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GEOTECHNICAL ENGINEERING INVESTIGATION

PROPOSED JAIL FACILITY
1106 W HUTCHINSON LANE
MADISON, INDIANA

ATC PROJECT NO. LOUGE19051

August 27, 2019

PREPARED FOR:

JEFFERSON COUNTY BOARD OF COMMISSIONERS
300 EAST MAIN STREET
MADISON, INDIANA

ATTENTION: MR. DAVID BRAMER, COMMISSIONER

August 27, 2019

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ATC Group Services LLC

2724 River Green Circle
Louisville, KY 40206

Phone +1 502 722 1401

www.atcgroupservices.com

Mr. David Bramer, Commissioner
Jefferson County Board of Commissioners
Jefferson County Courthouse
300 East Main Street
Madison, IN 47250

Re: **Geotechnical Engineering Investigation**
Proposed Jail Facility
1106 W. Hutchinson Lane
Madison, Indiana
ATC Project No. LOUGE19051

Dear Mr. Bramer:

Submitted herewith is the report of our geotechnical engineering investigation for the referenced project. This report contains the results of our field and laboratory testing program, an engineering interpretation of this data with respect to the available project characteristics and recommendations to aid design and construction of the foundations and other earth-connected phases of this project. Once additional design and construction details are available, ATC can determine if additional analysis and/or consideration is required and if provided recommendations are still pertinent based on further project information.

We wish to remind you that we will store the samples for 30 days after which time they will be discarded unless you request otherwise. We appreciate the opportunity to be of service to you on this project. If we can be of any further assistance, or if you have any questions regarding this report, please do not hesitate to contact either of the undersigned.

Sincerely,

TRAVIS J. ANDRES
REGISTERED
PE11300496
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Ryan C. Ortiz, PE
Project Geotechnical Engineer
Licensed Kentucky

Travis Andres, P.E.
Senior Geotechnical Engineer
Licensed Indiana

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1 PURPOSE AND SCOPE

The purpose of this study was to determine the general subsurface conditions at the project site by drilling 16 engineering test borings to evaluate the site development, foundation concept, and design for the proposed project. This includes an evaluation of the site with respect to potential construction problems and recommendations dealing with earthwork and quality control during construction. All of the borings were performed, where reasonably accessible, per the proposed boring location plan provided in our proposed scope of work, as agreed by Jefferson County Board of Commissioners.

2 PROJECT CHARACTERISTICS

The site is located north of the intersection of W. Hutchinson Lane and Old Hutchinson Lane in Madison, Indiana. The general location of the project site is shown on the Site Location Map (Figure 1 in the Appendix).

The geotechnical exploration was performed in support of a planned jail facility. The assumed maximum column, perimeter wall, and slab load is 80 kips, 2,000 plf, and 200 psf, respectively. There will be surrounding parking lots and drive lanes. Project information, including plans and loading conditions, were not provided at the issuance of this report. Additional exploration is likely warranted once final plans and structure locations are determined.

The proposed building is assumed to have slab-on-grade ground floors with no basements or pits. The proposed finish floor elevation within the building footprint is unknown at this time. The topography within the proposed jail facility appears relatively flat. However, the grades within the potential garage and animal shelter facility area of the site contain topographic relief of about 8 feet. ATC should be allowed to review the final grading plan once available. The site was generally comprised of grassy or cover crop areas in the areas explored. Remaining areas included mature hardwoods. The approximate location of the proposed building is shown on the Site Plan (Figure 2 in the Appendix).

3 GENERAL SUBSURFACE CONDITIONS

3.1 Site Geology

Based on review of the Indiana Geological Survey publicly available mapping systems, the site is underlain by the Niagaran Series (also called the Wabash Formation). The Niagaran Series is generally comprised of silty dolomite, dolomitic silty limestone, limestone, or dolomite. This bedrock formation is typically gray to dark brown, commonly vuggy, fine to coarse grained, dense, cherty and fossiliferous.

3.2 Subsurface Conditions

Subsurface conditions were explored via 16 engineering test borings. The boring locations and measurements were selected by ATC to provide a spread of information across the site. The boring locations were locating using recreational grade GPS. Some borings required offsets from the originally

planned GPS coordinate due to utility conflicts. Boring locations appear on a Boring Location Plan, Figure 2, in the Appendix.

Subsurface conditions encountered in the boring are described on boring logs in the Appendix. Subsurface strata descriptions represent our interpretation based on the field logs and visual examination of recovered samples. Contacts between various strata on the test boring logs represent approximate contact depths as transitions between strata may be gradual.

Surface Cover: The ground surface at the borings located contained soil, grass, or cover-crop, with topsoil.

Lean Clay: Lean clay was encountered at all the boring locations below topsoil. Lean clay was visually described as light brown, light reddish brown with variable amounts of gray, and contained variable amounts of silt. Lean clay was generally firm to very stiff, with standard penetration test “N” values ranging from 6 to 28 blows per foot.

Fat Clay: Fat clay was encountered below lean clay at Borings B-1, B-2, B-6, B-7, B-8, F-1, F-2, and F-3 at about 8 feet below existing grade (BEG). Fat clay was visually described as light brown with variable amounts of gray, and contained variable amounts of silt, sand, and gravel. Fat clay was generally very soft to very stiff, with standard penetration test “N” values ranging from 22 to 50+ blows per foot.

3.3 Ground Water

In order to better define the ground water regime at this site, an extensive ground water monitoring program would be required at numerous locations for an extended period of time. It is not uncommon to encounter significant amounts of ground water in excavations in this area, particularly in wet seasons. The ground water flow patterns can also be changed as a result of construction and changes in site grading and therefore higher ground water levels could be encountered in the future. It is likely that a groundwater table exists at the boring locations. In cohesive soils, due to the low permeability, it is possible that the groundwater table did not stabilize in the boring for the short duration the boring was open.

4 DESIGN RECOMMENDATIONS

The following design recommendations have been developed on the basis of the previously described project characteristics (Section 2.0) and subsurface conditions (Section 3.0). If there is any change in these project criteria, including project location on the site, a review should be made by this office.

Based on geologic mapping, our experience in the project area, and the results of the test borings, it is our opinion that the subsurface conditions at this site meet the criteria for **Site Class C** based on Section 1613.3.2 of the 2018 International Building Code, the expected use of shallow spread foundations, and considering the project information and assumptions made at this time.

4.1 General Construction Considerations

Based upon the results of the subsurface investigation performed at this site in conjunction with the assumed finished floor elevations (as discussed in Section 2.0 of this report), a shallow foundation system is considered suitable at the site. Total and differential settlements are expected to be less than about 1 and ¾ inches, respectively. Based on major rutting observed onsite by agriculture equipment, we recommend drainage measures are implement to control moistures in upper soils. It is important that the observation and evaluation methods outlined in Section 5.4 be implemented and that any soft natural soils, old fill materials, and remnants from previous construction revealed by such observations and evaluations be removed and replaced. Relatively soft near surface soils within the upper 3 feet should be expected, especially during wet periods of the year.

4.2 Spread Footings

Our findings show that the proposed building supported on conventional shallow spread footings bearing on stiff existing soils should be suitable for direct support, pending approval by the geotechnical engineers representative. Depending on the time of year and weather conditions, it may be necessary to remove any unsuitable materials (including pockets of soft natural soils) where encountered below the nominal spread footing bearing elevations in some isolated cases and to re-establish the nominal design bearing level using engineered fill, flowable fill, or lean concrete.

Footings bearing on stiff natural soils, or on engineered fill that is placed over stiff natural soils, can be designed for a **net allowable bearing pressure of 2500 lbs/sq.ft.** considering all unsuitable materials below the spread footings are identified, removed and replaced with well-compacted engineered fill or lean concrete as described in Section 5.3. It is important that the soil at the base of and below each spread footing excavation be carefully observed and evaluated as described in Section 5.3 to determine whether the actual bearing materials are consistent with those upon which the recommendations are based. It is recommended that the contract documents include provisions for the removal and replacement of unsuitable materials as determined to be necessary based on field observations.

In using the net allowable bearing pressure, the weight of the footing and backfill over the footing including the weight of the floor slab need not be considered; hence, only loads applied at or above the finished floor need to be used for dimensioning the footings. Wall footings should be at least 1.5 feet wide and column footings should be at least 2.5 feet wide for bearing capacity considerations. The Indiana Building Code suggests 2 feet of foundation embedment below the exterior grade for Jefferson County. However, to minimize potential undercutting of near surface soils in foundation areas, foundations may be designed to bear at 2.5 to 3 feet depth.

Uplift forces on the spread footings can be resisted by the weight of the footings and the soil material that is placed over the footings. It is recommended that the soil weight considered to resist uplift loads be limited to that immediately above and within the perimeter of the footings (unless a much higher factor of safety is used). A total soil unit weight of 120 lbs/cu.ft can be used for the backfill material placed above the footings, provided it is compacted as recommended in Section 5.2. It is also recommended that a factor of safety of at least 1.3 be used for calculating uplift resistance from the footings (provided only the weight of the footing and the soil immediately above it are used to resist uplift forces).

Lateral forces on a spread footing can be resisted by the passive lateral earth pressure against the side of the footing and by friction between the soil and the base of the footing. A uniform allowable passive pressure of 350 lbs/sq.ft can be used for that portion of the footing that is below a depth of 2 ft below the final exterior grade (no portion of the footing above this depth should use for lateral resistance). An allowable coefficient of friction between the base of the footing and the underlying soil of 0.3 (based on a factor of safety of 1.5) can be used in conjunction with the minimum downward load on the base of the footing.

Care must be exercised when excavating near the existing streets, utilities, etc. to protect the integrity of the existing foundations, and other features. Bracing or underpinning may be required where it is necessary to excavate below the bottom elevation of the existing streets, utilities, etc.

4.3 Floor Slabs

Floor slabs can be supported on stiff, low-plasticity natural soils or on newly compacted structural fill. Where unsuitable soils are encountered, they should be undercut and replaced with low-plasticity clay soil and/or granular fill, or lime stabilized as recommended by the geotechnical engineer during construction. In areas of grade-raise fill, the combination of undercut and fill should ensure that a minimum of 1.5 feet of low-plasticity clay and/or granular fill is maintained underneath the floor slab.

It is recommended that the slab-on-grade floors be supported on a minimum 6 inch thick layer of granular material such as crushed stone. This is to help equalize moisture conditions beneath the floor slab and provide uniform support of the slab, as well as protect the subgrade through construction. Provided that a minimum of 6 inches of crushed stone is placed beneath the floor slabs, a modulus of subgrade reaction of 100 pci can be used for design of the floor slabs.

We have recommended in this report that a minimum 6-inch-thick layer of granular base be used to support construction equipment prior to concrete placement. However, a minimum of 4 inch may be considered to be used provided no construction traffic is allowed on the floor slab base prior to placement. Based on our experience, limiting traffic on the building pad stone during construction is difficult to achieve.

4.4 Seismic Site Class

Seismic site classification was performed and design spectral responses were calculated in accordance with the 2018 International Building Code. A 100 feet depth subsurface profile consisting of a maximum 24 feet of firm soil overlying 76 feet of rock and foundation construction expected to consist of shallow spread foundations bearing below local frost depth was used in our analysis, yielding a Site Class “C”. Site specific seismic shear wave velocity testing was also performed. ATC recommends the following seismic parameters for use in design:

Table 2: Seismic Site Classification and Design Spectral Response Values

Seismic Design Parameter	Parameter Value
Seismic Site Classification	C
Design Spectral Response at Short Periods (SD_S)	0.133
Design Spectral Response at 1-Second Periods (SD_1)	0.104

4.5 Pavement

Pavements can be supported on stiff, low-plasticity natural soils or on newly compacted structural fill. Where unsuitable soils are encountered, they should be undercut and replaced with low-plasticity clay soil and/or granular fill, or lime stabilized as recommended by the geotechnical engineer during construction. In areas of grade-raise fill, the combination of undercut and fill should ensure that a minimum of 1.5 feet of low-plasticity clay and/or granular fill is maintained underneath the pavement.

Controlling subsurface water in pavement areas is important to enhancing the long term performance of the pavements. The pavement subgrade surface should be uniformly sloped to facilitate drainage through the granular base and to avoid ponding of water beneath the pavement. Subsurface perforated drainage pipes should at a minimum be included beneath the lowest lines of the pavement and between catch basins. Since the storm water catch basins in pavement areas are at the lowest points in pavement areas where water is often trapped beneath the pavements, they should be designed to allow water to drain from the aggregate base into the catch basins. At a minimum, subsurface perforated drainage pipes should be included that extend out beneath the pavement at least 20 feet from the catch basins in at least four directions in addition to the other subsurface perforated drainage pipes included for the project.

The following report sections outline recommendations for asphalt and concrete pavements for automobile parking areas and truck zones. It is important to note that the recommendations for the automobile parking areas are based on the assumption that these areas will not be subject to any heavy truck traffic. Therefore, in areas where truck traffic cannot be controlled (i.e., driveways), it is suggested that the thicker pavement section be utilized.

4.5.1 Asphalt Pavement

Based on the proposed site use, we expect that the pavements will primarily be subject to light duty vehicle traffic and weekly garbage collection and delivery trucks. Based on a design period of 20 years, the design equivalent single axle load (ESAL) and the conditions encountered at the site, the following asphalt pavement sections are recommended:

Automobile Parking Areas (no truck traffic)	1.5 inch of asphalt surface course 2.5 inch of asphalt base course 6 inch of granular base
Driveway Areas and Truck Zones	1.5 inch of asphalt surface course 3.5 inch of asphalt base course 6 inch of granular base

The base should be a well-graded crushed stone with a maximum of 12 percent (by weight) finer than the No. 200 sieve such in accordance with Indiana Department of Transportation (INDOT) Specifications for #53 or #73 crushed stone base material. The recommended pavement sections would allow for future milling and overlay without potentially sacrificing the underlying pavement section.

4.5.2 Concrete Pavement

Concrete pavement thicknesses were determined from methods developed by the Portland Cement Association (PCA), the American Association of State Highway and Transportation Officials (AASHTO)

and the American Concrete Institute (ACI). These methods assume that the subgrade is firm, well-compacted and non-pumping and that all joints are properly designed, located and sealed to minimize moisture seepage into the subgrade. It is also important to insure that proper concrete curing practices will be employed and that traffic will not be allowed until the concrete has had sufficient time to cure.

For design calculation purposes, the compressive strength of the concrete was assumed to be 4,000 lbs/sq.in. The modulus of subgrade reaction of the soil (k) was estimated to be 100 lbs/cu.in.

Based on the above information, the following concrete pavement sections are recommended:

Automobile Parking Areas (no truck traffic)	5 in. of concrete over minimum 6 in. of crushed stone over a well-compacted, non-pumping subgrade.
Driveway Areas and Truck Zones	6 in. of concrete over minimum 6 in. of crushed stone over a well-compacted, non-pumping subgrade.
Dumpster Pads and High Shear Zones	7 in. of concrete over minimum 6 in. of crushed stone over a well-compacted, non-pumping subgrade.

The performance of the asphalt and concrete paving sections is highly dependent on controlling the pumping and rutting of the subgrade soils. Elevated moisture contents were observed in the near surface soils at several test boring locations. It is important that surface and subgrade drainage be controlled to prevent water from ponding in pavement areas.

4.6 Site Grading and Drainage

Proper surface and subgrade drainage should be provided at the site to minimize any increase in moisture content of the foundation soils. Pavement subgrades should be sloped to drain and stone base underlying pavement sections should be daylighted (exposed and draining) where possible at the edge of pavements. The exterior grade should be sloped away from the structures to prevent ponding of water. Any roof drains or down spouts should be channeled or piped well away from the structure.

5 GENERAL CONSTRUCTION PROCEDURES AND RECOMMENDATIONS

Since this investigation identified actual subsurface conditions only at the test boring locations, it was necessary for our geotechnical engineers to extrapolate these conditions in order to characterize the entire project site. Even under the best of circumstances, the conditions encountered during construction should be expected to vary somewhat from the test boring results and may, in the extreme case, differ to the extent that modifications to the foundation recommendations become necessary. Therefore, we recommend that ATC be retained as geotechnical consultant throughout the earth-related

phases of this project to correlate actual soil and rock conditions with test boring data, identify variations, conduct additional tests that may be needed and recommend solutions to earth-related problems that may develop.

5.1 Site Preparation

All areas that will support structures, slabs, pads, and pavements should be properly prepared. After rough grade has been established and prior to placement of fill, the exposed subgrade should be carefully observed by the geotechnical engineer, or a qualified soils technician working under the direction of the geotechnical engineer, by probing and testing as needed. Any organic material still in place, frozen, wet, soft or loose soil, uncontrolled fill, existing demolition debris and pavements, foundation remnants, utilities, and other undesirable materials should be removed. The exposed subgrade should be evaluated by proofrolling with suitable equipment to check for pockets of soft material hidden beneath a thin crust of better soil. Any unsuitable materials thus exposed should be removed and replaced with well-compacted, engineered fill as outlined in Section 5.2.

It is important that positive surface drainage be established at the beginning of the earthwork operations and be maintained throughout the project. Surface water must not be allowed to pond. Furthermore, compaction and sealing of the subgrade surface is important when precipitation is expected. The site storm drainage elements (i.e., catch basins, pipes, manholes, etc.) should be installed as early as possible, which will aid in control of surface and ground water.

Care should be exercised during the grading operations at the site. Due to the nature of the near surface soils, the traffic of construction equipment may create pumping and general deterioration of the shallower soils, especially if excess surface water is present. The grading, therefore, should be done during a dry season, if at all possible. Based on our experience on other nearby sites, it is likely that the subgrade soils in some areas will be wet and soft when exposed. The extent to which yielding subgrade may be a problem is difficult to predict beforehand since it is dependent upon several factors including seasonal conditions, precipitation, cut depths, sequencing and scheduling of the earthwork, surface and subsurface drainage measures, the weight and traffic patterns of construction equipment, etc. Therefore, it is suggested that provisions be made in the contract documents for subgrade improvements to be used where determined to be necessary in the field at the time of construction.

It may be possible to improve or stabilize the subgrade soils in the areas that are found to be excessively wet, soft or yielding at the time of construction, by discing, aerating and recompacting. However, this will require a combination of time to allow for working the soils, favorable weather conditions for drying and firmer soils at shallow depth below the yielding soils in order to be successful. If site grading operations are planned through the winter months, subgrade stabilization is expected to be required as part of fill construction to aid in moisture conditioning during fill construction through the seasonably wetter winter months.

If it is not possible to improve the subgrade soils in this manner because of weather conditions, scheduling or other constraints or site conditions (which is most often the case); mechanical stabilization (i.e., a geogrid with additional crushed limestone placed over the subgrade), chemical stabilization by lime or cement modification, or removal of the unsuitable soils and replacement with crushed limestone or engineered soil fill. The best method for stabilizing the subgrade should be determined in the field at the time of construction based upon the actual field conditions in conjunction with the specific soil

type encountered at the locations requiring stabilization, the size of the areas requiring stabilization and the construction schedule.

5.2 Fill Compaction

All engineered fill beneath footings, floor slabs and pavements should be compacted to a dry density of at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). For soil, the compaction should be accomplished by placing the fill in about 8 inches (or less) loose lifts and mechanically compacting each lift to at least the specified minimum dry density.

It is recommended that only well-graded granular material, such as pit-run sand, gravel, or INDOT #53 or #73 crushed stone or lean concrete be used to fill undercut excavations beneath footings and other excavations of limited lateral dimensions where proper compaction of cohesive materials is difficult and compaction can only be accomplished with small vibratory equipment.

Clay fill materials should be compacted using a non-vibratory sheeps-foot roller and aggregate fill materials should be compacted using a vibratory smooth-drum roller or as judged acceptable by the geotechnical engineer. Field density tests should be performed on each lift as necessary to insure that adequate moisture conditioning and compaction is being achieved.

Prior to beginning fill construction, we recommend samples of proposed borrow materials be collected for standard Proctor testing. The following criteria are recommended where soil material is utilized for structural fill:

- Soils referred to as ‘low volume change” in this report have a Liquid Limit less than 50 percent.
- Limit maximum particle sizes to 4-inches (in the largest dimension) and less than 3 percent organic material by weight.
- Maintain the moisture content of the fill soils to within ±2 percentage points of the soils' optimum moisture content.
- Perform one in-place density test in every 5,000 square feet for each one-foot- thick fill layer, with a minimum of two tests per lift.
- Retain the geotechnical engineer to observe, document and test fill placement and compaction operations.
- Provide and maintain efficient drainage of building and pavement subgrades both during and after construction to prevent ponding of water and to promote rapid and efficient surface drainage.
- Maintain positive surface drainage to prevent water from ponding on surfaces during all earthwork operations.
- Roll fill surfaces with a rubber-tired or steel-drummed roller prior to precipitation events to improve surface runoff if precipitation is expected.
- Contact the geotechnical engineer should the subgrade soils become excessively wet, dry, or frozen.

5.3 Footing Excavation Observations

The soil at the base of each spread footing excavation should be observed and evaluated by a geotechnical engineer or a qualified soils technician working under the direction of the geotechnical engineer to insure that any remnants from previous construction, old fill material, soft natural soil and any otherwise undesirable material is identified and removed at footing locations and that the footing will bear on satisfactory material. At the time of such inspection, it will be necessary to make hand auger borings or use a hand penetration device in the base of the foundation excavation to determine

whether the soils below the base are satisfactory for foundation support. The necessary depth of penetration will be established during inspection.

Where undercutting is required to remove unsuitable materials beneath footings, the proposed footing bearing elevation may be re-established by backfilling after all undesirable materials have been removed. The undercut excavation beneath each footing should extend to suitable bearing soils. The dimensions of the excavation base should be determined by imaginary planes extending downward and outward on a 2 (vertical) to 1 (horizontal) slope from the base perimeter of the footing. The entire excavation should then be refilled with engineered fill. The engineered fill should be limited to low plasticity site soils or well-graded crushed stone (e.g., INDOT #53 or #73) compacted to the minimum dry density recommended in Section 5.2; or lean concrete or cementitious flowable fill may be used. Special care should be exercised to remove any sloughed, loose or soft materials near the base of the excavation slopes. In addition, special care should be taken to "tie-in" the compacted fill with the excavation slopes with benches as necessary. This is to ensure that no pockets of loose or soft materials will be left in place along the excavation slopes below the foundation bearing level.

Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in condition such as from disturbance, rain and freezing. Surface run-off water should be drained away from the excavation and not allowed to pond. If possible, all footing concrete should be placed the same day the excavation is made. If this is not practical, the footing excavations should be adequately protected. It is recommended that a concrete “mud mat” be placed at the base of the footing excavations to protect the subgrade soils from deterioration due to seepage of ground water, surface water, etc., and to aid in the proper placement of reinforcing steel.

5.4 Construction Dewatering

Encountered ground water levels during the exploration does not appear to require any specific consideration during construction. However, depending on the seasonal conditions, some seepage into excavations may be experienced. It is anticipated that such seepage can be handled by conventional dewatering methods such as by pumping from sumps. However, in cases where a saturated layer is encountered in the base or sidewall of the excavation, it will not be possible to pump water directly from the base of the excavation without causing deterioration of the subgrade soil. In this case, it will be necessary to pump from a sump located adjacent to the excavation or to depress the ground water using wells or well points. The best dewatering system for each case must be determined at the time of construction based upon actual field conditions. Dewatering is not expected to be required.

6 FIELD INVESTIGATION

Borings B-1 to B-8, P-1 to P-5, and F-1 to F-3 were advanced at the approximate locations shown on the Site Plan (Figure 2 in the Appendix). The test borings were extended to select depths or auger refusal depth, whichever was less. Split-barrel samples were obtained within the overburden soils by the Standard Penetration Test procedures (ASTM D-1586) at 2.5 to 5 ft intervals.

Logs of all borings, which show visual descriptions of all soil strata encountered using the Unified Soil Classification System, have been included in numerical order in the Appendix. Ground water

observations, sampling information and other pertinent field data and observations are also included. In addition, a "Legend to Soil Classification and Symbols" document defining the terms and symbols used on the logs is provided immediately following the boring logs.

7 LABORATORY INVESTIGATION

The disturbed samples were inspected and classified in accordance with the Unified Soil Classification System and the boring logs were edited as necessary. To aid in classifying the soils and to determine general soil characteristics, select laboratory testing methods were performed on selected samples. The results of these tests are included on the test boring logs and summary sheets in the Appendix.

8 LIMITATIONS OF STUDY

An inherent limitation of any geotechnical engineering study is that conclusions must be drawn on the basis of data collected at a limited number of discrete locations. The recommendations provided in this report were developed from the information obtained from the test borings that depict subsurface conditions only at these specific locations and at the particular time designated on the logs. Soil and bedrock conditions at other locations may differ from conditions occurring at these boring locations. The nature and extent of variations between the borings may not become evident until the course of construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report after performing on-site observations during the excavation period and noting the characteristics of any variation.

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either express or implied. This company is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, ground water or surface water within or beyond the site studied.

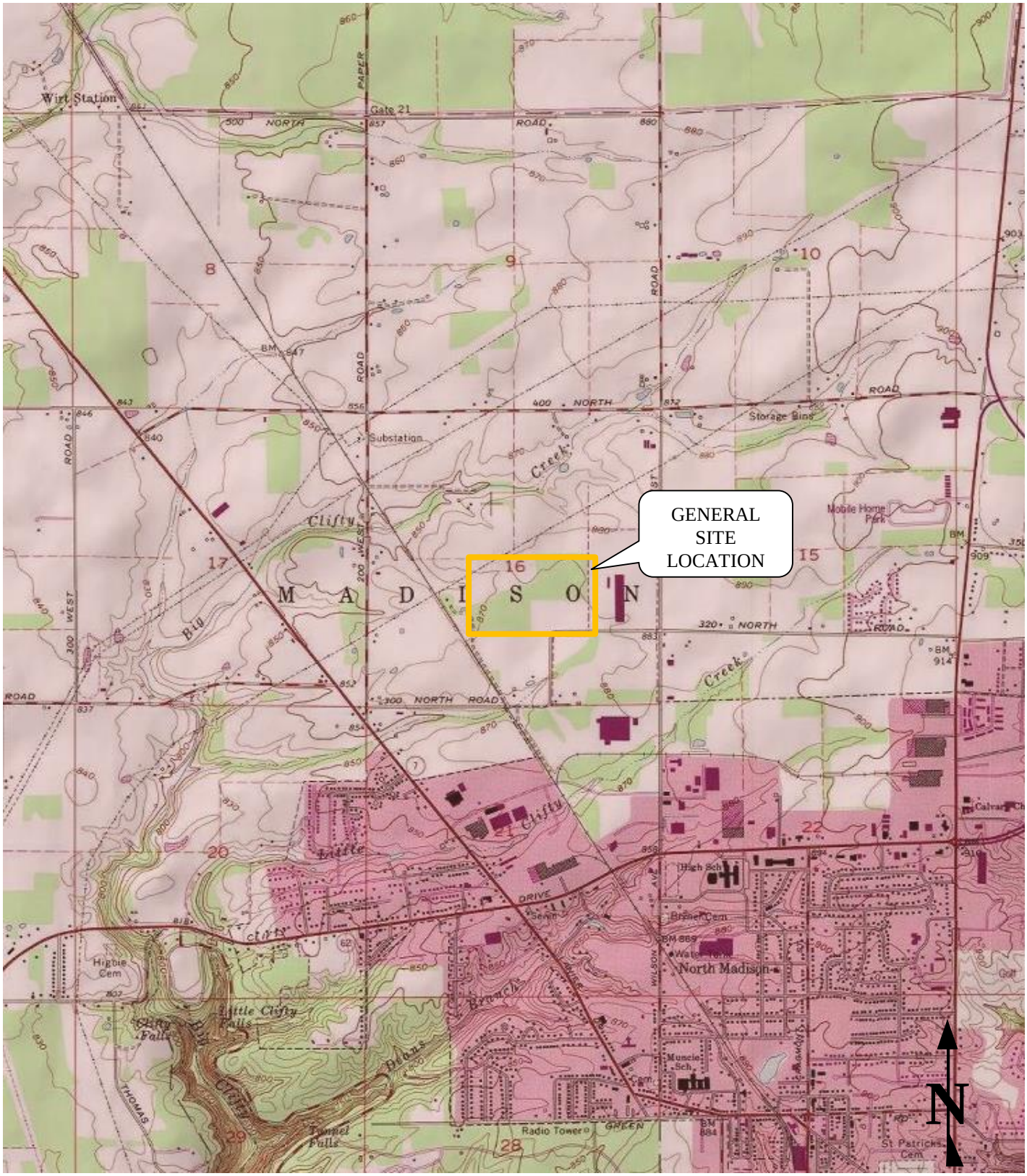
ATC assumes no responsibility for any construction procedures, temporary excavations (including utility trenches), temporary dewatering or site safety during or after construction. The contractor will be solely responsible for all construction procedures, construction means and methods, construction sequencing and for safety measures during construction. All applicable federal, state and local laws and regulations regarding construction safety must be followed, including current Occupational Safety and Health Administration (OSHA) Regulations including OSHA 29 CFR Part 1926 “Safety and Health Regulations for Construction”, Subpart P “Excavations”, and/or successor regulations. The Contractor is solely responsible for designing and constructing stable, temporary excavations and should brace, shore, slope, or bench the sides of the excavations as necessary to maintain stability of the excavation sides and bottom.

Appendix

Figure 1: Site Location Map
Figure 2: Boring Location Plan

“Legend to Soil Classification and Symbols”
“Important Information About Your Geotechnical Engineering Report”

Boring Logs
Laboratory Summary



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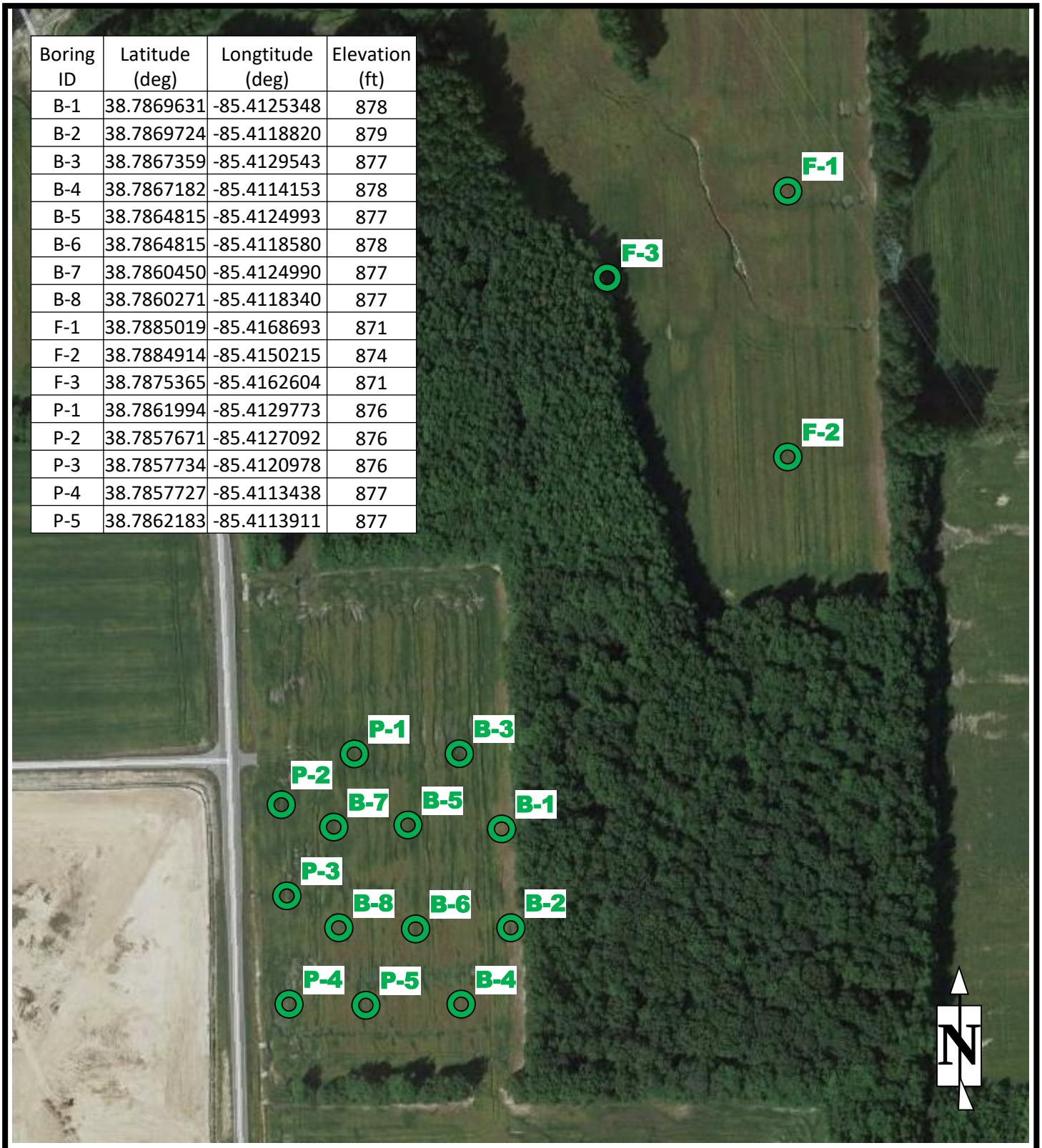
2724 River Green Circle
Louisville, KY 40206
Phone: (502) 722-1401
Fax: (502) 267-4072

PROJECT NO: LOUGE19051		
DESIGNED BY: RCO		REVIEWED BY: TA
DRAWN BY: RCO	DATE: 8/19/19	FIGURE: 1

VICINITY MAP

Jefferson County Jail Facility
1106 W. Hutchinson Lane
Madison, Indiana

Boring ID	Latitude (deg)	Longtitude (deg)	Elevation (ft)
B-1	38.7869631	-85.4125348	878
B-2	38.7869724	-85.4118820	879
B-3	38.7867359	-85.4129543	877
B-4	38.7867182	-85.4114153	878
B-5	38.7864815	-85.4124993	877
B-6	38.7864815	-85.4118580	878
B-7	38.7860450	-85.4124990	877
B-8	38.7860271	-85.4118340	877
F-1	38.7885019	-85.4168693	871
F-2	38.7884914	-85.4150215	874
F-3	38.7875365	-85.4162604	871
P-1	38.7861994	-85.4129773	876
P-2	38.7857671	-85.4127092	876
P-3	38.7857734	-85.4120978	876
P-4	38.7857727	-85.4113438	877
P-5	38.7862183	-85.4113911	877



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2724 River Green Circle
Louisville, KY 40206
Phone: (502) 722-1401
Fax: (502) 267-4072

PROJECT NO: LOUGE19051

DESIGNED BY: RCO		REVIEWED BY: TA
DRAWN BY: RCO	DATE: 8/19/2019	FIGURE: 2

BORING LOCATION PLAN

Jefferson County Jail Facility
1106 W. Hutchinson Lane
Madison, Indiana

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)

- Fill
- Asphalt
- Topsoil
- Gravel
- Sand
- Silt
- Lean Clay
- Fat Clay
- Silty Sand
- Clayey Sand
- Sandy Silt
- Clayey Silt
- Sandy Clay
- Silty Clay
- Limestone
- Sandstone
- Siltstone
- Shale

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	Over 30

RELATIVE DENSITY OF COHESIONLESS SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	5 to 10
Firm	11 to 20
Very Firm	21 to 30
Dense	31 to 50
Very Dense	Over 50

ESTIMATED RELATIVE MOISTURE CONDITION

(Visual classification relative to assumed optimum moisture content (OMC) of standard proctor)

Dry	- Air dry to dusty
Slightly Moist	- Dusty to approximately -2% OMC
Moist	- Approximately between ±2% OMC
Very Moist	- From approximately +2% to nearly saturated
Wet	- Contains free water or nearly saturated

PARTICLE SIZE IDENTIFICATION

Boulders	Over 6"
Gravel	
Coarse	6" - ½"
Fine	½" - 2 mm
Sand	
Coarse	2 mm - 0.6 mm
Medium	0.6 mm - 0.2 mm
Fine	0.2 mm - 0.06 mm
Silt	0.06 mm - 0.005 mm
Clay	Less than 0.005 mm

RELATIVE HARDNESS OF ROCK

Very soft	Pieces 1 inch or more in thickness can be broken by finger pressure; can be scratched readily by fingernail.
Soft	May be broken with fingers.
Medium	May be scratched with a nail; corners and edges may be broken with fingers.
Moderately Hard	Moderate blow of hammer required to break sample.
Hard	Hard blow of hammer required to break sample.
Very Hard	Several hard blows of hammer required to break sample.

SAMPLER TYPES

(Shown in Sampler Column)

- Shelby Tube
- Split Spoon
- Rock Core
- Grab Sample
- No Recovery

TERMS

Standard Penetration Resistance	The Number of Blows of a 140 lb. Hammer Falling 30 in. Required to Drive a 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D-1586. Also commonly referred to as an "N" value.
REC	Recovery - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%
RQD	Rock Quality Designation - Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.

ATC ASSOCIATES INC.

Important Information About Your

Geotechnical Engineering Report

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

The following information is provided to help you manage your risks.

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 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 your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the 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.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of 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,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- 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 study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the 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 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 construction recommendations included in your report. *Those 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 recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower 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. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing 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 Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors 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 contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors 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 contractors do not 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.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental 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 geoenvironmental 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, a number of 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 ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

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

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ATC Group Services, LLC
2724 River Green Circle
Louisville, KY 40206
(502) 722-1401
Fax (502) 267-4072

TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-1
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 878.0
Latitude (ft): 38.786963, Longitude (ft): -85.412535

TEST DATA

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.5												
LEAN CLAY (CL), with silt, Light brown, STIFF to VERY STIFF				SS			6-6-5- [*11*]		15.7				
				SS			4-6-7- [*13*]		19.5				
		5											
				SS			14-11-11- [*22*]		17.9				
FAT CLAY (CH), with silt, Light brown, HARD	8.0												
				SS			12-12-15- [*27*]		24.8				
		10											
- light reddish brown to brown, with black nodules													
				SS			27-50/0"-- [*50/0"*]		18.0				
Auger Refusal at 14 feet	14.0												

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

ATC Group Services, LLC
2724 River Green Circle
Louisville, KY 40206
(502) 722-1401
Fax (502) 267-4072

TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-2
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

TEST DATA

SOIL CLASSIFICATION SURFACE ELEVATION (ft): 879.0 Latitude (ft): 38.786972, Longitude (ft): -85.411882	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.5												
LEAN CLAY (CL), with silt, Light brown, FIRM to VERY STIFF				SS			2-3-3- [*6*]		20.4				
				SS			3-6-6- [*12*]		23.3				
		5											
- light reddish brown to light brown				SS			11-11-11- [*22*]		18.5				
FAT CLAY (CH), with silt, Light reddish brown, trace gray, VERY STIFF	8.0			SS			11-11-11- [*22*]		16.6				
		10											
Auger Refusal at 13.2 feet	13.2												

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
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DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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2724 River Green Circle
Louisville, KY 40206
(502) 722-1401
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TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-3
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 877.0
Latitude (ft): 38.786736, Longitude (ft): -85.412954

TEST DATA

Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
0.6												
TOPSOIL												
SILTY CLAY (CL-ML), Light brown, STIFF			SS			5-5-5- [*10*]		13.5	24	19		
3.0												
LEAN CLAY (CL), with silt and sand, Light brown, VERY STIFF to HARD			SS			6-6-7- [*13*]		18.5				
	5											
			SS			10-11-10- [*21*]		21.1				
			SS			13-13-14- [*27*]		12.8				
	10											
12.8												
Auger Refusal at 12.8 feet												

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
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DC - Driving Casing
MD - Mud Drilling
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Louisville, KY 40206
(502) 722-1401
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TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-4
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 878.0
Latitude (ft): 38.786718, Longitude (ft): -85.411415

TEST DATA

Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
0.5												
			SS			2-2-4- [*6*]		18.6				
			SS			4-4-8- [*12*]		22.2				
	5											
			SS			10-11-12- [*23*]		18.4				
			SS			12-12-12- [*24*]		20.3				
	10											
13.0												

TOPSOIL

LEAN CLAY (CL), with silt, Light brown to light reddish brown, FIRM to VERY STIFF

- with black nodules

Auger Refusal at 13 feet

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

ATC Group Services, LLC
2724 River Green Circle
Louisville, KY 40206
(502) 722-1401
Fax (502) 267-4072

TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-5
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 877.0
Latitude (ft): 38.786481, Longitude (ft): -85.412499

TEST DATA

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.6												
LEAN CLAY (CL), with silt, Light brown, STIFF to HARD				SS			4-5-6- [*11*]		18.5				
- light brown to reddish brown				SS			5-5-8- [*13*]		19.6				
		5		SS			10-11-12- [*23*]		19.6				
				SS			12-14-14- [*28*]		16.1				
		10											
Auger Refusal at 13.1 feet	13.1												

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-6
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 878.0
Latitude (ft): 38.786482, Longitude (ft): -85.411858

TEST DATA

Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
0.5												
TOPSOIL												
LEAN CLAY (CL), with silt, Light brown to light reddish brown, FIRM to VERY STIFF			SS			3-3-3- [*6*]		15.2				
			SS			4-5-7- [*12*]		23.0	37	16		
	5		SS			12-11-12- [*23*]		16.0				
			SS			10-12-12- [*24*]		18.1	38	13		
	10											
12.0												
FAT CLAY (CH), with silt, Light brown to light reddish brown, HARD - dark brown to light reddish brown with black nodules			SS			26-32-50/3"- [*50/3"*]		20.2				
14.8												
Auger Refusal at 14.8 feet												

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
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2724 River Green Circle
Louisville, KY 40206
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TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-7
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 876.0
Latitude (ft): 38.786045, Longitude (ft): -85.412499

TEST DATA

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.6												
LEAN CLAY (CL), with silt, Light brown to light reddish brown, with gray, STIFF to VERY STIFF				SS			3-4-3- [*7*]		18.1				
- light brown to gray with black nodules				SS			4-5-7- [*12*]		19.1				
		5											
- light brown to light reddish brown				SS			11-10-10- [*20*]		17.1				
FAT CLAY (CH), Light brown to light reddish brown, with gray, VERY STIFF to HARD	8.0			SS			10-11-13- [*24*]		18.8				
		10											
- brown to light reddish brown, with black nodules and rounded rock fragments				SS			30-31-34- [*65*]		15.5				
		15											
Auger Refusal at 17.3 feet	17.3												

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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Fax (502) 267-4072

TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **B-7A**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/14/19	Hammer Wt.	140	lbs.
Date Completed	8/14/19	Hammer Drop	30	in.
Drill Foreman	D. Dunaway	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	HSA, AH	Shelby Tube OD	3	in.

TEST DATA

SOIL CLASSIFICATION SURFACE ELEVATION (ft): 876.0 Latitude (ft): 38.786045, Longitude (ft): -85.412499	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
AUGER DRILLING - NO SAMPLES OBTAINED		5 10 15											

Sample Type
- SPT - Standard Penetration Test
- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling
- MH - Manual Hammer
- AH - Automatic Hammer

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(502) 722-1401
Fax (502) 267-4072

TEST BORING LOG
(Continued)

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **B-7A**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/14/19	Hammer Wt.	140	lbs.
Date Completed	8/14/19	Hammer Drop	30	in.
Drill Foreman	D. Dunaway	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	HSA, AH	Shelby Tube OD	3	in.

TEST DATA

SOIL CLASSIFICATION (continued) Latitude (ft): 38.786045, Longitude (ft): -85.412499	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
AUGER DRILLING - NO SAMPLES OBTAINED													
LIMESTONE, Light gray, fine grained, with black shale partings at 25 and 26 ft	24.0	25		RC									RQD=97%
Boring Terminated at 29 feet	29.0												

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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Louisville, KY 40206
(502) 722-1401
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TEST BORING LOG

CLIENT	Jefferson County Board of Commissioners	BORING #	B-8
PROJECT NAME	Proposed Jail Facility	JOB #	LOUGE19051
PROJECT LOCATION	1106 W Hutchinson Lane	DRAWN BY	R. Ortiz
	Madison, Indiana	APPROVED BY	T. Andres

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 877.0
Latitude (ft): 38.786027, Longitude (ft): -85.411834

TEST DATA

Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
0.5												
			SS			3-4-4- [*8*]		20.4				
			SS			4-5-5- [*10*]		21.9				
	5											
			SS			9-11-10- [*21*]		19.3				
8.0												
			SS			11-11-12- [*23*]		17.5				
	10											
			SS			28-32-37- [*69*]		18.4				
	15											
17.7												

TOPSOIL

LEAN CLAY (CL), with silt, Light brown to light reddish brown, with silt, STIFF to VERY STIFF

FAT CLAY (CH), with silt, Light brown to light reddish brown, with silt, VERY STIFF to HARD

- brown to light reddish brown, with black nodules and rounded rock fragments

Auger Refusal at 17.7 feet

Sample Type

SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **F-1**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 871.0
Latitude (ft): 38.788502, Longitude (ft): -85.416869

TEST DATA

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.7												
LEAN CLAY (CL), with silt, Light brown to light reddish brown, with gray, FIRM to VERY STIFF				SS			2-3-3- [*6*]		21.2				
				SS			4-4-4- [*8*]		21.2				
		5											
				SS			9-8-11- [*14*]		21.8				
FAT CLAY (CH), with silt, Light brown to light reddish brown, with gray, HARD	8.0			SS			11-11-16- [*27*]		20.9				
Boring Terminated at 10 feet	10.0	10											

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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(502) 722-1401
Fax (502) 267-4072

TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **F-2**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SOIL CLASSIFICATION

SURFACE ELEVATION (ft): 874.0
Latitude (ft): 38.788491, Longitude (ft): -85.415022

TEST DATA

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.8												
LEAN CLAY (CL), with silt, Light brown to light reddish brown, with gray, FIRM to VERY STIFF				SS			3-2-4- [*6*]		20.0				
				SS			3-4-4- [*8*]		23.0				
		5											
				SS			9-9-11- [*20*]		19.0				
				SS			9-12-15- [*27*]		20.3	46	16		
Boring Terminated at 10 feet	10.0	10											

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **F-3**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SURFACE ELEVATION (ft): 872.0
Latitude (ft): 38.787536, Longitude (ft): -85.41626

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.8												
LEAN CLAY (CL), with silt, Light brown, FIRM to VERY STIFF				SS			3-3-3- [*6*]		18.0				
- light brown to light reddish brown with gray, with organics		5		SS			3-3-5- [*8*]		18.3				
				SS			10-9-10- [*19*]		17.5				
FAT CLAY (CH), with silt, Light brown to light reddish brown, with gray, HARD	8.0			SS			10-13-14- [*27*]		19.5				
Boring Terminated at 10 feet	10.0	10											

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **P-1**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SURFACE ELEVATION (ft): 876.0
Latitude (ft): 38.786199, Longitude (ft): -85.412977

TEST DATA

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.5												
LEAN CLAY (CL), with silt, Light brown to reddish brown, STIFF				SS			3-5-4- [*9*]		19.3				
				SS			5-5-5- [*10*]		23.8				
Boring Terminated at 5 feet	5.0	5											

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **P-2**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SURFACE ELEVATION (ft): 875.0
Latitude (ft): 38.785767, Longitude (ft): -85.412709

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.6												
LEAN CLAY (CL), with silt, Light brown to reddish brown, STIFF				SS			4-3-4- [*7*]		16.6				
				SS			3-5-6- [*11*]		19.9				
Boring Terminated at 5 feet	5.0	5											

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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(502) 722-1401
Fax (502) 267-4072

TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **P-3**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SURFACE ELEVATION (ft): 876.0
Latitude (ft): 38.785773, Longitude (ft): -85.412098

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.6												
LEAN CLAY (CL), with silt, Light brown to reddish brown, STIFF, trace organics				SS			3-4-4- [*8*]		18.2				
- with black nodules				SS			4-4-5- [*9*]		18.8				
Boring Terminated at 5 feet	5.0	5											

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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2724 River Green Circle
Louisville, KY 40206
(502) 722-1401
Fax (502) 267-4072

TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**, **Madison, Indiana**

BORING #: **P-4**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SURFACE ELEVATION (ft): 877.0
Latitude (ft): 38.785773, Longitude (ft): -85.411344

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.6												
LEAN CLAY (CL), with silt, Light brown to reddish brown, STIFF				SS			5-4-4- [*8*]		16.0				
- with black nodules				SS			3-5-7- [*12*]		18.2				
Boring Terminated at 5 feet	5.0	5											

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

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Fax (502) 267-4072

TEST BORING LOG

CLIENT: **Jefferson County Board of Commissioners**
PROJECT NAME: **Proposed Jail Facility**
PROJECT LOCATION: **1106 W Hutchinson Lane**
Madison, Indiana

BORING #: **P-5**
JOB #: **LOUGE19051**
DRAWN BY: **R. Ortiz**
APPROVED BY: **T. Andres**

DRILLING and SAMPLING INFORMATION

Date Started	8/7/19	Hammer Wt.	140	lbs.
Date Completed	8/7/19	Hammer Drop	30	in.
Drill Foreman	M. Reynolds	Spoon Sampler OD	2	in.
Inspector	N/A	Rock Core Dia.	2	in.
Boring Method	Geoprobe, AH	Shelby Tube OD	3	in.

SURFACE ELEVATION (ft): 877.0
Latitude (ft): 38.786218, Longitude (ft): -85.411391

SOIL CLASSIFICATION	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [*N-Value*] *blows/foot*	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
TOPSOIL	0.6												
LEAN CLAY (CL), with silt, Light brown to reddish brown, FIRM to STIFF				SS			3-3-3- [*6*]		20.7				
- with blck nodules				SS			4-5-5- [*10*]		19.6				
Boring Terminated at 5 feet	5.0	5											

TEST DATA

Sample Type
SPT - Standard Penetration Test
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools	N/A	ft.
At Completion (in augers)	N/A	ft.
At Completion (open hole)	N/A	ft.
After N/A hours	N/A	ft.
After N/A hours	N/A	ft.
Cave Depth	N/A	ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
MH - Manual Hammer
AH - Automatic Hammer

Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class-ification	Water Content (%)	Unconfined Compressive Strength (tsf)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Cc	Cr	pH
B-1	1.0	SS					15.7												
B-1	3.5	SS					19.5												
B-1	6.0	SS					17.9												
B-1	8.5	SS					24.8												
B-1	13.5	SS					18.0												
B-2	1.0	SS					20.4												
B-2	3.5	SS					23.3												
B-2	6.0	SS					18.5												
B-2	8.5	SS					16.6												
B-3	1.0	SS	24	19	5	CL-ML	13.5												
B-3	3.5	SS					18.5												
B-3	6.0	SS					21.1												
B-3	8.5	SS					12.8												
B-4	1.0	SS					18.6												
B-4	3.5	SS					22.2												
B-4	6.0	SS					18.4												
B-4	8.5	SS					20.3												
B-5	1.0	SS					18.5												
B-5	3.5	SS					19.6												
B-5	6.0	SS					19.6												
B-5	8.5	SS					16.1												
B-6	1.0	SS					15.2												
B-6	3.5	SS	37	16	21	CL	23.0												
B-6	6.0	SS					16.0												
B-6	8.5	SS	38	13	25	CL	18.1												
B-6	13.5	SS					20.2												

ATC Group Services, LLC
2724 River Green Circle
Louisville, KY 40206
phone (502) 722-1401
Fax (502) 267-4072

Summary of Laboratory Results

Client: Jefferson County Board of Commissioners
Project: Proposed Jail Facility
Location: 1106 W Hutchinson Lane
City, State: Madison, Indiana
Number: LOUGE19051 Date: 8/26/2019

US_LAB-SUMMARY LANDSCAPE JEFFERSON COUNTY JAIL.GPJ ATC.GINT7 OFFICIAL TEMPLATE.GDT 8/26/19

Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class-ification	Water Content (%)	Unconfined Compressive Strength (tsf)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Cc	Cr	pH
B-7	1.0	SS					18.1												
B-7	3.5	SS					19.1												
B-7	6.0	SS					17.1												
B-7	8.5	SS					18.8												
B-7	13.5	SS					15.5												
B-8	1.0	SS					20.4												
B-8	3.5	SS					21.9												
B-8	6.0	SS					19.3												
B-8	8.5	SS					17.5												
B-8	13.5	SS					18.4												
F-1	1.0	SS					21.2												
F-1	3.5	SS					21.2												
F-1	6.0	SS					21.8												
F-1	8.5	SS					20.9												
F-2	1.0	SS					20.0												
F-2	3.5	SS					23.0												
F-2	6.0	SS					19.0												
F-2	8.5	SS	46	16	30	CL	20.3												
F-3	1.0	SS					18.0												
F-3	3.5	SS					18.3												
F-3	6.0	SS					17.5												
F-3	8.5	SS					19.5												
P-1	1.0	SS					19.3												
P-1	3.5	SS					23.8												
P-2	1.0	SS					16.6												
P-2	3.5	SS					19.9												

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Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class-ification	Water Content (%)	Unconfined Compressive Strength (tsf)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Cc	Cr	pH
P-3	1.0	SS					18.2												
P-3	3.5	SS					18.8												
P-4	1.0	SS					16.0												
P-4	3.5	SS					18.2												
P-5	1.0	SS					20.7												
P-5	3.5	SS					19.6												

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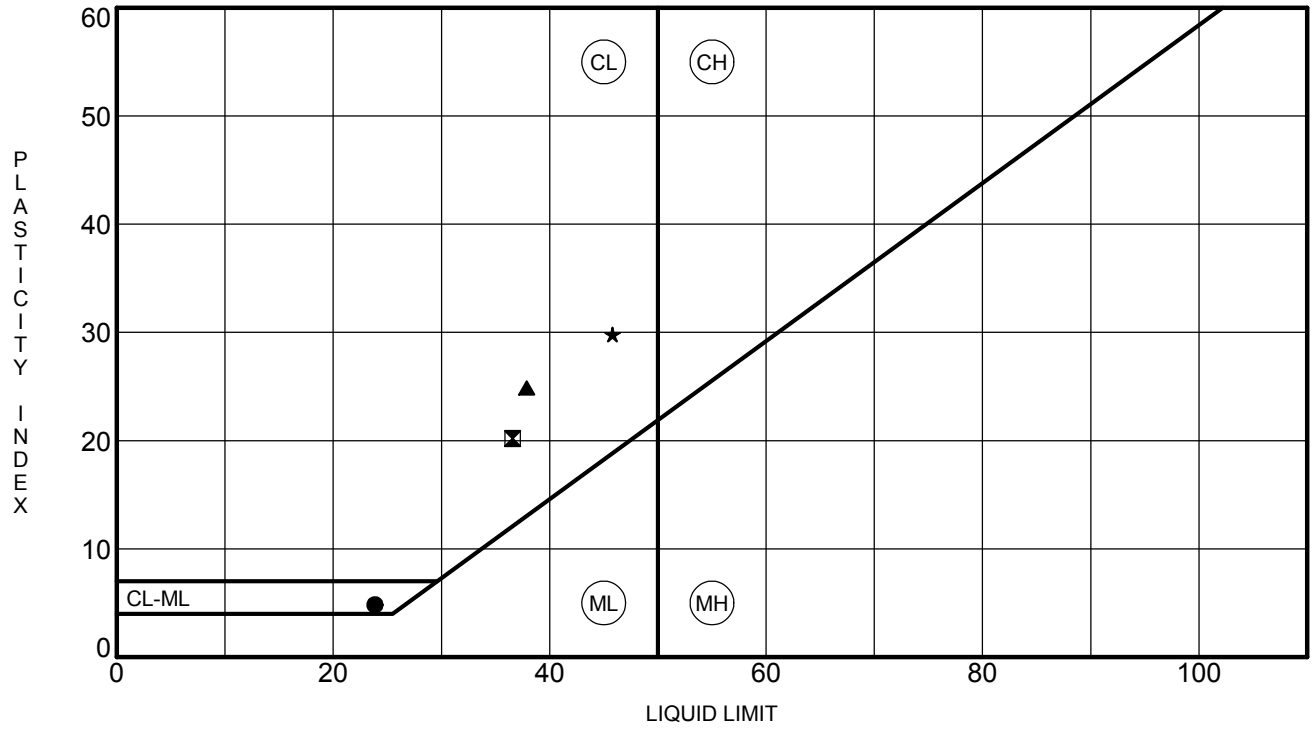

	Specimen Identification		LL	PL	PI	Water Content	Description
●	**B-3**	**1.0**	**24**	**19**	**5**	**13.5**	**SILTY CLAY (CL-ML), Grayish Brown**
⊠	**B-6**	**3.5**	**37**	**16**	**21**	**23.0**	**LEAN CLAY (CL), Gray with Dark Brown**
▲	**B-6**	**8.5**	**38**	**13**	**25**	**18.1**	**LEAN CLAY (CL), Gray with Light Brown**
★	**F-2**	**8.5**	**46**	**16**	**30**	**20.3**	**LEAN CLAY (CL), Gray with Light Brown**

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ATTERBERG LIMITS RESULTS

Client: Jefferson County Board of Commissioners
Project: Proposed Jail Facility
Location: 1106 W Hutchinson Lane
City, State: Madison, Indiana
Number: LOUGE19051
Date: 8/26/2019

US_ATTERBERG_LIMITS_JEFFERSON COUNTY JAIL.GPJ ATC GINT7 OFFICIAL TEMPLATE.GDT 8/26/19