PRELIMINARY SUBSURFACE EXPLORATION
PROPERTY TRANSFER DUE DILIGENCE
BANNISTER FEDERAL COMPLEX
KANSAS CITY, MISSOURI

Prepared for:

LUTJEN, INC.
North Kansas City, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
Overland Park, Kansas

Geotechnology, Inc. Project No. J023703.02

October 8, 2015

October 8, 2015 J023703.02

Mr. Scott Cargill, P.E.
Lutjen, Inc.
1301 Burlington, Suite 100
North Kansas City, Missouri 64116

PRELIMINARY SUBSURFACE EXPLORATION
PROPERTY TRANSFER DUE DILIGENCE
BANNISTER FEDERAL COMPLEX
KANSAS CITY, MISSOURI

Dear Mr. Cargill:

Presented in this report are the results of a preliminary subsurface exploration conducted for the referenced project. This report includes our understanding of the project, observed site conditions, general geotechnical considerations, and support data as listed in the Table of Contents. Additional subsurface exploration will be required for final design.

It has been our pleasure to provide these services to you, and we would welcome the opportunity to provide other services during the course of the project. Please contact us if you need further information or clarification about this document.

Respectfully submitted,

GEOTECHNOLOGY, INC.

STATE OF MISSOURI
MATTHEW H. McQUALITY
NUMBER
PE-28930
REGISTERED PROFESSIONAL ENGINEER

Matt McQuality, P.E.
Branch Manager

Oct 8, 2015

MHM/FC:mhm/ljd

Copies submitted: (2)

J023703.02

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SECTION I - PROJECT DATA

AUTHORIZATION

The services documented in this report were provided in accordance with the terms, conditions and scope of services described in Geotechnology, Inc.'s (Geotechnology) revised proposal P023703.02 dated August 10, 2015. A representative of Lutjen, Inc. (Lutjen) authorized our services.

PURPOSE AND SCOPE OF SERVICES

The purpose of our services was to provide information to characterize the site and provide general geotechnical considerations for site grading, utilities and detention ponds. Briefly, our services consisted of review of geotechnical field boring logs prepared by others, visual classification of the soil samples, laboratory testing, engineering evaluation, and preparation of this preliminary report. Important information prepared by the Geotechnical Business Council for studies of this type is presented in Appendix A for your review.

PROJECT AND SITE DESCRIPTION

The overall project consists of the redevelopment of the Bannister Federal Complex in Kansas City, Missouri. The project site is bordered by Bannister Road on the south; Troost Avenue on the west; undeveloped woodlands on the north, and railroad siding on the east. Based on available mapping, the site topography includes approximately 10 feet of relief with a gentle slope down from west to east. The location and general topography of the area as per the 2014 U.S.G.S. map of the vicinity are shown on Plate 1.

Preliminary plans include demolition of structures and construction of new buildings, pavements and 10- to 12-foot deep detention basins. Excavated soils from the detention basins will be used to fill basements of buildings that will be demolished. The storm sewer planned north of the site will have a flowline from El 784 down to El 776. Further details of the site redevelopment are not available.

SECTION II - FIELD EXPLORATION AND LABORATORY TESTING

FIELD EXPLORATION

The field exploration consisted of drilling 13 borings, designated as Borings B-1 through -13, at approximately the locations shown on Plate 2. A licensed surveyor retained by Lutjen located the borings, and the elevations recorded at the boring locations are shown on boring logs presented in Appendix B.

The borings were drilled by Odyssey Environmental Services, Inc. (Odyssey) using a track-mounted Geoprobe 7822DT drill rig equipped with 4 1/4-inch hollow stem augers. Standard Penetration Tests (SPT's) were performed using an automatic hammer. Split-spoon samples were collected at the depths indicated on the boring logs presented in Appendix B. An explanation of the terms and symbols used on the boring logs is also provided in Appendix B.

A representative of Odyssey logged the borings. Split-spoon samples and field boring logs were delivered to our office by a representative of Lutjen. A representative of Geotechnology visually classified the samples. The field boring logs have been edited by a professional engineer to incorporate results of the visual classifications and the laboratory tests.

Unless noted on the boring logs, the lines designating the changes between various strata represent approximate boundaries. The transition between materials may be gradual or may occur between recovered samples. The stratification given on the boring logs, or described herein, is for use by Geotechnology in its analyses and should not be used as the basis of design or construction cost estimates without realizing that there can be variation from that shown or described.

The boring logs and related information depict subsurface conditions only at the specific locations and time where sampling was conducted. The passage of time may result in changes in conditions, interpreted to exist, at or between the locations where sampling was conducted.

LABORATORY TESTING

Laboratory testing was performed on soil samples to estimate engineering and index properties. Moisture contents and Atterberg limits tests were performed on selected samples. Laboratory test results are presented on the boring logs.

SECTION III - SUBSURFACE CONDITIONS

STRATIGRAPHY

In general, the upper stratigraphy consists of approximately 6 inches of asphalt pavement underlain by 2 to 4 feet of fill. Asphalt pavement was not reported at Borings B-1, -2, -7, -10 and -11. At Boring B-3, fill was sampled to the 15-foot depth of exploration. Sampled fill included lean and fat clay, crushed limestone and fragments of shale, sandstone and limestone. SPT N-values in the fill are variable and range from 1 to 39 blows per foot (bpf). Fill moisture contents range from 6 to 29 percent.

Below the fill, the natural soil stratigraphy generally consists of medium stiff and stiff, lean and fat clay to the depths explored (15 feet). At the sample depth of 15 feet, however, the natural soil has a very soft to soft consistency. At Boring B-2 weathered sandstone and shale was reported below a depth of approximately 11 feet and split-sampler refusal occurred at approximately 13 feet. Auger refusal material was not encountered.

GROUNDWATER

Groundwater was encountered in the borings at the depths indicated in the table below. Groundwater levels may not have stabilized, particularly in less permeable cohesive soil, prior to backfilling. Consequently, the indicated groundwater levels, or lack thereof, may not represent present or future levels. Groundwater may be perched near the top of rock. Water may collect in permeable pockets of fill, in pavement base course and in utility trenches. Groundwater levels may vary significantly over time due to the effects of seasonal variation in precipitation, recharge, and water level of the nearby Blue River or other factors not evident at the time of exploration. Therefore, groundwater levels during construction may be higher or lower than the levels indicated on the boring logs.

GROUNDWATER DATA			
Boring	Surface Elevation	Approximate Groundwater Levels	
		Depth, feet	Elevation
B-1	El 787.19	13	El 774
B-5	El 798.96	8	El 791
B-6	El 799.37	13	El 786
B-10	El 799.85	2	El 798
B-12	El 799.12	13	El 786

SECTION IV – SITE GRADING AND UTILITY CONSIDERATIONS

Considerations for geotechnical aspects of site development are presented herein to assist the client with planning and preliminary design of the project. Additional subsurface exploration and geotechnical evaluation will be required to provide geotechnical recommendations for the final design. Subsurface features that will influence the geotechnical approach to the proposed development include the presence of existing fill, highly plastic clay, soft soils, the depth to rock and the depth to groundwater. Discussions of each subsurface feature are presented in the following paragraphs.

<u>Existing Fill</u>. Fill was encountered at the boring locations. The presence of fill complicates the project. The fill should be considered uncontrolled and potentially compressible. The risks associated with supporting foundations and floor slabs on uncontrolled fill include total and differential settlement in excess of tolerable limits. Differential settlement can lead to cosmetic and structural distress including substantial cracking in walls and floor slabs. In addition, portions of the existing fill are highly plastic. Floor slabs and pavements supported on highly plastic soil can move upward and downward, and such movements can result in distortion, cracking, and structural damage. Site development must consider fill remediation. Due to the limited fill encountered (typically 2 to 4 feet deep), full depth remediation is recommended. Fill overexcavations should be backfilled with engineered fill. Fill remediation should extend at least 10 feet beyond the perimeter of planned structures.

<u>High Plasticity Clay</u>. Highly plastic clays were encountered in the borings. These soils, commonly referred to as “fat” or “expansive” soils, expand or swell as their moisture content increases. However, these soils also “contract” or “shrink” as their moisture content decreases. Lightly loaded structural features such as floor slabs and pavements can undergo heaving and distress unless these soils are mitigated. Removing and replacing the potentially expansive soil with a low plasticity material or chemically-treated soil can reduce the swell potential and should be considered during the planning for the development.

<u>Soft Soils</u>. In general, the soils become softer with depth. Bottoms of deep excavations may consist of soft soils sensitive to disturbance. Placement of a crushed rock working platform on the bottom of deeper excavations may be required in some areas to facilitate construction.

<u>Rock Excavation</u>. Weathered rock was encountered at a depth of approximately 11 feet in Boring B-2. Consequently, deep excavations may encounter bedrock. Weathered rock encountered in mass excavations can sometimes be excavated with heavy trackhoes or bulldozers equipped with rippers. However, it is likely that conventional excavating equipment may not be able to excavate weathered rock, and that hard rock removal techniques, such as line drilling, hydraulic chipping or splitting, may be required. Hard rock removal techniques should be anticipated in confined excavations; e.g. trenches and footing excavations. Blasting is not recommended due to the urban proximity of the project.

<u>Groundwater</u>. Groundwater was encountered at depths of 2 to 13 feet. Consequently, excavations may encounter groundwater. Sump/pump pits can typically be used to control groundwater in excavations in fine-grained soil. If differing conditions occur during construction, alternate dewatering methods such as well points may be required. Surfaces should be sloped away from excavations to prevent precipitation from entering excavations.

<u>Utility Excavations</u>. It is anticipated that materials encountered during excavation for utilities will consist of loose fills underlain by firm clays underlain, in turn, by very soft to soft clays. In Boring B-2, however, weathered rock was encountered above the preliminary flowline of the planned storm sewer. As previously discussed, hard rock removal techniques may be required to excavate trenches in weathered rock.

Depending on construction sequencing and required depths of excavation, it may be possible to lay temporary slopes back to a stable configuration. If site geometry does not permit laying temporary slopes back, shoring will be required to maintain stability of the excavation. A discussion of temporary slopes and shoring systems are discussed herein.

Detention Ponds. Reportedly, the detention ponds will have a depth of 10 to 12 feet. Based on the results of the borings, loose fills underlain by firm clays will be encountered during excavation of the detention ponds. Depending on the desired pond water level, placement of a fine-grained soil liner along pond edges may be required to reduce the potential for leakage. Specific liner criteria can be developed as part of final geotechnical design.

SITE GRADING

This section of the report discusses anticipated site preparation requirements, the suitability of site soils for constructing required fills, and fill placement conditions.

Demolition. The more positive approach for site development is the complete removal of former foundations and slabs-on grade, below-grade walls and floors, pavements, abandoned utilities and associated trench backfill. Rubble and debris derived from demolition of the existing structures should be hauled off-site and disposed. Alternatively, concrete and asphalt resulting from demolition activities may be reused for structural fill provided these materials are processed as discussed herein.

Partial removal of these structures may be considered if the client is willing to accept an increase in the potential for structure and pavement distress. Partial removal could also complicate installation of below-grade utilities.

In pavement and retaining wall areas only, former structures may be left in place provided these items are a depth of at least 3 feet below planned subgrade. In floor slab areas only, structures may be left in place provided these items are at least 5 feet below planned subgrade. Greater depths of removal and replacement may be required based on observation during proofrolling and/or excavation. Open-graded rock occurring at the base of excavations should be covered with filter fabric to reduce the migration of fines into the voids. Abandoned utilities must be fully grouted. Basement floors should be broken to reduce accumulation of trapped water in former basement areas.

Site Preparation. Site preparation should consist of removal of existing pavements, fill, foundations, floor slabs and utilities to the depths previously discussed. Site preparations may also require clearing and grubbing trees and brush, stripping of topsoil, organic soil, or other deleterious material. Upon completion of site preparation activities, the exposed subgrade should be proofrolled with a loaded, tandem-axle dump truck or equivalent equipment. Subgrade areas that exhibit excessive deflection and rutting during proofrolling should be overexcavated and replaced with compacted fill. This requirement may be waived if the geotechnical engineer judges that proofrolling may disturb an otherwise acceptable subgrade.

Bottoms of deep excavations may consist of soft soils unable to support construction activities. Placement of a crushed rock mat may be required for a stable working platform. We recommend that an 18-inch thick loose lift of coarse, well-graded crushed rock be placed onto soft soil areas with the equipment working on top of the rock platform. After the initial lift is placed and thoroughly compacted, subsequent fill lifts can be placed conventionally. With this procedure, new fills can be placed above these soft soils and the potential for disturbing the underlying subgrade is reduced. As a measure to further reduce the potential for disturbing the underlying subgrade, a biaxial geogrid such as Tensar Type 2 could be placed on the soft soils prior to the crushed rock working platform. If geogrid is used, the working platform should consist of 2-inch minus well-graded crushed limestone.

Remediation of Highly Plastic Clay. Highly plastic soil within 24 inches of floor slab subgrade must be remediated. Potential remediation measures include limited removal of the plastic material and replacement with low plastic soil or crushed rock, or stabilization with lime or fly ash. Remediation of highly plastic clay occurring at pavement subgrades to a depth of 12 inches could also be performed as a measure to improve pavement performance.

Suitability of Soils for Filling. Materials generated from on-site excavations and demolition activities are expected to include low plasticity clay, highly plastic clay, crushed limestone, and fragments of asphalt, concrete, shale, sandstone and limestone. Low plasticity clay may be used without restriction. Asphalt, concrete, shale, sandstone and limestone may be used without restriction provided these materials are processed to form a well-graded mixture with a 2-inch maximum particle size. Coarser lifts of asphalt, concrete, shale, sandstone and limestone may be reused for structural fill provided the material is processed to form a well-graded mixture with a maximum 6-inch particle size, and placed at least 5 feet below footings and floor slabs. Nesting of coarse material should not be permitted. Under no circumstances should deleterious materials such as wood, metal, or organic debris be included in the fill.

Highly plastic clay may be reused for structural fill provided it is placed at least 2 feet below floor slab subgrade and at least 12 inches below pavement subgrades. Highly plastic clay may be reused at shallower depths provided, however, the highly plastic clay is treated with lime, fly ash or cement.

Off-site soils recommended for fill include low plasticity clay (liquid limit less than 45) and crushed limestone with a 2-inch maximum particle size. Permeable material, i.e. clean rock and sand, should not be used for trench backfill. Permeable backfill can collect water and promote subgrade softening or in the presence of highly plastic clay, promote subgrade heaving.

Fill and Backfill Placement. Successful performance of the planned structures will require that new fills be carefully placed and compacted. In general, new fills should be placed in thin lifts (6- to 8-inches typical) and compacted with multiple passes of compaction equipment. Cohesive fill should be compacted using kneading equipment (e.g. sheepsfoot roller), and granular fill should be compacted using vibratory equipment (e.g. vibratory roller).

Compaction of fill using tracking methods is typically not successful and problematic. Each lift of fill should be visually observed and tested to evaluate placement conditions.

Lifts of coarse fill, however, cannot be tested using conventional nuclear density gauge methods. Full-time monitoring of the compaction of coarse fill is recommended. Lifts of coarse fill should be compacted using multiple passes of a 10-ton vibratory sheepsfoot roller. Specific compaction criteria will be developed as part of final geotechnical design.

Temporary Slopes. We anticipate that, in most cases, open-cut excavations can be used to construct the proposed structures. Excavation slopes should be consistent with OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. The soil materials encountered during excavations for the proposed project are anticipated to consist of fill underlain by medium stiff to stiff, fine-grained soils underlain, in turn, by very soft to soft, fine-grained soils. The existing fill and very soft to soft, fine-grained soils can generally be classified as OSHA Type C soils. The medium stiff to stiff, fine-grained soils can generally be classified as OSHA Type B. Soils. OSHA guidelines provide for temporary slopes performed in Type C soils to be constructed at 1V:1.5H (1 vertical on 1.5 horizontal) or flatter, and at 1V:1H or flatter in Type B soils. Excavations that extend below groundwater should be constructed at 1V:1.5H or flatter regardless of the soil classification.

Temporary Excavations. Excavated temporary slopes may not be feasible at all locations, and temporary retention systems may be required. While many different types and configurations can be used, the more common types, and applicable to this site, are soldier pile and lagging, tangent walls (closely spaced drilled piers) with shotcrete, driven sheet piles, and soil nail walls. The design of the system should be performed by the contractor that performs the work. The contractor should also be responsible for monitoring the stability of the retention system.

Project specifications should indicate that the wall be designed in accordance with OSHA requirements. For temporary shoring systems in which tilting or deflection is not tolerable, at-rest lateral earth pressure conditions should be assumed. For temporary shoring systems in which tilting or deflection is tolerable, active lateral earth pressure conditions can be assumed.

Permanent Slopes. The stability of slopes depends on many factors, including the height and geometry of the slopes, the types of soils contained in the slopes, effects of groundwater, and any surface loads present. In general, permanent cut and fill slopes, constructed at 1V:3H have been observed to perform satisfactorily. Therefore, it is our opinion that slopes should be constructed at 1V:3H or flatter.

Cut slopes can be designed similar to fill slopes. However, the potential for sloughing and/or general slope failure increases with an increase in the steepness and depth of cut, particularly if low strength soil or rock is present, or if groundwater occurs, near the base of the slope.

UTILITIES

Manhole and Sewer Bedding. Manholes and sewers may be located in soft soils. If soft soil occurs in the bottom or sides of trench excavations, a suitable geotextile fabric may be required between the soil and bedding material to provide filter separation.

Proper grading of the utility area excavations should be provided to protect the area from the detrimental effects of weather. Excavations should be kept dry. Loose material that accumulates in excavations should be removed prior to laying pipe or placing concrete or rock base for manholes.

Disturbed soil subgrade areas should be replaced with compacted, well-graded crushed rock. Well-graded crushed rock should be used as the bedding material for pipes and sewer structures.

Manholes. Soft soil at manhole bearing elevations should be overexcavated and replaced with compacted, well-graded crushed rock. In deep soft soil areas, placement of geogrid below the crushed rock could be used to reduce the depth of soft soil overexcavation.

Trench Backfill. Settlement of trench backfill can result in unsightly depressions and localized failures. The magnitude of settlement can be substantially reduced by mechanical compaction of the trench backfill. Well-graded crushed rock should be used as backfill in pavement and floor slab areas. Poorly-graded ("clean") rock must not be used for trench backfill. Clean rock can collect water which can soften the underlying cohesive soils, result in the migration of fines and loss of subgrade support or, in the presence of expansive soils, promote heaving.

SECTION V - ADDITIONAL SUBSURFACE EXPLORATION

The preliminary engineering evaluation given in this report is based on interpretation of limited exploration data and Geotechnology's experience. The client must recognize that variations may occur from conditions observed in the widely-spaced borings. This report is a preliminary subsurface exploration and should not be used for final design. Geotechnology will not be responsible for improper use of the engineering comments herein or failure by others to recognize conditions that may be detrimental to the successful design of the project. Additional soil borings and geotechnical evaluation are needed at each specific structure location.

SECTION VI - LIMITATIONS OF PRELIMINARY REPORT

This report has been prepared on behalf of and for the exclusive use of the client for specific application to the named project as described herein. If this report is provided to prospective contractors, the client should make it clear that the information is provided for factual data only and not as a warranty of subsurface conditions included in this report.

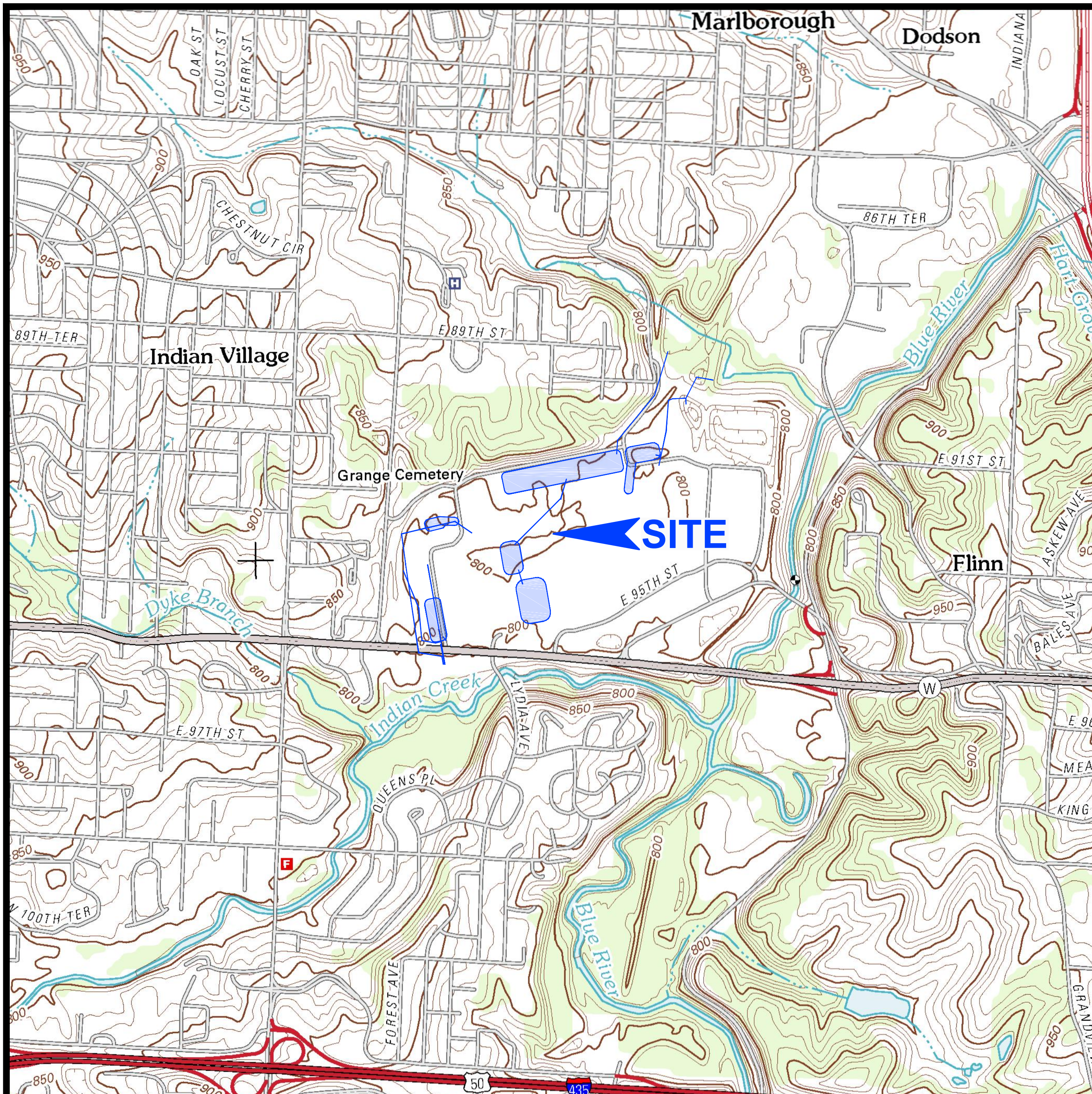
The analyses, conclusions and recommendations contained in this report are based on the data obtained from the preliminary subsurface exploration. The field exploration methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Discrete sampling cannot be relied on to accurately reflect natural variations in stratigraphy that may exist between sample locations and/or intervals.

Geotechnology has attempted to conduct the services reported herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. The recommendations and conclusions contained in this report are professional opinions. No other representation, expressed or implied, is included or intended.

Unless specifically stated in our proposal or this report, the scope of our services for this phase of the project did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic material in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors noted or unusual or suspicious items or conditions observed are strictly for the information of the client. Our scope did not include any services to investigate or detect the presence of mold or any other biological contaminants (such as spores, fungus, bacteria, viruses, and the by-products of such organisms) on and around the site, or any services designed or intended to prevent or lower the risk of the occurrence of an infestation of mold or other biological contaminants.

The comments in this report should only be used for conceptual planning. The comments in this report should not be used if the nature, design or location of the facilities is changed or if there is a substantial lapse in time between the submittal of this report and the start of work at the site. If changes are contemplated, or significant time lapse occurs, Geotechnology must review them to assess their impact on this report's findings, conclusions and/or design recommendations. Geotechnology will not be responsible for any claims, damages, or liability associated with any other party's interpretations of this report's subsurface data or reuse of this report's subsurface data or engineering analyses without our express written authorization.

The recommendations included in this report have been based on limited subsurface exploration conducted for preliminary evaluation of the geotechnical aspects of site development. Additional subsurface exploration will be required prior to considering any of the recommendations included herein as final. Accordingly, these recommendations should not be applied until Geotechnology has been given an opportunity to finalize its findings, recommendations, and geotechnical design criteria. Geotechnology cannot assume liability for the adequacy of its recommendations when they are used in the field without Geotechnology being retained to complete the subsurface exploration and geotechnical design for the project.



NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Grandview, Missouri-Kansas quadrangle, last revised in 2014.

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Date: 10-2-15	Date: 10-7-15	Date: 10-7-15

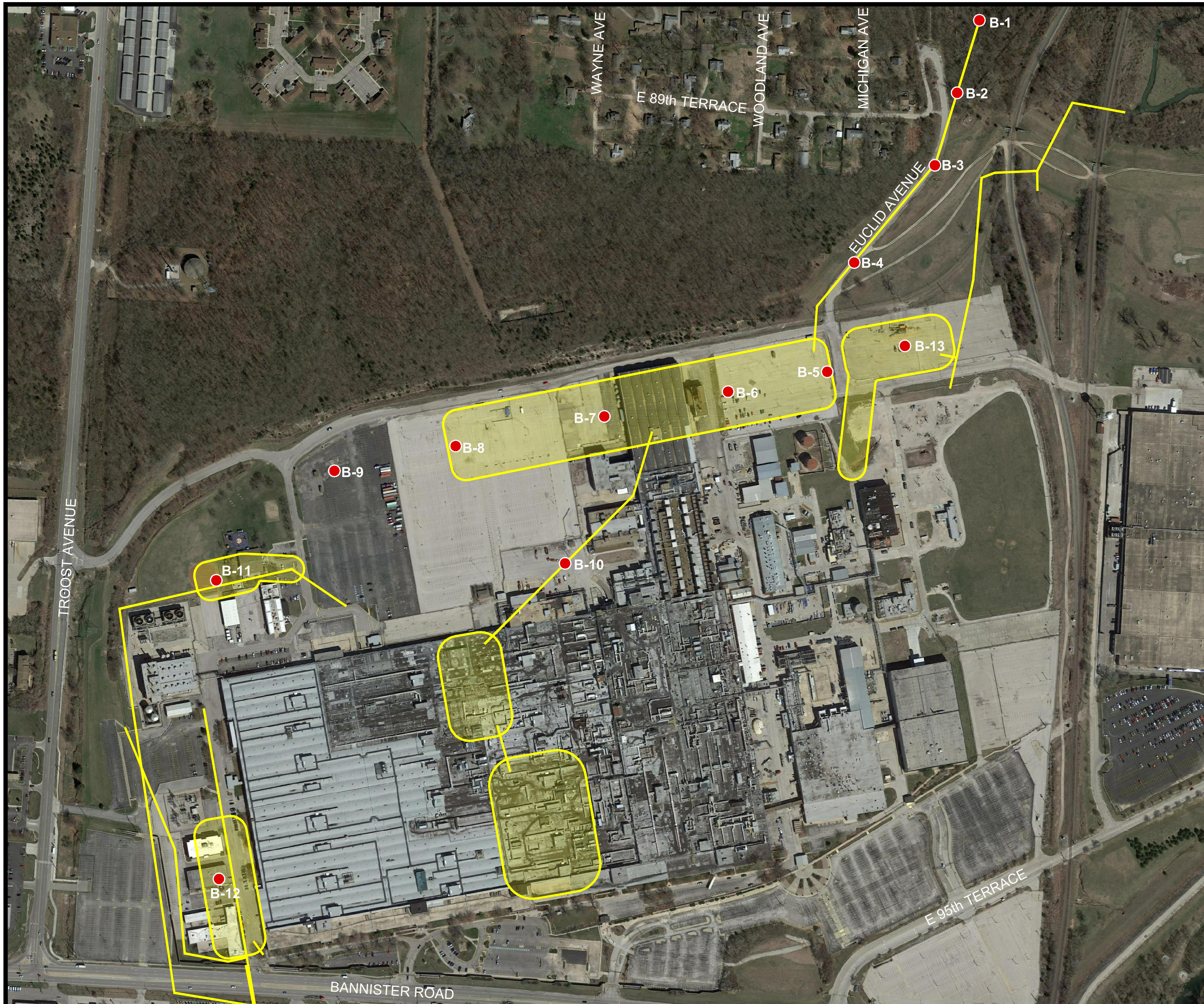
GEOTECHNOLOGY INC
FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

SITE LOCATION AND TOPOGRAPHY

Project Number J023703.02

PLATE 1



NOTES

1. Plan adapted from a March 30, 2015 aerial photograph courtesy of Google Earth and drawings "BH001" and "BH002" dated April 30, 2015 titled "Geotechnical Boreholes - Phase 01".
2. Borings were located by a representative of Lutjen and the locations should be considered approximate.

LEGEND

- Boring Location
- Proposed Retention Basin
- Proposed Storm Sewer

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Date: 10-2-15	Date: 10-7-15	Date: 10-7-15

GEOTECHNOLOGY INC
FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

AERIAL PHOTOGRAPH OF SITE AND BORING LOCATIONS

Project Number J023703.02	PLATE 2

APPENDIX A

IMPORTANT INFORMATION ABOUT
THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GBC GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX B

LOGS OF BORINGS B-1 THROUGH -13
BORING LOG: TERMS AND SYMBOLS

Surface Elevation **787.19** Completion Date: **7/8/15**

Datum **msl**

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: brown, lean clay		0-0-1-1	SS1
	CLAY - brown, medium stiff, lean - CL		1-3-3-4	SS2
5			2-2-3-3	SS3
			4-4-4-4	SS4
			5-4-4-4	SS5
10				
	very soft	▽	0-0-0-0	SS6
15	Boring terminated at 15 feet.			
20				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - PP/2

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

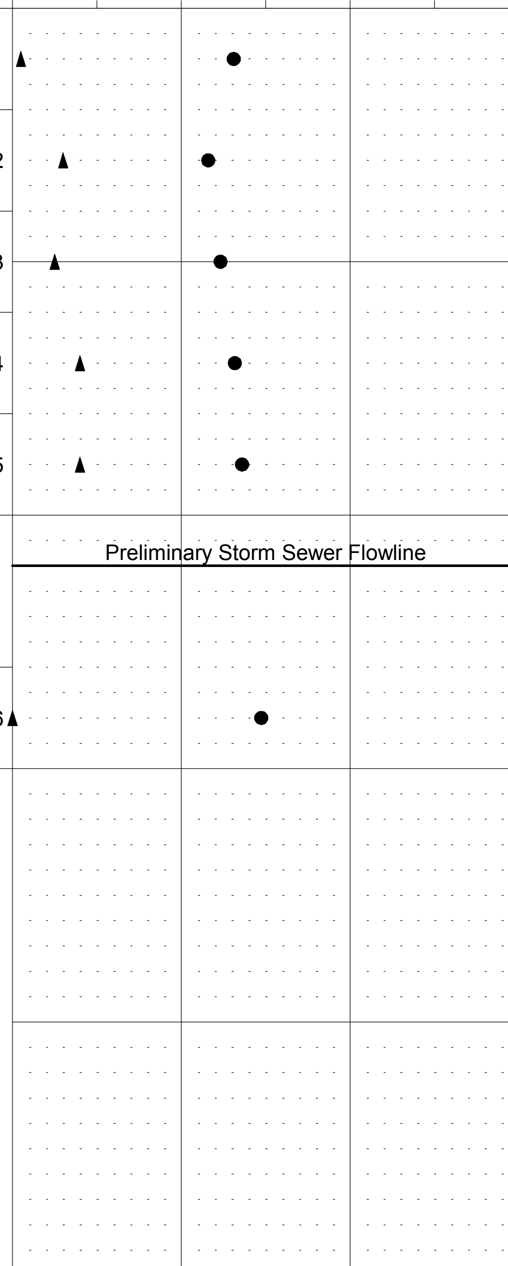
(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL ⊢—●—⊣ LL

10 20 30 40 50



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-01

Project No. J023703.02

LOG OF BORING 2002 WL GINT.GPJ GTINC 0638301.GPJ 10/7/15

Surface Elevation 790.71

Datum msl

Completion Date: 7/8/15

SHEAR STRENGTH, tsf: △ - UU/2, ○ - QU/2, □ - PP/2 (0.5, 1.0, 1.5, 2.0, 2.5)

STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, % PL — LL (10, 20, 30, 40, 50)

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	FILL: brown, lean clay		0-0-1-1	SS1
			0-1-1-2	SS2
3.5	CLAY - brown, medium stiff to stiff, fat - CH			
5			1-3-3-4	SS3
			7-6-8-8	SS4
8	CLAY - brown and gray, very stiff, shaley - CH		9-8-9-9	SS5
10				
11	Weathered SHALE and SANDSTONE		30-50/3"	SS6
12.75	Split-spoon sampler refusal at 12.75 feet.			
15				
20				

Preliminary Storm Sewer Flowline

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-02

Project No. J023703.02

LOG OF BORING 2002 WL GINT.GPJ GTINC 0638301.GPJ 10/7/15

Surface Elevation 798.97 | Completion Date: 7/8/15
Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: shale fragments, lean clay, sandstone fragments, limestone fragments		21-11-10-8	SS1
			8-10-9-11	SS2
5			5-2-2-3	SS3
	FILL: fat clay, limestone fragments		6-5-5-6	SS4
			6-7-7-8	SS5
10				
			0-2-2-3	SS6
15	Boring terminated at 15 feet.			
20				

SHEAR STRENGTH, tsf

△ - UU/2 ○ - QU/2 □ - PP/2

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

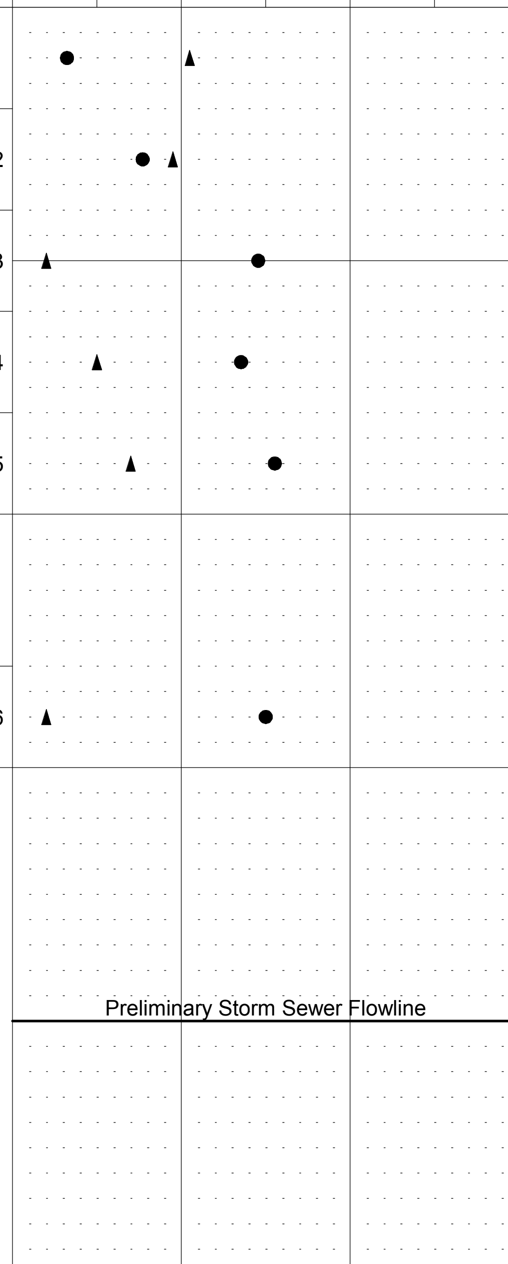
(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL ├──●──┤ LL

10 20 30 40 50



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-03

Project No. J023703.02

Surface Elevation 803.37
Datum msl
Completion Date: 7/8/15

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: lean clay, limestone fragments		14-14-6-4	SS1
	FILL: fat clay, limestone fragments		6-5-8-9	SS2
5			2-3-4-3	SS3
			5-4-6-6	SS4
			6-7-6-4	SS5
10				
	CLAY - brown, soft, fat - CH			
			0-0-3-2	SS6
15	Boring terminated at 15 feet.			
20				

SHEAR STRENGTH, tsf
Δ - UU/2 ○ - QU/2 □ - PP/2
0.5 1.0 1.5 2.0 2.5
STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ N-VALUE (BLOWS PER FOOT)
WATER CONTENT, %
PL LL
10 20 30 40 50

Preliminary Storm Sewer Flowline

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM __ FEET
Odyssey DRILLER Odyssey LOGGER
Geoprobe 7822DT DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC
FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-04

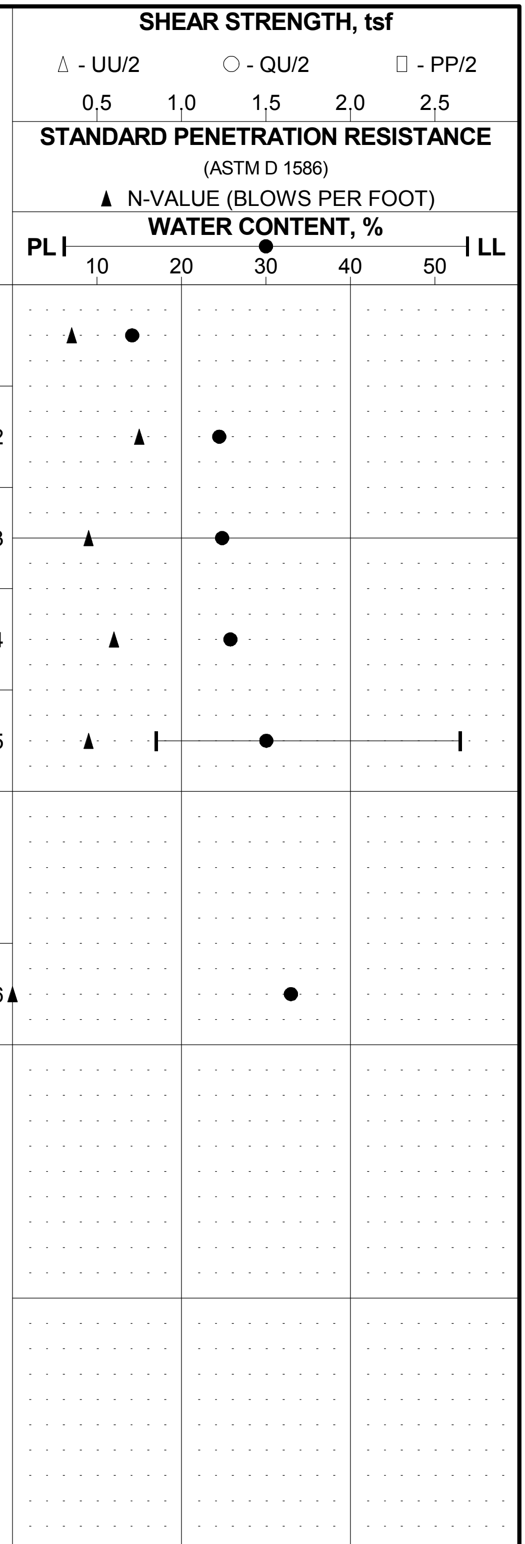
Project No. J023703.02

LOG OF BORING 2002 WL GINT.GPJ GTINC 0638301.GPJ 10/7/15

Surface Elevation **798.96** Completion Date: **7/7/15**

Datum **msl**

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: fat clay, limestone fragments		13-3-4-4	SS1
	CLAY - brown, stiff, fat - (CH)		9-6-9-7	SS2
5			2-4-5-5	SS3
			7-6-6-5	SS4
			7-5-4-4	SS5
10				
	very soft		0-0-0-2	SS6
15	Boring terminated at 15 feet.			
20				



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 8 FEET ∇

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-05

Project No. J023703.02

Surface Elevation 799.37

Datum msl

Completion Date: 7/7/15

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: fat clay, shale fragments, limestone fragments		7-3-5-7	SS1
			7-6-8-7	SS2
	CLAY - brown, stiff, fat - (CH)			
5			2-4-6-7	SS3
			7-7-7-6	SS4
			6-6-6-5	SS5
10				
		▽		
	soft		0-0-3-2	SS6
15	Boring terminated at 15 feet.			
20				

SHEAR STRENGTH, tsf

∆ - UU/2 ○ - QU/2 ▯ - PP/2

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

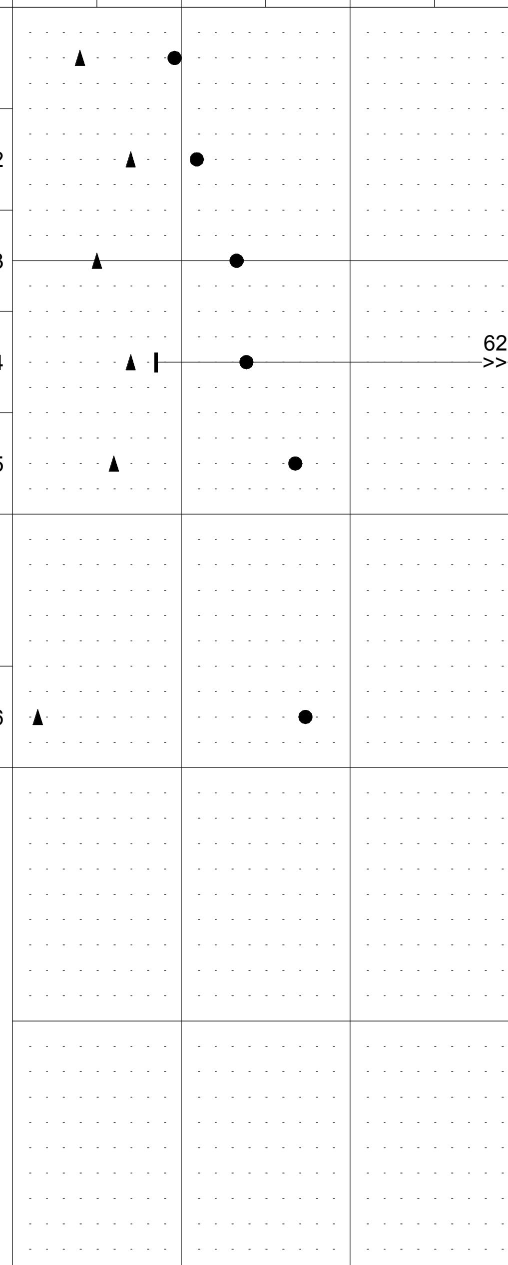
(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL |—●—| LL

10 20 30 40 50



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-06

Project No. J023703.02

Surface Elevation **801.02**

Datum **msl**

Completion Date: **7/7/15**

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: lean clay, limestone fragments		4-6-5-5	SS1
			7-6-7-7	SS2
5	CLAY - brown, medium stiff to stiff, fat - (CH)		4-4-3-4	SS3
			6-6-7-5	SS4
			5-6-5-7	SS5
10				
	soft		0-1-1-3	SS6
15	Boring terminated at 15 feet.			
20				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - PP/2

0.5 1.0 1.5 2.0 2.5

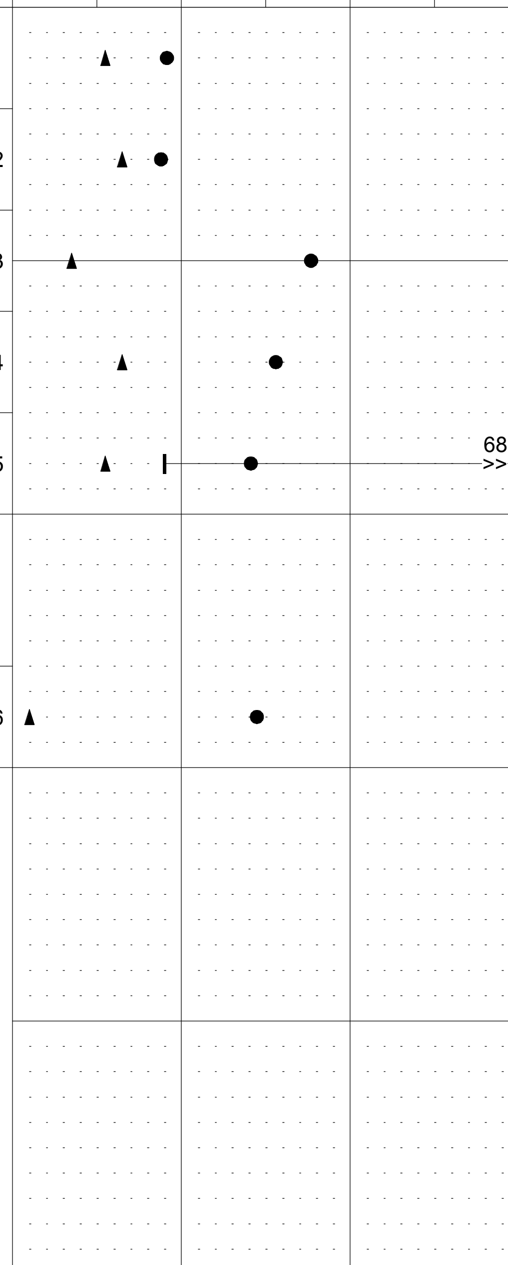
STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL ● LL

10 20 30 40 50



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-07

Project No. J023703.02

Surface Elevation **801.35** Completion Date: **7/2/15**

Datum **msl**

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: brown, lean clay		14-5-3-4	SS1
	CLAY - brown, medium stiff to stiff, fat - (CH)		4-4-4-4	SS2
5			3-3-4-4	SS3
			5-5-4-3	SS4
			3-3-4-5	SS5
10				
			2-3-3-5	SS6
15	Boring terminated at 15 feet.			
20				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 ▯ - PP/2

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

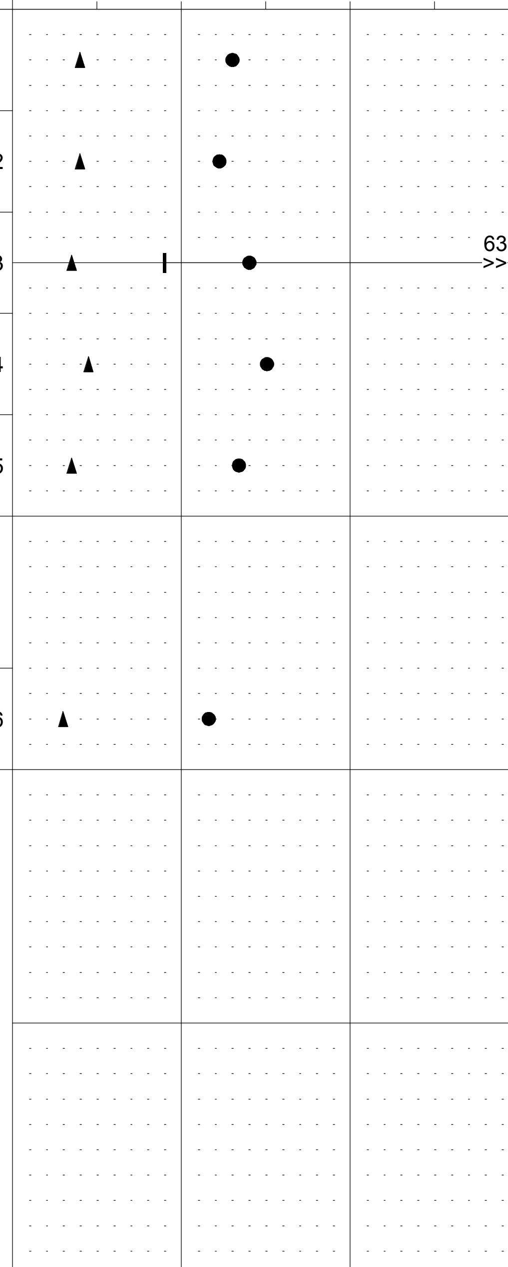
(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL ├──●──┤ **LL**

10 20 30 40 50



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

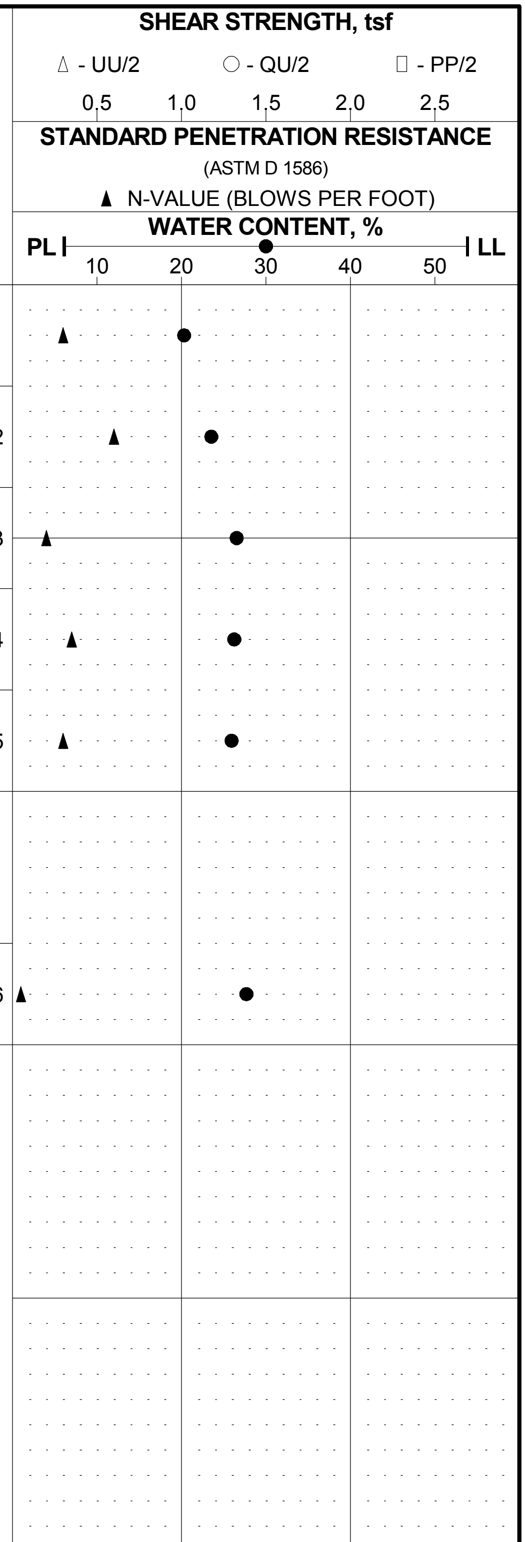
LOG OF BORING: B-08

Project No. J023703.02

Surface Elevation 799.47 | Completion Date: 7/9/15

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: fat clay		3-3-3-6	SS1
			7-6-6-5	SS2
	CLAY - brown, soft to medium stiff, lean - CL			
5			1-2-2-2	SS3
			3-3-4-3	SS4
			4-3-3-3	SS5
10				
	very soft		0-0-1-2	SS6
15	Boring terminated at 15 feet.			
20				



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence Bannister Federal Complex Kansas City, Missouri

LOG OF BORING: B-09

Project No. J023703.02

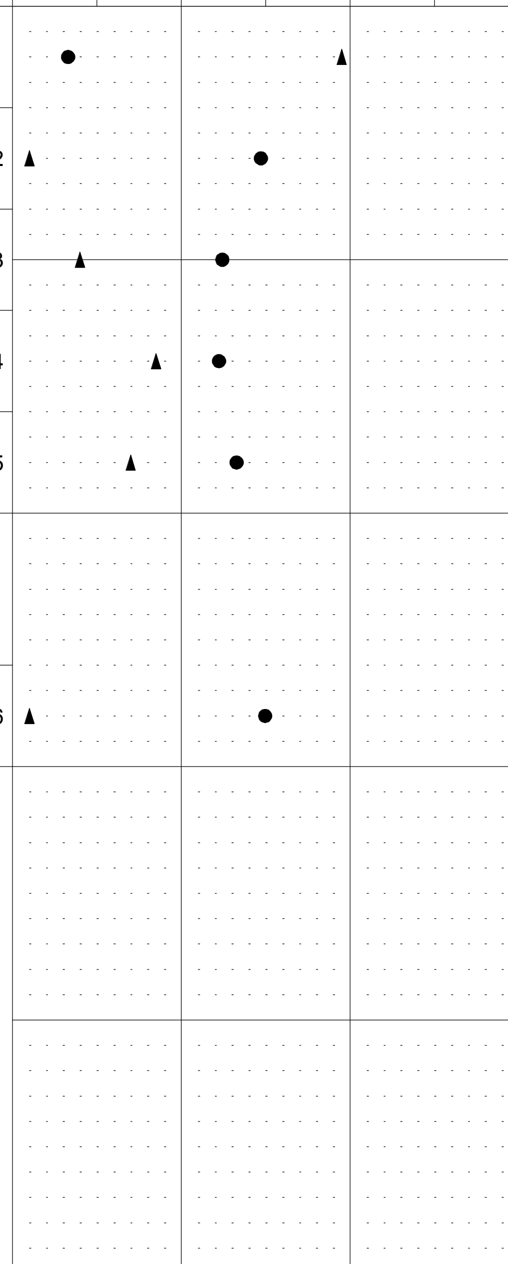
Surface Elevation **799.85**	Completion Date: **7/7/15**
Datum **msl**	

SHEAR STRENGTH, tsf: △ - UU/2 ○ - QU/2 ▯ - PP/2 (0.5, 1.0, 1.5, 2.0, 2.5)

STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %: PL ● LL (10, 20, 30, 40, 50)

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: crushed limestone, fat clay		19-25-14 -12	SS1
	▽		7-1-1-2	SS2
5	CLAY - brown, medium stiff to very stiff, fat - CH		2-3-5-6	SS3
			8-9-8-7	SS4
			8-7-7-6	SS5
10				
	soft		0-0-2-3	SS6
15	Boring terminated at 15 feet.			
20				



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 2 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence Bannister Federal Complex Kansas City, Missouri

LOG OF BORING: B-10

Project No. J023703.02

Surface Elevation 799.11 | Completion Date: 7/9/15

Datum msl

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: sandy clay, gravel, fat clay		0-0-3-3	SS1
			7-13-6-5	SS2
	CLAY - brown, stiff to medium stiff, lean - (CL)			
5			4-5-5-6	SS3
			7-7-5-6	SS4
			6-4-4-4	SS5
10				
	very soft		0-0-1-3	SS6
15	Boring terminated at 15 feet.			
20				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 ▯ - PP/2

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, %

PL ● LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-11

Project No. J023703.02

Surface Elevation 799.12 | Completion Date: 7/8/15

Datum msl

SHEAR STRENGTH, tsf: Δ - UU/2, ○ - QU/2, □ - PP/2 (0.5, 1.0, 1.5, 2.0, 2.5)

STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ N-VALUE (BLOWS PER FOOT)

WATER CONTENT, % PL ● LL (10, 20, 30, 40, 50)

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: brown, lean clay		3-1-3-3	SS1
	CLAY - brown, stiff to medium stiff, lean - (CL)		5-6-7-7	SS2
5			3-4-5-6	SS3
			6-5-5-4	SS4
			4-3-3-3	SS5
10				
	soft		0-0-2-3	SS6
15	Boring terminated at 15 feet.			
20				

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ∇

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC FROM THE GROUND UP

Property Transfer Due Diligence Bannister Federal Complex Kansas City, Missouri

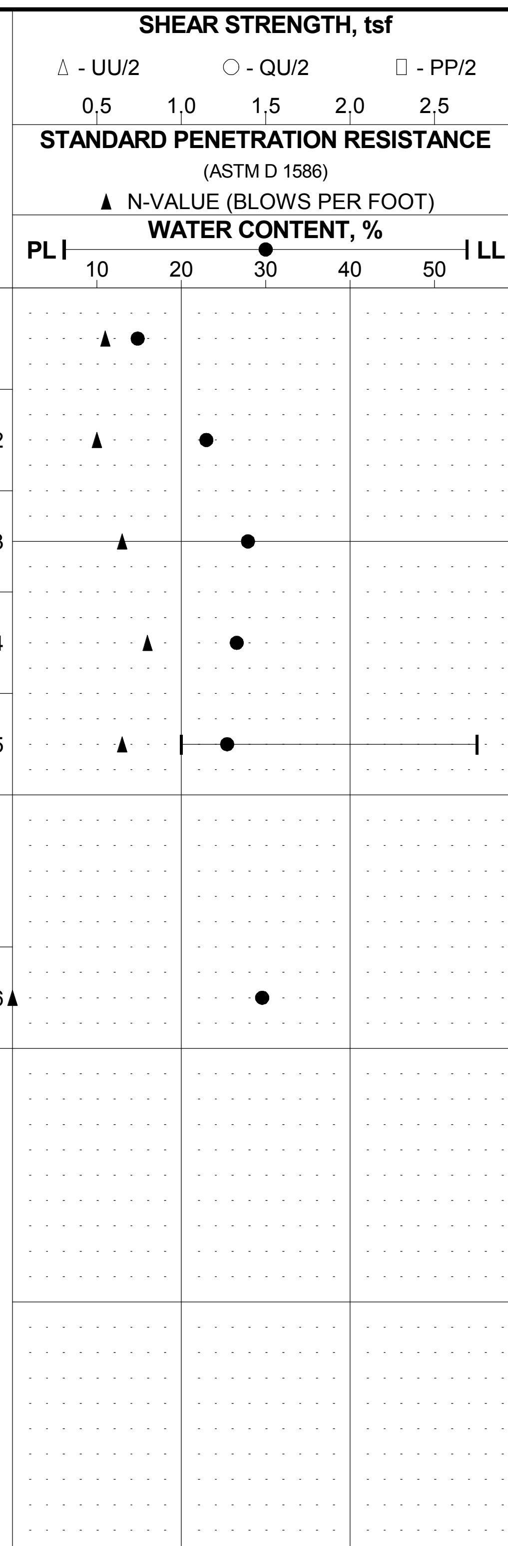
LOG OF BORING: B-12

Project No. J023703.02

Surface Elevation **801.05** | Completion Date: **7/8/15**

Datum **msl**

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt Pavement			
	FILL: fat clay, crushed limestone		7-8-3-3	SS1
			4-5-5-6	SS2
	CLAY - brown, stiff to very stiff, fat - (CH)			
5			5-6-7-7	SS3
			9-9-7-7	SS4
			8-7-6-7	SS5
10				
	very soft		0-0-0-0	SS6
15	Boring terminated at 15 feet.			
20				



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

Odyssey DRILLER Odyssey LOGGER

Geoprobe 7822DT DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: CDB	Check by: MHM	App'vd by: FC
Date: 9/10/15	Date: 10/7/15	Date: 10/7/15

GEOTECHNOLOGY INC
FROM THE GROUND UP

Property Transfer Due Diligence
Bannister Federal Complex
Kansas City, Missouri

LOG OF BORING: B-13

Project No. J023703.02

BORING LOG: TERMS AND SYMBOLS

GENERAL NOTES

1. *Information on each boring log is a compilation of subsurface conditions based on soil or rock classifications obtained from the field as well as from laboratory testing of samples. The strata lines on the logs may be approximate or the transition between the strata may be gradual rather than distinct. Water level measurements refer only to those observed at the times and places indicated, and may vary with time, geologic condition or construction activity.*
2. *Relative composition and Unified Soil Classification designations are based on visual estimates and are approximate only. If laboratory tests were performed to classify the soil, the unified designation is show in parenthesis.*
3. *Value given in Unit Dry Weight/SPT Column is either a unit dry weight in pounds per cubic foot, if adjacent to a ST sample designation, or blows per 6-inch increment if adjacent to a SS sample designation.*

ABBREVIATIONS

UU/2	*Shear Strength from Unconsolidated – Undrained Triaxial Test (ASTM D2850)*
QU/2	*Shear Strength from Unconfined Compression Test (ASTM D2166)*
SV	*Shear Strength from Field Vane (ASTM D2573)*
PL	*Plastic Limit (ASTM D4318)*
LL	*Liquid Limit (ASTM D4318)*

LEGEND

CS	Continuous Sampler
GB	Grab Sample Taken From Auger Cuttings or Wash Water Return
NX 100 42	NX Rock Core with Percent Recovery/R.Q.D. Given In Adjacent Column
PST	Three Inch Diameter Piston Tube Sample
SS	Split Spoon Sample (Standard Penetration Test)
ST	Three Inch Diameter Shelby Tube Sample
*	Sample Not Recovered
SV	Field Vane Test

SPLIT – BARREL SAMPLER DRIVING RECORD

Blow per Foot (N-Value) — *Description*

25……………………………………………………………………………....25 blows drove sampler 12 inches after initial 6 inches of seating.
75/10"………………………………………………………………………….75 blows drove sampler 10 inches after initial 6 inches of seating.
50/S3"……………………………………………………………………….50 blows drove sampler 3 inches during initial 6 inch seating interval.

NOTES:
1. *To avoid damage to sampling tools, driving is limited to 50 blows during any six inch interval.*
2. *N-Value (Blow Count) is the standard penetration resistance based on the total number of blows, using a 140-lb hammer with 30-inch free fall, required to drive a split spoon the last two of three, 6-inch drive increments. (Example: 4/7/9, N = 7 + 9 = 16). Values are shown as a summation on grid plot and may be shown as 4/7/9 in Unit Dry Weight – SPT column.*

RELATIVE COMPOSITION

Trace…………………...0-10 %
With/Some…………...11-35 %
Soil modifier such….... > 35 %
As silty, clayey, sandy, etc.

DENSITY OF GRANULAR SOILS

Descriptive Term:	***N—Value***
Very Loose	*0 - 4*
Loose	*5 - 10*
Medium Dense	*11 - 30*
Dense	*31 - 50*
Very Dense	*> 50*

STRENGTH OF COHESIVE SOILS

Consistency	***Undrained Shear Strength Tons Per Sq. Ft.***	***Field Test***	***Approximate N-Value Range***
Very Soft	*less than 0.12*	*Thumb will penetrate soil more than 1"*	*0 - 1*
Soft	*0.13 to 0.25*	*Thumb will penetrate soil about 1"*	*2 - 4*
Medium Stiff	*0.26 to 0.50*	*Thumb will penetrate soil about ¼"*	*5 – 8*
Stiff	*0.51 to 1.00*	*Thumb hardly indents soil*	*9 – 15*
Very Stiff	*1.01 to 2.00*	*Thumb will not indent soil, but readily indented with thumbnail*	*16 – 30*
Hard	*greater than 2.00*	*Thumbnail will not indent soil*	*> 30*

SOIL GRAIN SIZE

U.S. STANDARD SIEVE

	12"		3"		¾"		4		10		40		200		

BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
300	76.2	19.1	4.76	2.00	0.42	0.074	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

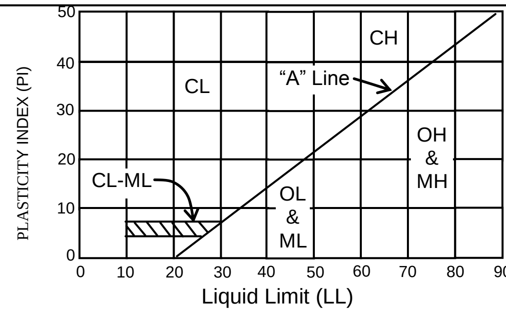
SOIL STRUCTURE

Calcareous *– Having appreciable quantities of carbonate.*
Fissured *– Containing shrinkage or relief cracks, often filled with sand or silt; usually more or less vertical.*
Slickensided *– Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along those planes.*
Layer *-- Inclusion greater than 3 inches thick.*
Seam *– Inclusion 1/8 inch to 3 inches thick extending through the sample*
Parting *– Inclusion less than 1/8 inch thick.*
Pocket *– Inclusion of material of different texture that is smaller than the diameter of the sample.*
Interlayered *– Soil samples composed of alternating layers of different soil types.*
Intermixed *– Soil samples composed of pockets of different soil types and a layered or laminated structure is not evident.*
Laminated *– Soil sample composed of alternating partings or seams of different soil type.*

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL	DESCRIPTION
Coarse-Grained Soils (More than 50% Larger than No 200 Sieve Size)	Gravel and Gravelly Soils	Clean Gravels Little or no Fines	GW	Well-Graded Gravel, Gravel-Sand Mixture
			GP	Poorly –Graded Gravel, Gravel-Sand Mixture
		Gravels with Appreciable Fines	GM	Silty Gravel, Gravel-Sand-Silt Mixture
			GC	Clayey-Gravel, Gravel-Sand-Clay Mixture
	Sand and Sandy Soils	Clean Sands Little or no Fines	SW	Well-Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sands with Appreciable Fines	SM	Silty Sand, Sand-Silt Mixture
			SC	Clayey Sand, Sand-Clay Mixture
Fine-Grained Soils (More than 50% Smaller than No 200 Sieve Size)	Silts and Clays	Liquid Limit Less Than 50	ML	Silt, Clayey Silt, Silty or Clayey Very Fine Sand, Slight Plasticity
			CL	Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity
			OL	Organic Silts, or Silty Clays of Low Plasticity
	Silts and Clays	Liquid Limit More Than 50	MH	Silt, Fine Sandy or Silt Soil with High Plasticity
			CH	Clay, High Plasticity
			OH	Organic Clay of Medium to High Plasticity
	Highly Organic Soils		PT	Peat, Humus, Swamp Soil

PLASTICITY CHART



RELATIVE PLASTICITY

Nonplastic	Cannot Roll Into Ball
Trace Plasticity	Barely Roll Into Ball
Medium Plastic	Can be Rolled Into Ball
Highly Plastic	No Rupture by Kneading

VISUAL DESCRIPTION CRITERIA*

TABLE 1: CRITERIA FOR DESCRIBING ANGULARITY OF COARSE-GRAINED PARTICLES

Description	***Criteria***
Angular	*Particles have sharp edges and relatively plane sides with unpolished surfaces*
Subangular	*Particles are similar to angular description but have rounded edges*
Subrounded	*Particles have nearly plane sides but have well-rounded corners and edges*
Rounded	*Particles have smoothly curved sides and no edges*

TABLE 2: CRITERIA FOR DESCRIBING PARTICLE SHAPE

Description	***Criteria***
Flat	*Particles with width/thickness X3*
Elongated	*Particles with length/width X3*
Flat and Elongated	*Particles meet criteria for both flat and elongated*

TABLE 3: CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	***Criteria***
Dry	*Absence of moisture, dusty, dry to the touch*
Moist	*Damp, but no visible water*
Wet	*Visible free water, usually soil is below the water table*

TABLE 4: CRITERIA FOR DESCRIBING REACTION WITH HCL

Description	***Criteria***
None	*No visible reaction*
Weak	*Some reaction, with bubbles forming slowly*
Strong	*Violent reaction, with bubbles forming rapidly*

TABLE 6: CRITERIA FOR DESCRIBING CEMENTATION

Description	***Criteria***
Weak	*Crumbles or breaks with handling or little finger pressure*
Moderate	*Crumbles or breaks with considerable finger pressure*
Strong	*Will not crumble or break with finger pressure*

**NOTES: 1. Tables adapted from ASTM D2488 "Description and identification of Soils" (Visual-Manual Procedure)*
2. Tables 5, 7 and 11 incorporated into other information on this plate.

TABLE 8: CRITERIA FOR DESCRIBING DRY STRENGTH

Description	***Criteria***
None	*The dry specimen crumbles into powder with mere pressure of handling*
Low	*The dry specimen crumbles into powder with some finger pressure*
Medium	*The dry specimen breaks into pieces or crumbles with considerable finger pressure*
High	*The dry specimen cannot be broken with finger pressure. Specimen will break into pieces between thumb and a hard surface.*
Very High	*The dry specimen cannot be broken between the thumb and a hard surface*

TABLE 9: CRITERIA FOR DESCRIBING DILATANCY

Description	***Criteria***
None	*No visible change in the specimen*
Slow	*Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing.*
Rapid	*Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.*

TABLE 10: CRITERIA FOR DESCRIBING TOUGHNESS

Description	***Criteria***
Low	*Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.*
Medium	*Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness*
High	*Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness*

TABLE 12: IDENTIFICATION OF INORGANIC FINE-GRAINED SOILS FROM MANUAL TESTS

Soil Symbol	***Dry Strength***	***Dilatancy***	***Toughness***
ML	*None to low*	*Slow to rapid*	*Low or thread cannot be formed*
CL	*Medium to high*	*None to slow*	*Medium*
MH	*Low to medium*	*None to slow*	*Low to medium*
CH	*High to very high*	*none*	*High*