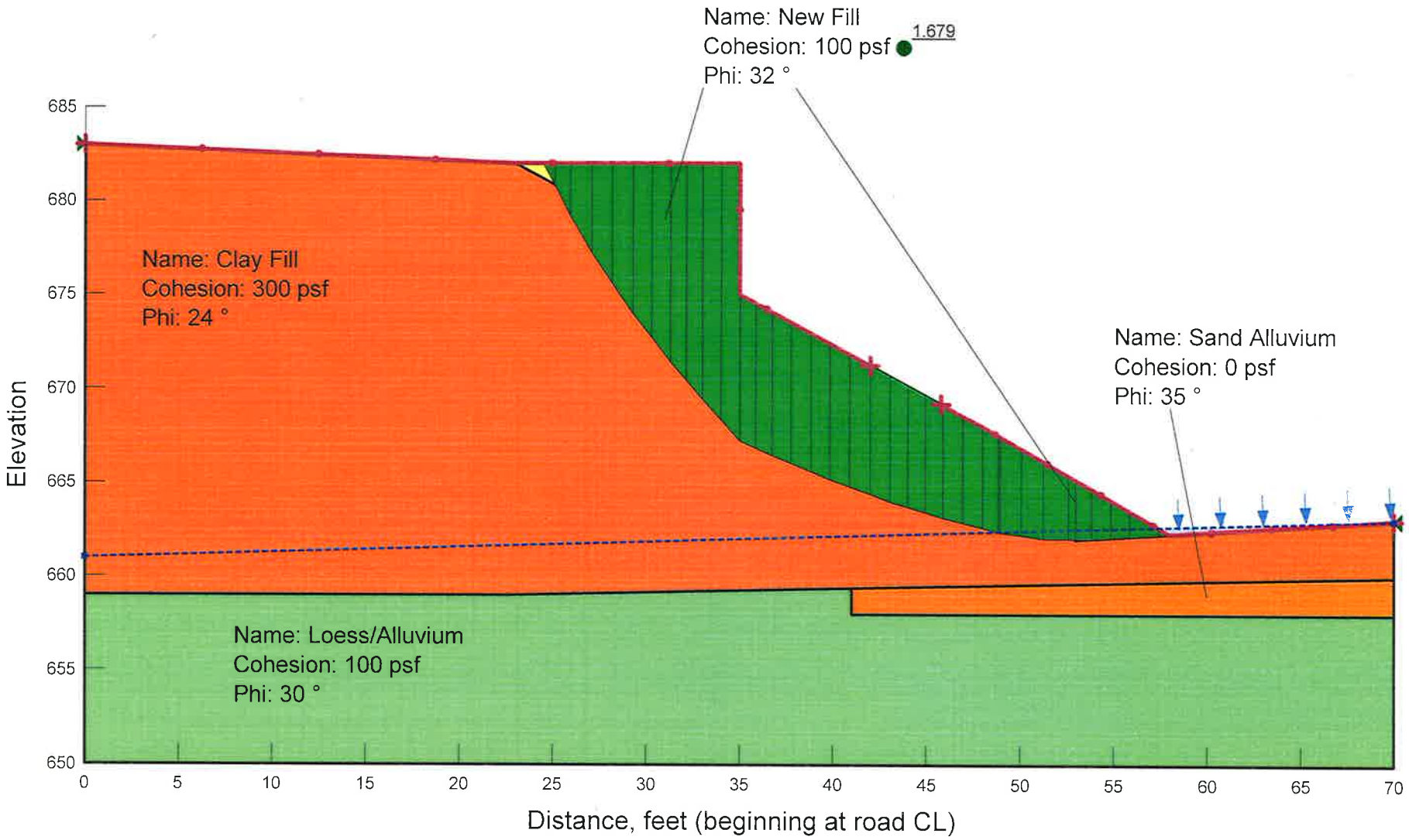
Area F: Station 74+80



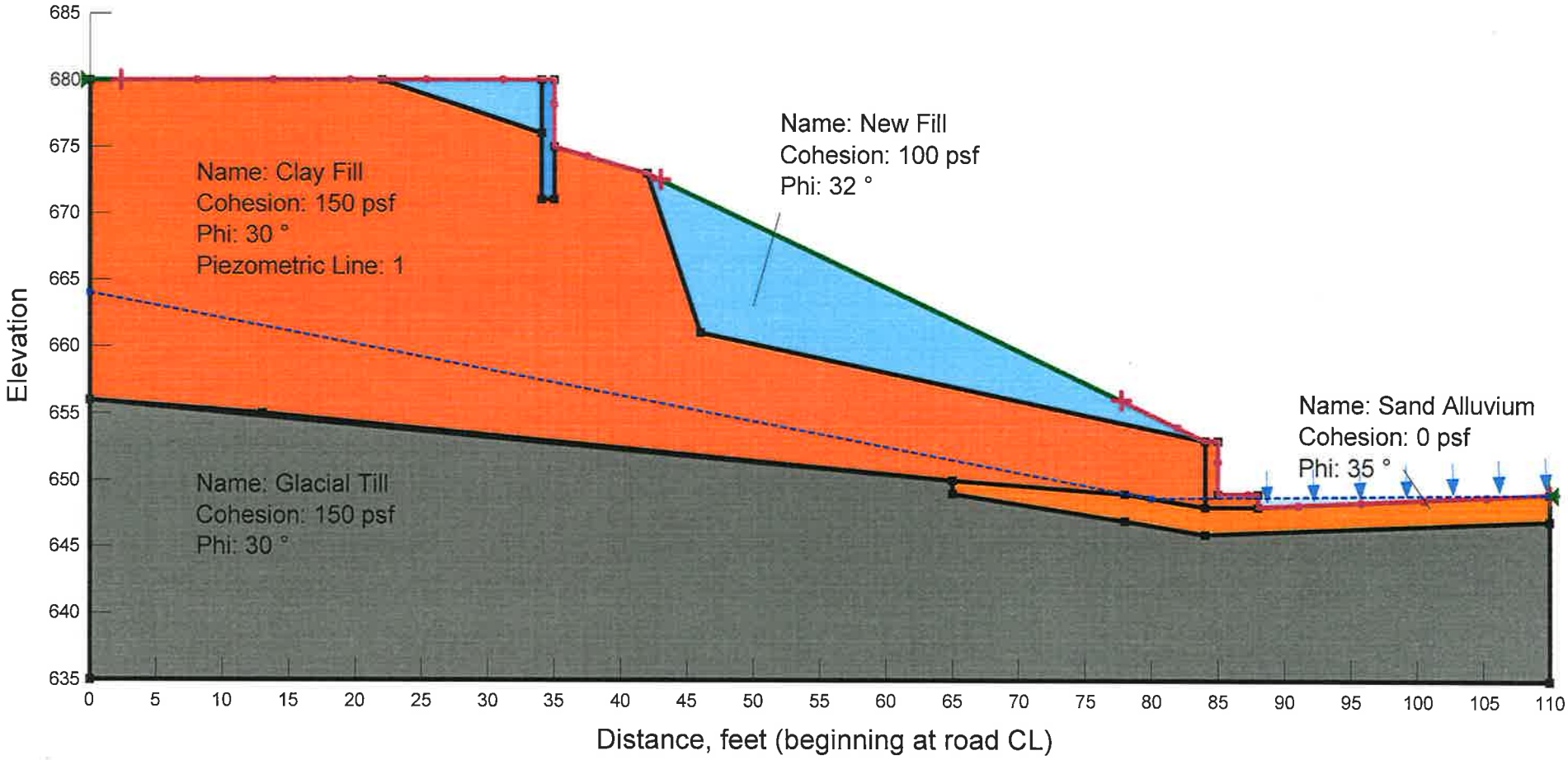
Area H: Station 87+15



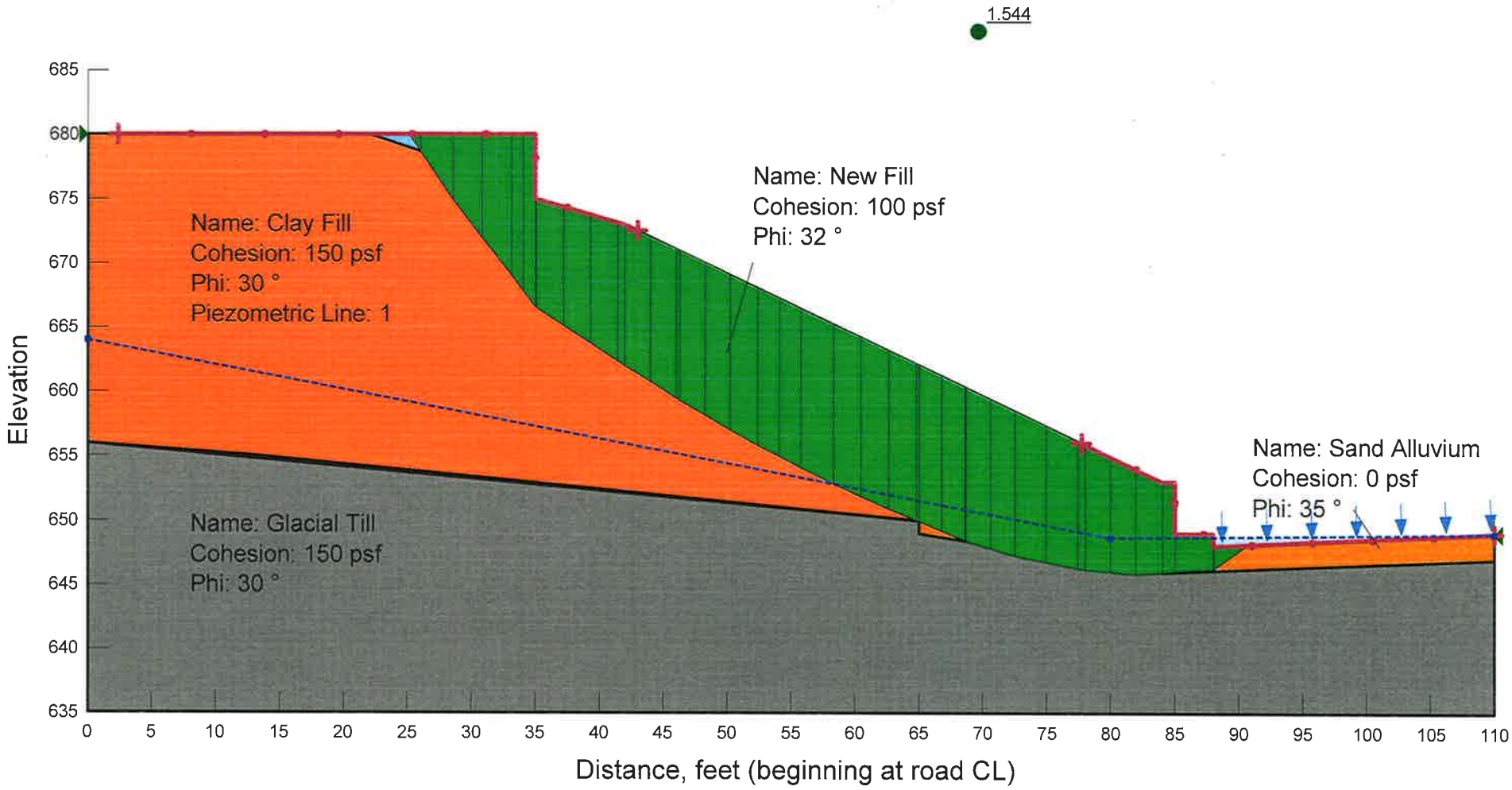
Area H: Station 87+15



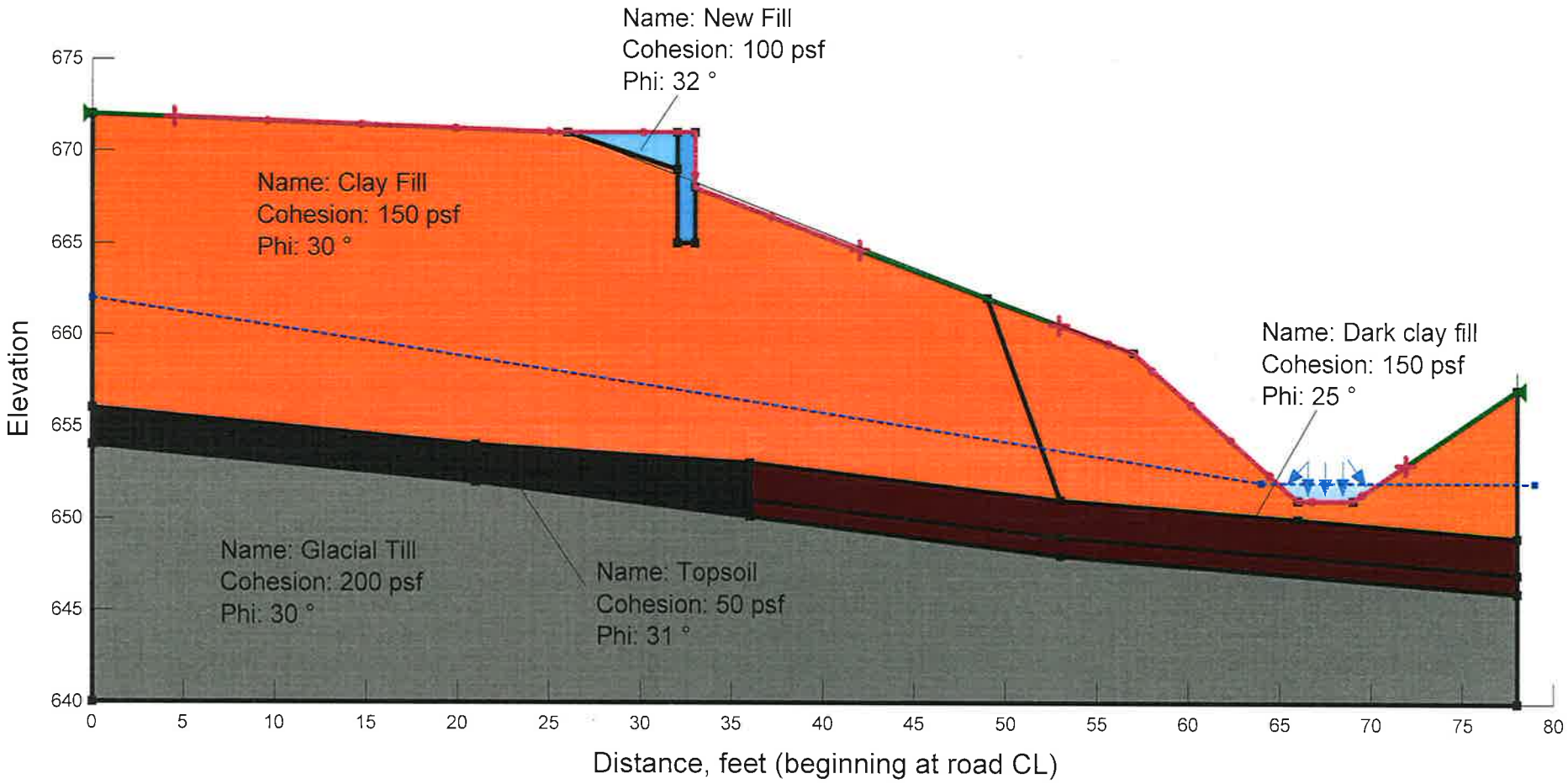
Area I: Station 100+30



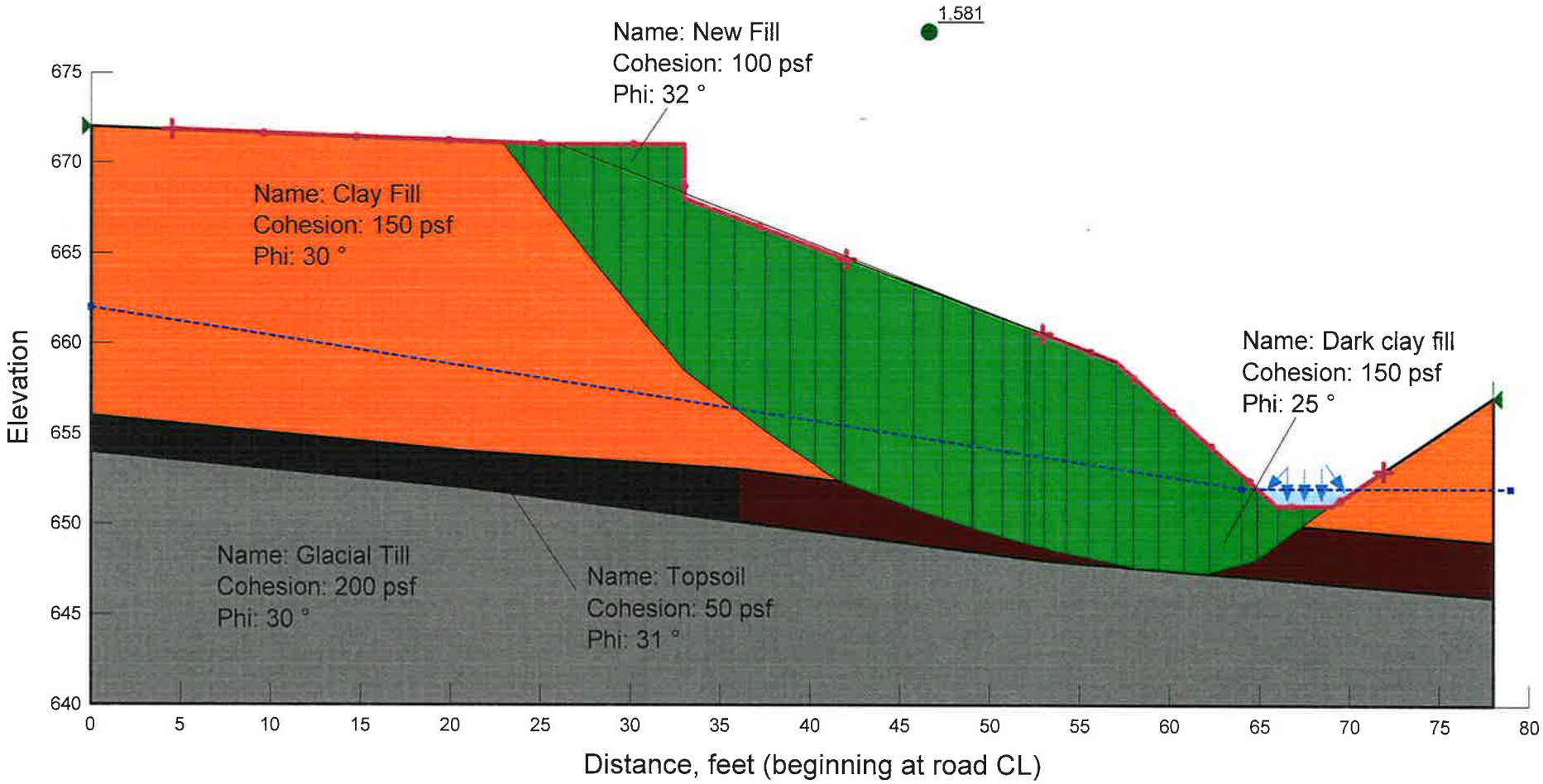
Area I: Station 100+30



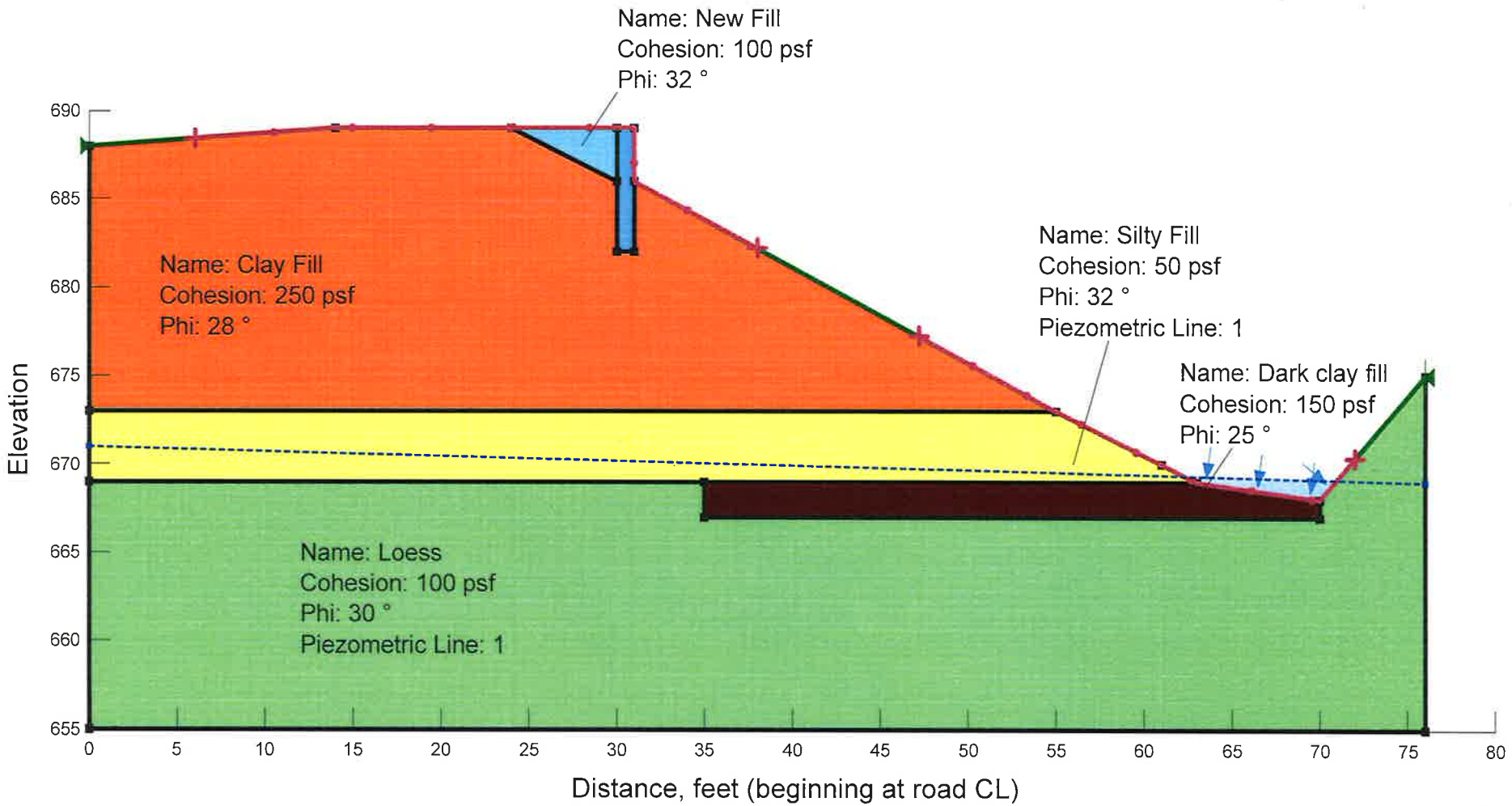
Area J: Station 109+20



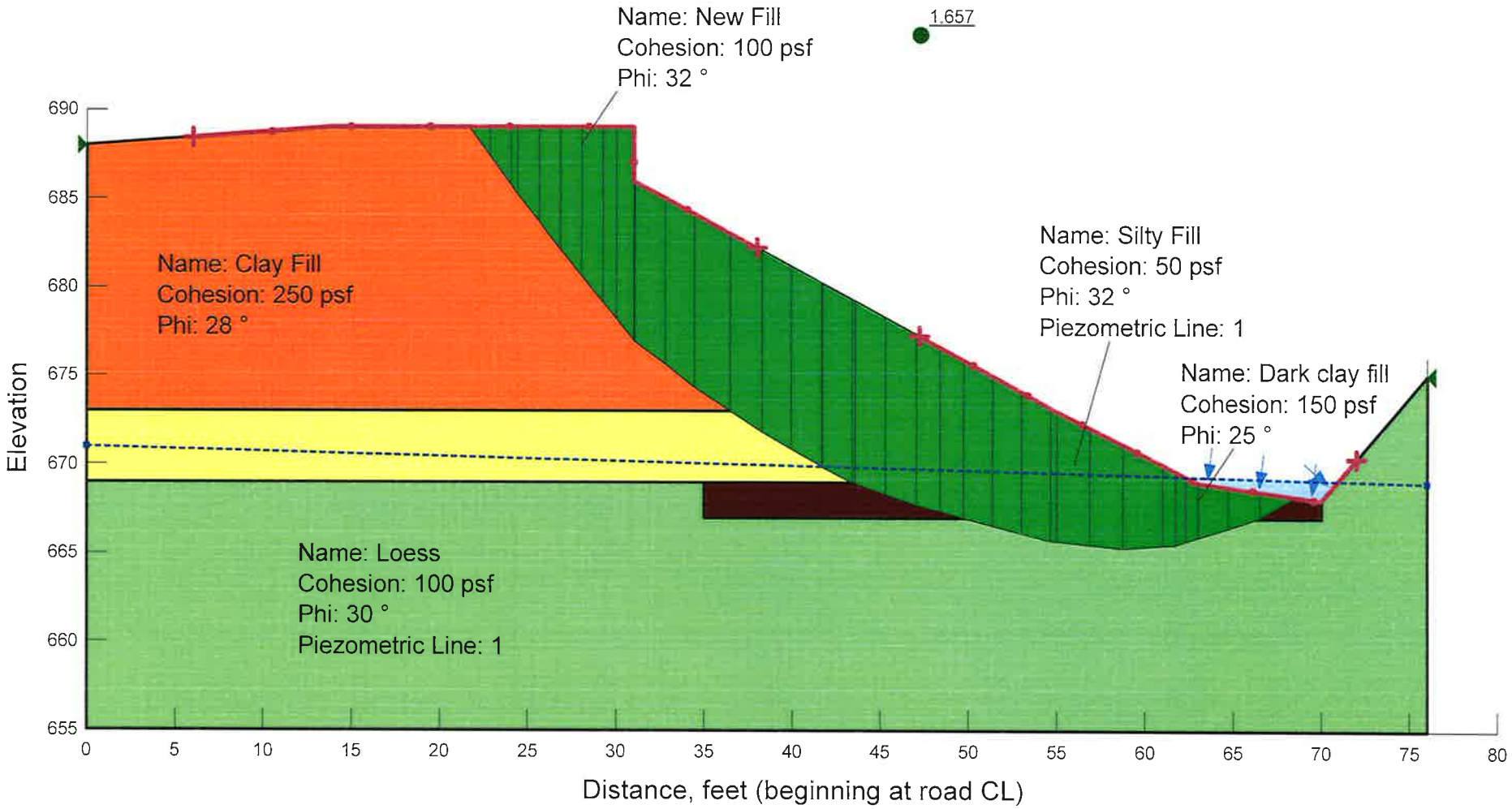
Area J: Station 109+20



Area K: Station 139+80



Area K: Station 139+80



UNIFIED SOIL CLASSIFICATION SYSTEM

TEAM *Services*

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]					Soil Classification	
					Group Symbol	Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]		GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]		GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH		GM	Silty gravel[F, G, H]
			Fines classify as CL or MH		GC	Clayey gravel[F, G, H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[E]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]		SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3$[E]		SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH		SM	Silty sand[G, H, I]
			Fines classify as CL or CH		SC	Clayey sand[G, H, I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]		CL	Lean clay[K, L, M]
			PI < 4 or plots below "A" line[J]		ML	Silt[K, L, M]
		organic	Liquid limit – oven dried	< 0.75	OL	Organic clay[K, L, M, N]
			Liquid limit – not dried			Organic silt[K, L, M, O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line		CH	Fat clay[K, L, M]
			PI plots below "A" line		MH	Elastic silt[K, L, M]
		organic	Liquid limit – oven dried	< 0.75	OH	Organic clay[K, L, M, P]
			Liquid limit – not dried			Organic silt[K, L, M, Q]
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:

SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

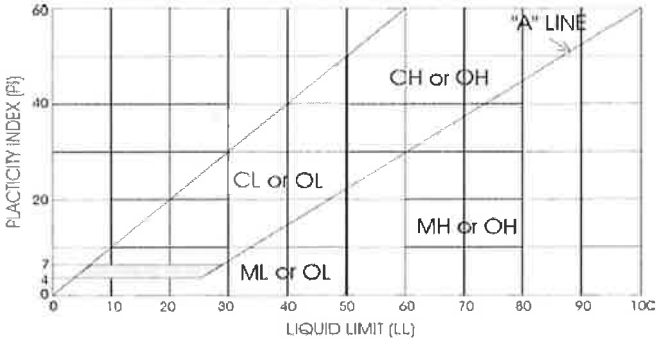
For classification of fine-grained soils and fine grained fraction of coarse-grained soils.

Equation of "A" Line:
Horizontal at PI = 4 to LL + 25.5.
then PI = 0.73 (LL-20)

[E]
$Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

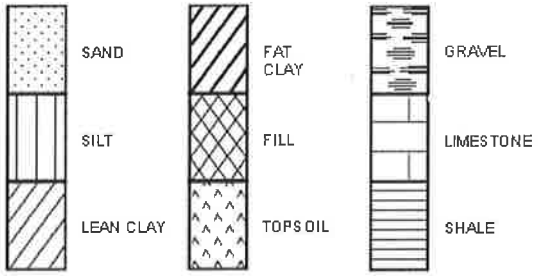
[F] If soil contains $\geq$ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains > 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plots in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
[L] If soil contains $\geq$ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains $\geq$ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI $\geq$ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



GENERAL NOTES

SOIL and ROCK TYPES



DRILLING & SAMPLING SYMBOLS

SS Split Spoon - 1 1/2" I.D., 2" O.D., unless otherwise noted
ST Thin-Walled Tube - 3" O.D., unless otherwise noted
PA Power Auger
HA Hand Auger
DB Diamond Bit - 4", N, B
AS Auger Sample
HS Hollow Stem Auger
WS Wash Sample
RB Rock Bit
BS Bulk Sample
DC Dutch Cone
WB Wash Bore
AR Air Rotary

CONSISTENCY OF FINE-GRAINED SOILS
(major portion passing No. 200 sieve)

Consistency	Unconfined Compressive Strength, Qu, psf	N-Blows/ft* (Approx. Correlation)
Very Soft	< 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,001 - 2,000	5 - 8
Stiff	2,001 - 4,000	9 - 15
Very Stiff	4,001 - 8,000	16 - 30
Hard	8,001 - 16,000	31 - 50
Very Hard	> -16,000	50 +

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N-Blows/ft. *
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	50 - 80
Extremely Dense	80 +

* Standard "N" Penetration Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch OD split spoon, except where noted.

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) (of components also present in sample)	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) (of components also present in sample)	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Size Range
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300 mm to 4.75 mm)
Gravel	3 in. to #4 sieve (75 mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75 mm to 0.075 mm)
Silt or Clay	Passing #200 sieve (0.075 mm)

WATER LEVELS: WD = While Drilling AD = After Drilling

▽ Depth groundwater first encountered during drilling

▼ Groundwater level after 24 hours (unless otherwise noted, i.e. "AD" -- after drilling)

TERMS DESCRIBING SOIL STRUCTURE

Parting:	paper thin in size	Fissured:	containing shrinkage cracks, frequently filled with fine sand or silt, usually more or less vertical.
Seam:	1/8" to 3" in thickness		
Layer:	greater than 3" in thickness	Interbedded:	composed of alternate layers of different soil types.
Ferrous:	containing appreciable quantities of iron	Laminated:	composed of thin layers of varying color and texture.
Well-Graded:	having wide range in grain size and substantial amounts of all intermediate sizes.	Slickensided:	having inclined planes of weakness that are slick and glossy in appearance.
Poorly-Graded:	predominately one grain size or having a range of sizes with some intermediate sizes missing.	NOTE:	Clays possessing slickensided or fissured structure may exhibit lower unconfined strength than indicated above. Consistency of such soil is interpreted using the unconfined strength along with pocket penetrometer results.