ADDENDUM

Public Building Commission of Chicago | Richard J. Daley Center | 50 West Washington Street, Room 200 | Chicago, Illinois 60602 | (312) 744-3090 | pbcchicago.com

ADDENDUM NO.: **03**

PROJECT NAME: **Design-Build Services for Hancock Replacement School**

CONTRACT NO.: **PS3022**

DATE OF ISSUE: **January 16, 2019**

NOTICE OF CHANGES, MODIFICATIONS, OR CLARIFICATIONS TO CONTRACT DOCUMENTS

The following changes, modifications, or clarifications are hereby incorporated and made an integral part of the Contract Documents. Unless clearly expressed otherwise by this Addendum, all terms and conditions defined in the original Contract Documents shall continue in full force and effect and shall have the same meaning in this Addendum. Issued Addenda represent responses/clarifications to various inquiries. Contractors shall be responsible for including all associated labor/material costs in its bid. Drawings/specifications corresponding to inquiry responses will be issued with the Issue for Construction Documents, upon issuance of building permit.

ITEM NO. 1: **CHANGE TO KEY DATES AND EVENTS**

Change 1 The Submission Deadline has been rescheduled to Tuesday, January 22, 2019 at 1:00pm.

Change 2 The Questions Deadline has been extended to Thursday, January 17, 2019 at noon.

ITEM NO. 2: **CHANGES AND/OR CLARIFICATIONS TO REQUEST FOR PROPOSAL (RFP) DOCUMENT**

Change 1 **REMOVE** RFP Table of Contents and **REPLACE WITH** attached Addendum 03 – Table of Contents. Added Exhibit.

Change 2 **REMOVE** Page 8 of 39 Section III. Project Description and **REPLACE WITH** Revised Section III. Project Description

Change 3 **ADD** Exhibit I. Geotechnical Report (Draft)

ITEM NO. 3: **REQUESTS FOR INFORMATION**

RFI-1.

Question: **As a follow-up to the conference, we would like to extend a request for a deadline extension. Please consider this an RFI for a Phase I deadline.**

Response: **The Submission Deadline has been rescheduled to Tuesday, January 22, 2019 at 1:00pm. (Item No. 1, Change 1 above)**

RFI-2.

Question: **Due to the change in Pre-Submission and Submission Deadline schedules, will the Questions Deadline be extended?**

Response: **The Questions Deadline has been extended to January 17, 2019 at noon.**

RFI-3.

Question: **We are planning the submit 1 copy of our financial statements in a sealed envelope only. We are not planning to include the financials in the hard copies for flash drives. Is this correct?**

Response: **Correct. Financial Documents should not be included in the electronic PDF File, nor on the Flash Drive.**

This Addendum includes the following Documents and/or Specifications:

(Available on PBC's Current Opportunities page for this RFP.)

1. Addendum 03 – Table of Contents
2. Addendum 03 – Revised Section III. Project Description
3. Addendum 03 – Exhibit I. Geotechnical Report (Draft)

END OF ADDENDUM NO. 03

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REVISED SECTION III – PROJECT DESCRIPTION

PROJECT NAME:	Hancock Replacement School
PROJECT ADDRESS:	[5423 W. 64th Place] W. 65th St. & Long Ave., Chicago IL 60638
PROJECT NUMBER:	05195
PRINCIPAL:	Devon Herrick
PROJECT WARD:	13
ALDERMAN:	Marty Quinn
DESIGN ARCHITECT:	SMNG-A, Ltd.

PROJECT DESCRIPTION:

The new Southwest Side "Hancock" Selective Enrollment Replacement High School located in the Clearing East area, just south of Chicago Midway International Airport (MDW), on a vacant lot with boundaries of; W 64th Pl. to the north, W. 65th St. to the south, S. Linder Ave. to the west and Long Ave to the east. This is situated just south across W. 64th Pl. of Grimes Elementary School and lies within the Chicago Midway International Airport Height Overlay District of the Municipal Code and not in the direct flightpath of any runway.

The new approximate +/- 145,000 sq. ft. two-story 1,080 student capacity high school building will accommodate (19) standard classrooms; (2) LRE-3 diverse learning classrooms with (2) pullout spaces; (1) computer classroom; (7) science classroom suite [including (2) Chemistry, (2) Biology, and (3) Physics]; (3) music classroom suite [including (1) instrumental, (1) choral, and (1) music theory]; (2) 2D/3D art classrooms with kiln and storage; (1) health classroom; (4) multi-purpose rooms that will double when partitioned as also (4) CTE/STE(A)M classrooms; (1) dance/wrestling room; (1) fitness/weight room, (1) two-position gymnatorium with stage; supporting athletic general & team lockers, showers and toilets for boys/girls; (2) gym offices; (1) administrative center including a business office; (1) nurse & student services suite; (1) library/multi-media center; (1) Blackbox theatre, (1) business office; student dining facility with a servery and hybrid kitchen; building storage, toilets, utility rooms, an elevator for accessibility; and building support space.

Building construction will be of structural steel frame. Exterior walls will be predominantly constructed of cold-formed framing and cavity-wall construction with brick veneer. Select program features will be highlighted with insulated metal or stone clad panels. Primary building entrances and select program elements will employ window wall glazing to facilitate way-finding and support the building hierarchy. The new building project will be designed to achieve minimum target LEED v4 Silver classification as defined by the U.S. Green Building Council (USGBC).

The project will also include site improvements for a new surface parking lot (projected at 29 required spaces for an FTE of 86), however the project design will incorporate roughly +/- 67 spaces, incl. 3 ADA. Also incorporated on site is a loading area, refuse area w/enclosure, stormwater management infrastructure, landscaping areas, site lighting and furnishings and regulatory right of way improvements. The school is intended to accommodate a Full-Time Equivalent (FTE) program requirement of 86 faculty and staff personnel after completion. The projected student enrollment is 1,080 and has a utilization range from 864 to 1,296 students.

PROPOSED PROJECT SCHEDULE:

The proposed design and construction schedule as well as any other proposed dates for this procurement discussed in this RFP are subject to change, modification or revision based on PBC or user agency requirements and input from the successful proposer. However, for the purposes of this RFP, the anticipated Substantial Completion and other Milestone dates shall be considered fixed.

Present Design Build Entity Award Recommendation to Board for Approval:	1st Quarter 2019
Substantial Completion:	3rd Quarter 2021

The Design-Builder is responsible for developing and implementing a design, permitting and construction schedule to achieve the required Substantial Completion dates.

PROPOSED CONSTRUCTION BUDGET:

$50,000,000.00 - $60,000,000.00

The Budget is anticipated to include but is not limited to professional design services for the building's design, construction management services and construction costs for the Project. Funds available and provided by Chicago Public Schools.

EXHIBIT I – GEOTECHNICAL REPORT (DRAFT)

January 11, 2019
Project No. 1012-327-19-01

PUBLIC BUILDING COMMISSION OF CHICAGO

DRAFT GEOTECHNICAL EXPLORATION REPORT
HANCOCK REPLACEMENT SCHOOL

W. 65TH STREET & LONG AVENUE
CHICAGO, ILLINOIS

Prepared For:
Public Building Commission of Chicago
50 West Washington Street
Room 200
Chicago, IL 60602

PREPARED BY

Weaver Consultants Group

Weaver Consultants Group

January 11, 2019
Project No. 1012-327-19-01

Attn: Jose Barajas
Public Building Commission of Chicago
50 West Washington Street, Room 200
Chicago, IL 60602

Re: Geotechnical Exploration
Hancock Replacement School
W. 65th Street and Long Avenue
Chicago, Illinois

Dear Mr. Barajas

In compliance with your request, **Weaver Consultants Group** (WCG) has completed the geotechnical exploration at the site of the above-referenced project. Our work was completed in general accordance with the scope of services detailed in our proposal dated November 23, 2018. The purpose of this study was to explore the stratification and engineering properties of the subsurface soils and to provide recommendations for foundations of the proposed building and site improvements.

In the body of this report, we present a summary of our findings, an interpretation of the subsurface conditions, our design recommendations, and construction considerations. The property location map, boring location plan, and soil profiles are presented as figures. The soil boring logs are provided in **Appendix A**. Methods for field and laboratory operations are presented in **Appendix B**. Laboratory test results are provided in **Appendix C**. Select calculations are provided in the **Appendix D**. General Qualifications and Contractual Considerations are presented in **Appendix E**.

Thank you for selecting our firm to assist with this phase of the project. Please call us if there are any questions concerning this report.

Sincerely,

Weaver Consultants Group

Steve Schubert, PE
Geotechnical Engineering Manager

John Talbot, PE
Project Director

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APPENDICES

1 EXECUTIVE SUMMARY

The Public Building Commission of Chicago is proposing to construct a new high school to replace John Hancock High School in Chicago, Illinois. For the design and construction of the new school and associated improvements, a geotechnical study was performed consisting of twelve (12) soil borings in the project area.

In summary, the soil borings performed for the proposed design and construction of the development indicate that the site soils generally consist of surficial fill, underlain by medium stiff to hard clay to the terminal depths of the borings. In our opinion, the proposed building should be supported on a deep foundation system extending into the underlying very stiff clays. We recommend the deep foundation system be designed for a maximum allowable end bearing pressure of 6,000 psf bearing on native soils at least 14 feet below surface. Shallow foundations may be able to support the building, depending on the design loads, but significant over-excavation beneath the footings will be required.

To model stress-deformation characteristics of the subgrade under floor slabs, a subgrade modulus of 100 pounds per cubic inch is recommended, given the subgrade is prepared to the recommendations included in this report. We also recommend using Site Class C for seismic design at this site.

For the light-duty pavements anticipated at the site, we recommend 4 inches of asphalt over at least 6 inches of base course.

An infiltration test was performed near the proposed parking lot area, and no infiltration was noted during the test. Based on this result, and the guidelines in the Chicago Stormwater Ordinance Manual, we do not recommend incorporating infiltration into the site best management practices (BMPs).

A detailed discussion of design parameters and construction considerations is included in subsequent sections of this report.

2 PROJECT INFORMATION

2.1 Project Description and Location

The Public Building Commission of Chicago (PBC) is proposing to construct a new high school identified as the Southwest Side "Hancock" Selective Enrollment Replacement High School (Hancock). The site is located at a vacant lot bordered by W. 64th Place, W. 65th Street, S. Linder Avenue, and Long Avenue in Chicago, Illinois. **Figure 1** presents the site location in relation to its surroundings. The new school is designated to replace the existing John Hancock High School located on W. 56th Street.

The site development will consist of an approximately 175,000 ft^2 steel frame building. The building will have both one-story and two-story sections. An at-grade parking lot with a capacity for 67 vehicles will be provided in the northeast portion of the site.

A geotechnical exploration program, consisting of soil borings, was performed at the site to facilitate the design and construction of the proposed development. WCG and PBC agreed upon the boring locations and depths prior to commencing the field activities. A total of twelve (12) soil borings were drilled for the project, ten of which were within the footprint of the proposed building. The borings extended to depths between 10 and 50 feet below ground surface (bgs).

The location of each soil boring is presented in **Figure 2**.

2.2 Site Description

The proposed site is generally flat and has previously been used as a parking lot for nearby industry. The entire site surface consists of deteriorated asphalt pavement. Some private underground utilities are present in the project area.

3 FIELD EXPLORATION

Field exploration activities were performed at the site on December 11 through 14, 2018. All borings were advanced with a truck-mounted CME-55 drill rig equipped with 3.25-inch inside diameter (I.D.) hollow stem augers, mud rotary tooling, and an automatic Standard Penetration Test (SPT) hammer. SPT samples were collected at 2.5-foot intervals to a depth of 15 feet bgs and at 5-foot intervals thereafter. A representative sample from each SPT was retained in jars and sent to the WCG geotechnical laboratory for further evaluation. Select undisturbed cohesive samples were obtained by pushing Shelby tubes in accordance with ASTM D1587.

A geotechnical engineer provided oversight for all field exploration activities, logged soil samples, performed field tests, and retained representative samples prior to sending to the WCG geotechnical laboratory. Estimates of unconfined compressive strength of cohesive soil samples were performed in the field using a pocket penetrometer or a Rimac machine.

Selected samples from the borings were tested in the WCG geotechnical laboratory to verify field soil classifications and to determine pertinent engineering properties. Moisture content determinations (ASTM D2216), Atterberg Limits classifications tests (ASTM D4318), and unconfined compressive strength tests (ASTM D2166) were performed on select samples in accordance with current ASTM test methods.

One infiltration test was performed at the site by using a single-ring infiltrometer in accordance with the guidelines in the Chicago Stormwater Ordinance Manual. The infiltration test was performed in the area of the parking lot. Surficial materials were augered to a depth of about 2 feet below surface and the infiltrometer ring was set in the borehole. A seal was created around ring and the interior of the ring was filled with water. The water level decline was measured against time. The measurements were used to calculate the design infiltration rate.

Further information on the field exploration activities and laboratory testing is provided in the **Appendix B**.

4 SITE AND SUBSURFACE CONDITIONS

Our interpretation of the subsurface conditions is based on twelve (12) soil borings, spaced across the proposed project area. The following discussion is general; for more specific information, refer to the boring logs presented in **Appendix A.**

4.1 Surface Conditions

All boring locations had asphalt pavement at the surface. The asphalt thickness typically ranged from 3 to 4 inches and was underlain by 2 to 4 inches of gravel base course.

4.2 Subsurface Conditions

In general, the subsurface soil profile below the surficial asphalt consists of a layer of clayey fill, underlain by stiff to hard native cohesive soils. These subsurface soil layers in the borings are described in more detail below.

- **Fill Material –** Fill material was encountered in each boring beneath the surficial pavement. The fill generally consisted of lean clay with some organics, rubble, bricks, and cinders. The thickness of the fill layer ranged from 2 to 5 feet. The clayey portion of the fill was typically described as stiff to very stiff based on field-estimated unconfined compressive strength (Qp) values between 1.0 and 3.0 tons per square foot (tsf).
- **Native Lean Clay –** Native lean clay was encountered in each boring beneath the fill. The clay layer was classified as lean clay (CL) in accordance with the Unified Soil Classification System (USCS). The field-estimated Qp values performed on the samples within this layer ranged from 0.25 to over 5 tsf. Typically, the clay was described as stiff to hard; however, softer pockets of clay were observed in borings B-3 and B-9. The native lean clay layer extended to depths between 40 to 45 feet bgs in the deep borings and beyond the terminal depth in the remaining borings.
- **Hard to Very Hard Lean Clay –** A significantly harder layer of lean clay was encountered at depths between 40 and 45 feet bgs in borings B-1, B-7, B-10. The hard clay classified as lean clay (CL) in accordance with USCS. This layer extended beyond the terminal depths of the borings. The consistency of the native clay layer was described as hard to extremely hard with estimated Qp values between 4.5 and 9 tsf.

4.3 Groundwater Conditions

Groundwater was not observed in any of the borings during drilling or immediately after drilling operations. However, due to the low permeability of the soils encountered, long-term

measurements of the groundwater surface (water table) may have different results. Additionally, some gray colored soils were observed within the native clay layer between 13 and 18 feet bgs, which could indicate the presence of groundwater. Overall, we estimate that the water table elevation at the time of the exploration was between 20 and 25 feet relative to the Chicago City Datum.

Fluctuations in the water table should be anticipated throughout the year with variations in precipitation and other environmental or physical factors. Seasonal fluctuations in the groundwater level should be expected due to variations in precipitation, evaporation, and surface water runoff.

5 DESIGN RECOMMENDATIONS

5.1 Basis

Our recommendations for the proposed development are based on data presented in this report which included twelve (12) soil borings spaced across the entire project area. Subsurface variations can exist at a site which may not be indicated by such a dispersed and limited boring program. If such variations or unexpected conditions are encountered during construction, or if the project information is incorrect or changed, we should be informed immediately since the validity of our recommendations may be affected.

5.2 Building Foundations

Based on the anticipated loading conditions for the proposed school and the soil conditions, the proposed building could be supported on deep foundations (drilled piers) to transfer loads through the upper fill material and soft clay, and into the hard clay layer. Depending on the factored design loads, the building could also be supported on shallow spread footings provided that unsuitable material is removed and replaced with suitable compacted structural fill. The drilled pier and shallow foundation alternatives are discussed below in **Sections 5.2.1** and **5.2.2**, respectively.

5.2.1 *Drilled Piers*

In general, drilled piers consisting of shaft or belled piers can be dimensioned to exert a net allowable bearing pressure up to 6,000 pounds per square foot (psf) into the very stiff to hard clay observed below a depth of about 11 feet bgs. We recommend the deep foundations extend at least 3 feet into the bearing layer and have a minimum pier length of 14 feet. Skin friction should be neglected for the entire shaft length.

Drilled pier foundations should be designed with a minimum shaft diameter of 30 inches to facilitate clean out and possible dewatering of the pier excavations. The squeeze analysis performed for driller piers at the site indicates that casing will likely not be required. However, we recommend the contractor be prepared with temporary casing to extend through any zones observed to be susceptible to squeezing or caving, and to control possible groundwater seepage.

Care should be taken so that the side and bottom of the pier excavations are not disturbed during construction. The bottom of the piers should be free of loose soil or debris prior to placement of reinforcing steel and concrete.

5.2.2 *Shallow Foundations*

In our opinion, the building could be supported on shallow spread footings and continuous wall footings provided the foundations are constructed in compliance with the recommendations for site preparation, fill placement, and inspection that are discussed in **Section 6** of this report.

Shallow footings bearing on native soils or structural fill overlying the same, should be proportioned using a net allowable soil bearing pressure not exceeding 2,500 psf. The bearing pressure value is that pressure which may be transmitted to the foundation soil in excess of the final minimum surrounding overburden pressure. The clay soils with sufficient strength are expected to be found at the depths indicated in **Table 1** below. Over-excavation and replacement with structural fill will be required over the majority of the site.

TABLE 1
Bearing Strata Summary (Min. net allowable B.C. 2,500 psf)

BORING	BEARING DEPTH(1)	MATERIAL
B-1	5.5	Brown and Gray Lean Clay, Very Stiff
B-2	3.0	Greenish Gray Lean Clay, Very Stiff
B-3	10.5	Brown Lean Clay, Hard
B-4	5.5	Brown and Gray Lean Clay, Very Stiff
B-5	8.0	Brown Lean Clay, Very Stiff
B-6	5.5	Greenish Gray Lean Clay, Very Stiff
B-7	5.5	Brown and Gray Lean Clay, Very Stiff
B-8	8.0	Brown Lean Clay, Hard
B-9	5.5	Brown and Gray Lean Clay, Very Stiff
B-10	2.0	Brown Lean Clay, Very Stiff

(1) Bearing depth refers to feet below existing grade at the time of our field activities. In addition, the actual footing depths should be adjusted to meet minimum frost depth criteria.

We recommend that wall (including grade beams) and column footings be at least 18 inches wide and 24 inches wide, respectively. In order to provide adequate frost protection, we recommend locating perimeter footings at a depth of at least 42 in. below finished exterior grade. Interior footings in heated areas can bear at a nominal depth below the floor slab.

Provided the foundation subgrades are prepared as discussed in **Sections 6.1 and 6.2**, we estimate that the total foundation settlement should not exceed approximately 1 in. Careful field control during construction may reduce the actual settlement which occurs.

5.3 Floor Slab

Support of floor slabs on the existing unimproved fill should not be considered because of the risk of unacceptable settlements. If the risk of minor settlement of slabs can be tolerated, non-structural floor slabs may be supported on suitably prepared (compacted) subgrade independent of the deep foundation system. If used, we recommend that the existing fill be excavated to a minimum depth of three (3) feet beneath the floor slab, proof-rolled, replaced and compacted in accordance with **Section 6**. A vertical modulus of subgrade reaction of 100 pci is recommended for design of slab-on-grade floor slabs. A structural slab system should be considered if the risk of slab settlement cannot be tolerated.

Non-structural floor slabs should be structurally independent of the building columns and walls, and liberally jointed in accordance with ACI recommendations to reduce distress due to differential movement. We recommend that a plastic vapor barrier be placed under the floor slab where moisture-sensitive floor coverings will be used or where moisture-sensitive product or equipment will be stored.

The building floor slabs should be supported on a minimum 4-inch thick, relatively clean, free-draining granular base course bearing on a suitably prepared subgrade, including the removal and replacement of near-surface fill. In our opinion, relatively clean, free-draining granular soil should contain no more than 5 percent fines, by dry weight, passing a No. 200 U.S. Standard sieve. Adequately reinforced floor slabs will help minimize any differential settlement in subsurface soils.

5.4 Seismic

A seismic site classification is required for the estimation of minimum earthquake design forces. The coefficient is a function of soil type (i.e., depth of soil and strata types) and depth to bedrock. Although the depth to bedrock was not confirmed by the boring program, published geological information indicates that it is likely to be on the order of 50 to 100 feet below the existing ground surface. Based on the average property descriptions in the 2015 International Building Code (IBC) and our general knowledge of geological conditions in the locale, in our opinion, the soil conditions at this site most closely resemble the site classification C.

5.5 Pavement Recommendations

At-grade parking will be provided in the northeast portion of the site. Our recommendations are based on the assumption that the paved areas subgrade will be constructed on a proof-rolled (or stabilized) subgrade (see **Section 6.1**), or on structural fill overlying the same.

Serviceable pavements can be achieved by different combinations of materials and thicknesses, varied to provide roughly equivalent strengths. Local practice for existing pavement construction could be reviewed for other blends or combinations of materials that have been found satisfactory and for applicable minimum standards. For new pavements at the site, we provide the following guidelines that have been developed from the results of our geotechnical exploration assuming minimal truck traffic, moderate relatively low levels of vehicle traffic, and an assumed California Bearing Ratio (CBR) value of 4.

- 4 inches of compacted asphalt (combined surface and binder course);
- 6 inches of compacted granular base course.

We recommend that the base course consist of a dense-graded, crushed aggregate material, such as IDOT CA-6 stone. The gradation of this material is described in the Illinois Department of Transportation (IDOT) specifications. In our opinion, crushed aggregate material, such as gravel, slag, limestone or crushed concrete are acceptable base course materials as long as they approximate the recommended IDOT gradations and are approved by the design engineer/architect. The base course should be compacted to no less than 98 percent of its maximum standard Proctor density, or its equivalent relative density. Further, suitable primer and tack coats should be placed between the base course and between the overlying asphalt layers. In addition, all asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and the IDOT specifications.

Structural fill and aggregate base course materials should be compacted to at least 98 percent of the maximum standard Proctor dry density (ASTM D698). Additionally, structural fill placed in the top 3.5 feet should not be frost susceptible.

We do not anticipate any problems due to the high groundwater table underlying the Site since the proposed asphalt areas are expected to be located several feet above the current groundwater levels. However, we recommend that the pavement and aggregate base course be properly graded and sufficiently high above any adjacent drainage ponds or swales to provide for positive pavement surface and base drainage.

The procedures we have used to develop our pavement guidelines are consistent with generally accepted engineering practice and are intended to provide a 20-year life span. However, based upon our past experience, we have found that proper construction techniques, quality of drainage, pavement maintenance and actual traffic loads are the major factors in determining pavement life and performance. It is important that experienced technical personnel observe construction activities to check that the pavement layers are constructed as designed.

5.6 Infiltration

One single ring infiltrometer test was conducted at the site in the proposed parking lot area to estimate design infiltration rates in that area. The test was located in the vicinity of boring B-12. The site soils were tested at a depth of approximately 2 feet below the existing surface. Infiltration testing was conducted in accordance with the test methods and procedures described in the Chicago Stormwater Ordinance Manual.

No infiltration was noted during the infiltration test. Based on the results of the infiltration test and the guidelines in the Chicago Stormwater Ordinance Manual, we do not recommend incorporating infiltration into the site best management practices (BMPs).

6 CONSTRUCTION CONSIDERATIONS

6.1 Site Preparation

All structural areas plus, where feasible, a minimum lateral margin of 5 feet beyond the perimeter of the proposed construction should be initially prepared by stripping/removing and grubbing the vegetation, topsoil, unsuitable fill, and debris.

Following the stripping/removal activities, the slab and pavement areas should be proofrolled to detect any localized soft or loose materials. Proofrolling consists of repeated passes of a loaded, pneumatic-tired vehicle, such as a tandem-axle dump-truck or front end loader (minimum 20 ton weight). The proofrolling activities should be observed by the Geotechnical Engineer or his representative. Any areas judged by the engineer or his representative that need improvement should be densified further or otherwise improved at the engineer's discretion.

After successful preparation of the subgrade, placement of the structural fill may then proceed as necessary to establish design grades. Where fill is required in the proposed building area, we recommend that it consist of granular structural fill. Where structural fill is required under slabs, it should extend laterally beyond all edges of the footings at least 6 inches for every 12 inches of undercut or fill depth required below the base of the slab. The structural fill should meet the requirements of **Section 6.3** and be placed in accordance with **Section 6.4**.

6.2 Shallow Foundation Excavations

If the shallow foundation alternative is selected, foundation excavations should be sloped, shielded or shored in accordance with current Occupational Safety and Health Administration (OSHA) requirements (see **Section 6.7**). **Table 1** should be referenced for estimates on required excavation depths for spread footings or wall footings in the area of the identified borings. Once the footing excavations are completed, the exposed soils should be checked to confirm that existing natural soils of adequate strength [minimum unconfined compressive strength of 2.0 ton per square foot (tsf)]. Any localized soft zones should be undercut and replaced with structural fill (**Section 6.3**). During the excavation of weak soil or fill material, a geotechnical engineer or a soils technician who is familiar with testing of soils should be present to determine the depth of cuts. Where structural fill is placed below the foundation level, it should extend laterally beyond all edges of the footings at least 6 inches for every one foot of undercut depth required below the base of the foundation.

6.3 Structural Fill

Structural fill, defined as any fill which will support structural loads, should be free of organic material, have a plasticity index of less than 25 percent, a maximum particle size of no more than 3 inches, and a maximum dry density in excess of 100 pcf, as determined by the standard Proctor compaction test (ASTM D698). In addition, structural fill should not be frost susceptible if placed within 3½ feet from the surface. The structural fill should be compacted to at least 98 percent of its maximum standard Proctor dry density (ASTM D698) under the foundations or floor slabs.

Based on the borings, the near surface fill will likely not be acceptable for reuse as structural fill. Some of the native clay soils may be able to be reused as structural fill, but should not be placed within 3½ feet from the surface, due to frost considerations. Some wetting or drying of these soils may be necessary to achieve proper compaction.

6.4 Fill Placement Control

To achieve the recommended compaction of structural fill, the fill should be placed and compacted in layers not exceeding 8 inches in loose lift thickness. To observe compliance with the recommended density standards, we recommend that in-place density tests be performed at a frequency of at least one test for every 2,500 ft^2 of fill area per each lift of compacted fill placed in the proposed construction areas.

6.5 Construction Observations

We recommend that all floor slabs, drilled pier excavations, footing subgrades, and utility trenches be observed by a qualified Geotechnical Engineer or his representative prior to placement of any reinforcing steel, concrete materials, or trench backfill materials. These observations are to confirm that the exposed soil layers are consistent with those encountered in the borings and to check that the exposed soils are of uniform consistency and adequate density.

6.6 Groundwater Concerns

Groundwater was not encountered during the subsurface exploration of this site, as described in **Section 4.3** of this report. The design of a deep foundation system should consider the possibility that groundwater may be encountered during construction. We do not expect foundation excavations or utility excavations at this site to experience serious dewatering issues. However, if groundwater inflow, or surface water runoff (from a precipitation event) occurs, it should be removed by sumps and filtered pumps. Should these measures be inadequate or should groundwater conditions different than those described in this report be

encountered, we recommend that WCG be contacted immediately to make appropriate recommendations.

6.7 Excavation Slope Stability

Our exploration did not include a detailed analysis of slope stability for any temporary excavation condition, including utility trenches. Based on the soil conditions encountered at the boring locations, temporary shallow construction excavations could expose primarily clayey soils but also some sandy soil within the fill layer. For such conditions, it is our opinion that shallow temporary excavations can be cut with side slopes of 1.5H: 1V. However, current OSHA standards must be met and may be more restrictive. Hence, if safe side slopes cannot be maintained due to loose granular soil conditions, then the excavation sides should be flattened, shielded or shored in accordance with current OSHA standards.

7 GEOTECHNICAL RISK

The concept of risk is an important aspect of any geotechnical evaluation. The primary reason for this is that the analytical methods used by geotechnical engineers are generally empirical and must be tempered by engineering judgment and experience. Therefore, the solutions or recommendations presented in any geotechnical evaluation should not be considered risk free, and more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as predicted, desired, or intended. The engineering recommendations presented in the preceding sections constitute our best estimate of those measures that are necessary to help the structure perform in a satisfactory manner based on the information generated during this and previous evaluations and our experience in working with these conditions.

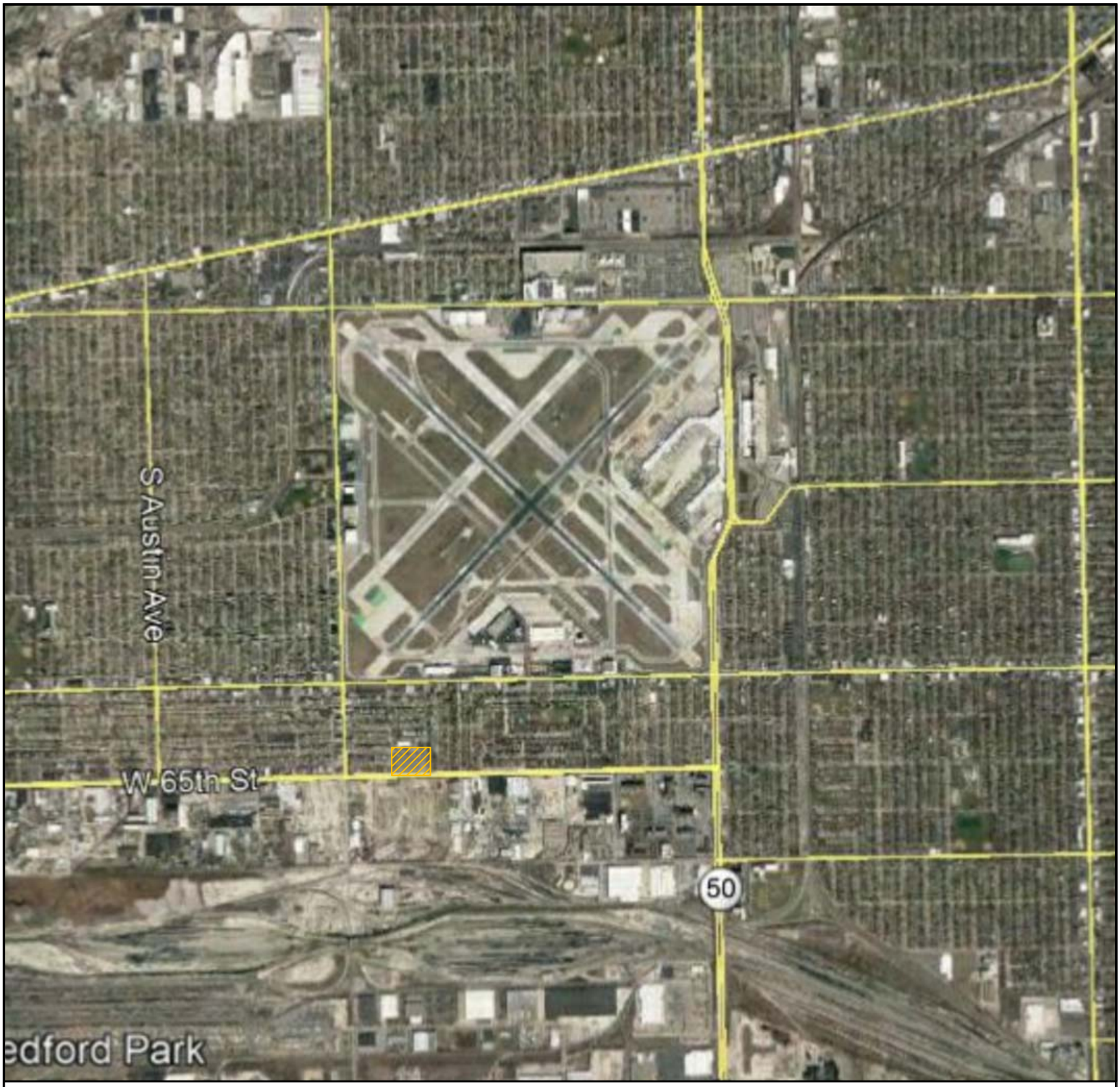
8 LIMITATIONS

WCG has prepared this report in accordance with generally accepted geotechnical engineering practices to aid in the evaluation of the site subsurface soils. No other warranty, expressed or implied, is made.

The scope of this report is limited to the specific project and location described herein, and our description of this project represents our understanding of the project. The geotechnical engineering analysis and foundation recommendations presented herein were developed based on the information obtained during the subsurface investigation. It should be noted that the borehole data reflects the subsurface conditions only at the specific locations designated on the borehole logs, and that soil and groundwater conditions could vary widely throughout the Site. If variations do appear during construction activities, it may become necessary to re-evaluate the recommendations of this report.

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

FIGURES



PROPERTY LOCATION

N

APPROXIMATE GRAPHIC SCALE

2000 0 1000 2000 4000

1 inch = 2000 ft.

PREPARED FOR:

PUBLIC BUILDING COMMISSION OF CHICAGO

PROPERTY LOCATION MAP

HANCOCK REPLACEMENT SCHOOL
W. 65th STREET & LONG AVENUE
CHICAGO, IL

Weaver Consultants Group
CHICAGO, ILLINOIS
(312) 922-1030 www.wcgrp.com

DRAWN BY: SAS
REVIEWED BY: JT
DATE: 12/27/2018
FILE: 1012-327-19-01
CAD: Boring Location Plan.dwg

FIGURE 1

50-FT BORING LOCATION

30-FT BORING LOCATION

10-FT BORING LOCATION

SOIL CROSS-SECTION LOCATION

APPROXIMATE GRAPHIC SCALE

100 0 50 100 200

1 inch = 100 ft.

N

PREPARED FOR:

PUBLIC BUILDING COMMISSION OF CHICAGO

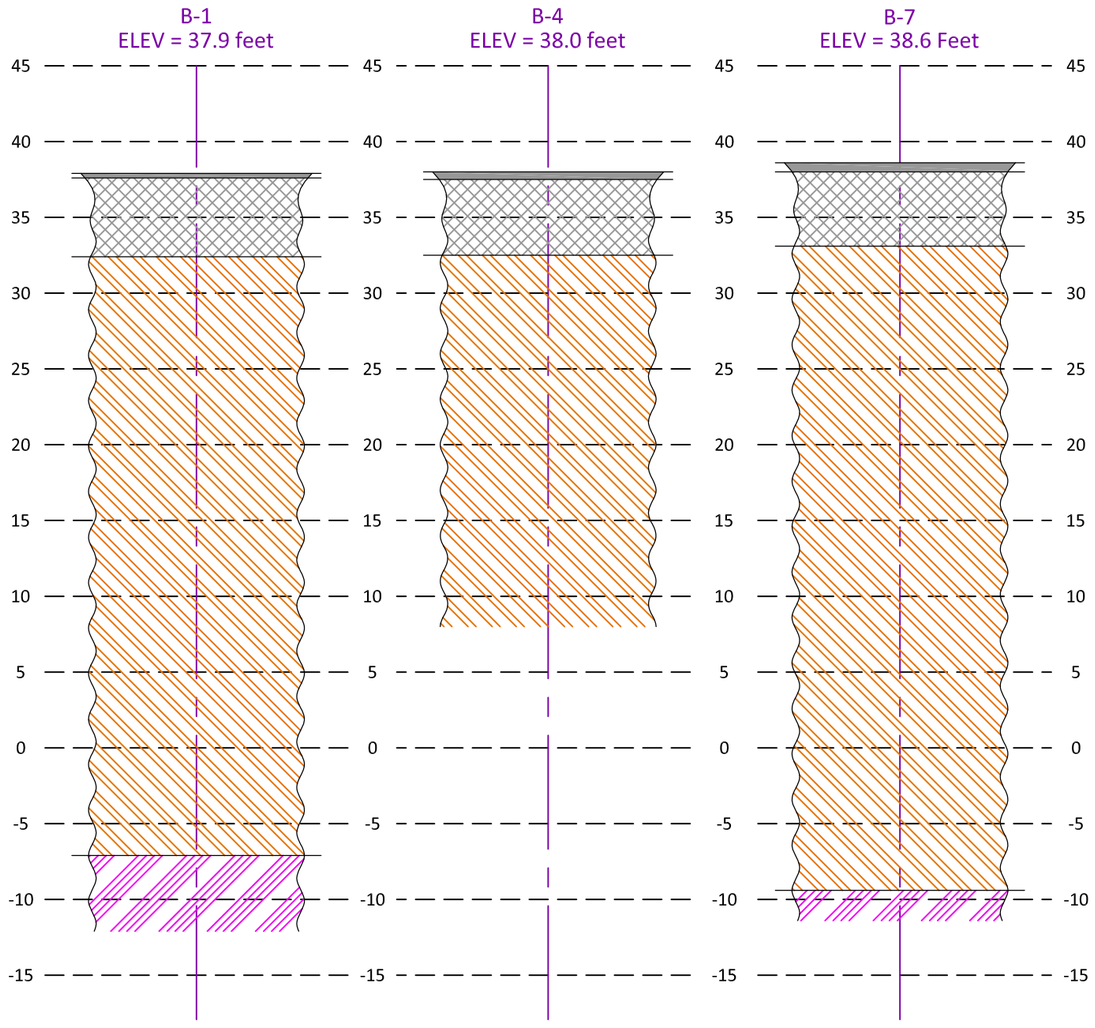
BORING LOCATION PLAN

HANCOCK REPLACEMENT SCHOOL
W. 65th STREET & LONG AVENUE
CHICAGO, IL

Weaver Consultants Group
CHICAGO, ILLINOIS
(312) 922-1030 www.wcgrp.com

DRAWN BY:	SAS
REVIEWED BY:	JT
DATE:	1/7/2019
FILE:	1012-327-19-01
CAD:	Boring Location Plan.dwg

FIGURE 2



LEGEND

- ASPHALT PAVEMENT
- FILL
- SOFT TO MEDIUM STIFF CLAY
- ORGANIC CLAY
- STIFF CLAY
- VERY STIFF CLAY
- HARD CLAY

APPROXIMATE VERTICAL GRAPHIC SCALE

10 0 5 10 20

1 inch = 10 ft.

HORIZONTAL N.T.S.

N

PREPARED FOR:

PUBLIC BUILDING
COMMISSION OF CHICAGO

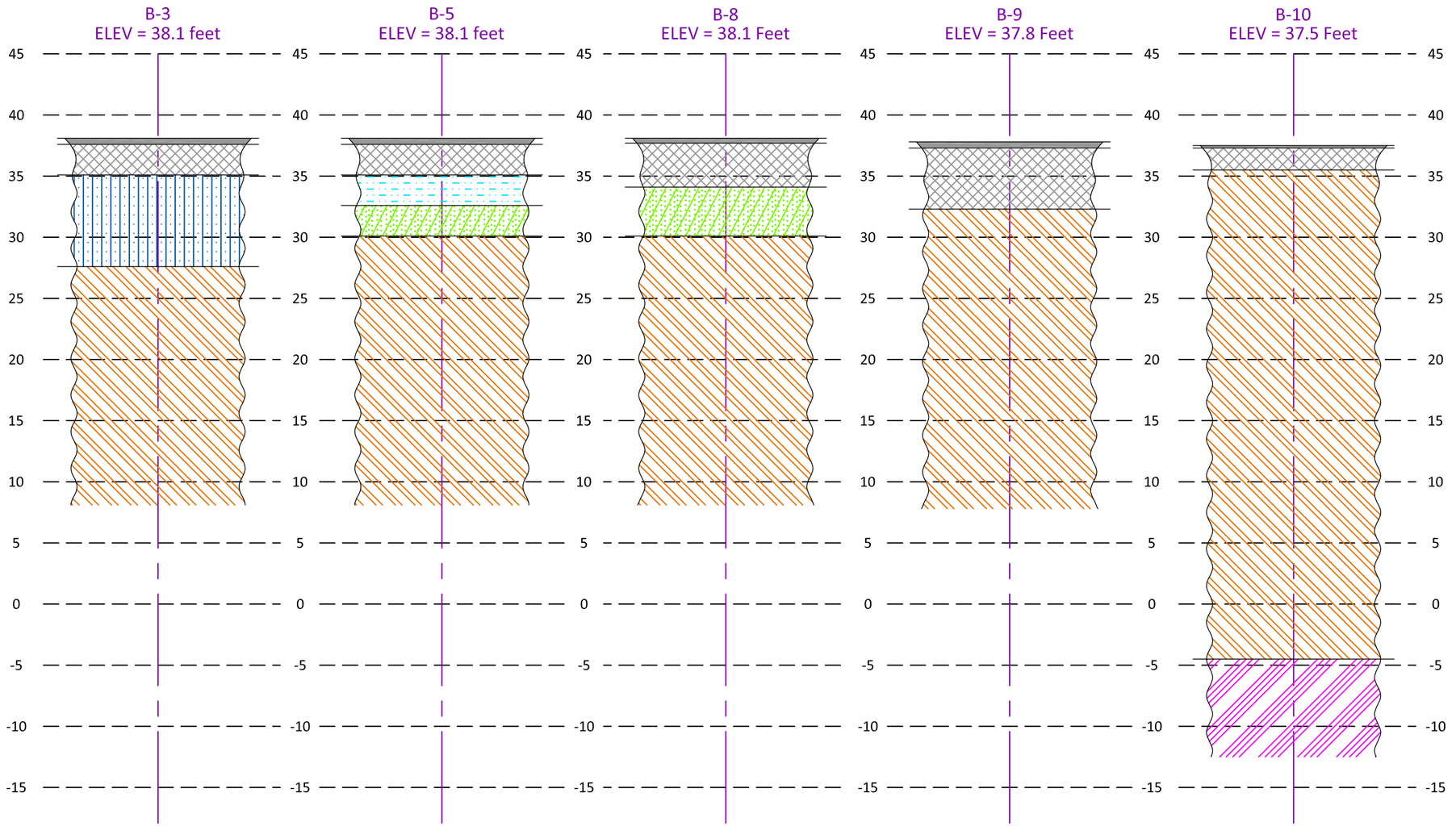
SOIL CROSS-SECTION A-A'

HANCOCK REPLACEMENT SCHOOL
W. 65TH STREET & LONG AVENUE
CHICAGO, IL

Weaver Consultants Group
CHICAGO, ILLINOIS
(312) 922-1030 www.wcgrp.com

DRAWN BY: AJ
REVIEWED BY: SAS
DATE: 01/09/2019
FILE: 1012-327-19-01
CAD: Fig 3&4 - Soil Profiles.dwg

FIGURE 3



LEGEND

- ASPHALT PAVEMENT
- FILL
- SOFT TO MEDIUM STIFF CLAY
- ORGANIC CLAY
- STIFF CLAY
- VERY STIFF CLAY
- HARD CLAY

APPROXIMATE VERTICAL GRAPHIC SCALE

10 0 5 10 20

1 inch = 10 ft.

HORIZONTAL N.T.S.

N

PREPARED FOR:

PUBLIC BUILDING
COMMISSION OF CHICAGO

SOIL CROSS-SECTION B-B'

HANCOCK REPLACEMENT SCHOOL
W. 65TH STREET & LONG AVENUE
CHICAGO, IL

Weaver Consultants Group
CHICAGO, ILLINOIS
(312) 922-1030 www.wcgrp.com

DRAWN BY: AJ
REVIEWED BY: SAS
DATE: 01/09/2019
FILE: 1012-327-19-01
CAD: Fig 3&4 - Soil Profiles.dwg

FIGURE 4

APPENDIX A

Boring Logs

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-01

Location: N 41.775168, E -87.75889

File No.: 1012-327-19-01 Sheet 1 of 2

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/11/2018
Completed: 12/11/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA/Mud Rotary

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 37.9

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, very stiff to stiff, dark gray to black, LEAN CLAY, trace rubble, gravel, organics FILL (CL)				1	3/4/6 (10)	1.8	3.5	20.6		35
						2	2/3/3 (6)	4.0	1.3	25.8		
5			5.5									
		Moist, very stiff to hard, brown to gray brown, LEAN CLAY, trace gravel (CL)				3	2/5/3 (8)		3.0	19.5		30
						4	6/8/10 (18)		5.2	19.2	Switch to mud rotary	
10						5	6/8/12 (20)		5.2	20.0		
			13.0									25
		Moist, hard to very stiff, dark gray, LEAN CLAY, trace gravel (CL)				6	4/6/10 (16)		4.4	18.5		
15												
												20
						7	4/5/7 (12)		2.1	20.5		
20												
												15
						8			2.5	18.5	Q_u= 2.24 tsf	
25												
												10
						9	5/6/9 (15)		2.5	19.6		
30												

NOTES:

1. Weather: Sunny, 39°F
2. Used automatic hammer
3. Backfilled with auger cuttings & bentonite chips
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger = No Recovery = Split-Spoon Sample
= Geoprobe = Core Sample = Vane Shear Test
= Grab Sample = Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group
7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-01
Location: N 41.775168, E -87.75889
File No.: 1012-327-19-01

DATUM: SURFACE ELEVATION (ft): 37.9

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		Moist, hard to very stiff, dark gray, LEAN CLAY, trace gravel (CL) *(continued)*										
						10	7/8/11 (19)		2.5	18.3		5
35												
												0
						11	7/9/10 (19)		2.0	22.1		
40												
												-5
						12	7/8/13 (21)		2.9	15.1		
45												
		Moist, hard, dark gray, LEAN CLAY, trace gravel (CL)	46.8									-10
						13	10/14/20 (34)		6.6	14.3		
50		Boring Terminated at 50 ft	50.0									
												-15
55												
												-20
60												
												-25
65												
												-30
70												

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-02

Location: N 41.774927, E -87.758858

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/13/2018
Completed: 12/13/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 38.2

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.5									
		Moist, very stiff gray to dark gray, LEAN CLAY, trace gravel and organics FILL (CL)	2.3	X		1	5/13/6 (19)	3.3	2.0	29.0		
		Moist, medium dense, black, fine to medium SILTY SAND, little gravel, trace organics FILL (SM)	3.0			2	3/5/6 (11)		2.7	23.0		35
5		Moist, very stiff, greenish gray, LEAN CLAY, trace gravel (CL)	5.5									
		Moist, very stiff to hard, brown, LEAN CLAY, with sand, trace gravel (CL)		X		3	3/3/5 (8)		3.7	20.7	LL = 43 PL = 18 PI = 25	
						4			4.3		Q_u= 4.06 tsf	30
10						5	5/8/10 (18)		4.7	19.2		
			13.0									
		Moist, hard to stiff, gray, LEAN CLAY, trace gravel (CL)		X		6	5/6/9 (15)		4.4	18.7		25
15												
												20
				X		7	4/5/6 (11)		2.1	21.6		
20												
												15
				X		8	3/4/5 (9)		1.8	19.9		
25												
												10
				X		9	6/5/8 (13)		2.6	18.9		
30			30.0									
		Boring Terminated at 30 ft										

NOTES:

1. Weather: Sunny, 44°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger
= Geoprobe
= Grab Sample
= No Recovery
= Core Sample
= Shelby Tube
= Split-Spoon Sample
= Vane Shear Test

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-03

Location: N 41.774674, E -87.75884

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/13/2018
Completed: 12/13/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 38.1

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.5									
		Moist, black, cinder (FILL)	1.2	X		1	3/6/7 (13)		1.5	23.6		
		Moist, stiff, gray to black, LEAN CLAY, trace gravel and organics FILL (CL)	3.0									35
		Moist, very stiff, greenish gray, LEAN CLAY, trace gravel (CL)		X		2	4/5/6 (11)		2.6	22.4		
5			5.5									
		Moist, medium stiff to soft, brown to dark gray, LEAN CLAY, trace gravel (CL)		X		3	3/3/3 (6)	2.6	0.5	41.4		
												30
				X		4	2/4/6 (10)		0.3	32.2		
10			10.5									
		Moist, hard, brown, LEAN CLAY, trace gravel (CL)		X		5	6/6/10 (16)		4.3	18.6		
			13.0									25
		Moist, hard to stiff, gray, LEAN CLAY, trace gravel (CL)		X		6	4/7/10 (17)		4.9	18.1		
15												
												20
				X		7	4/5/7 (12)		1.9	16.9		
20												
												15
				■		8			2.0	18.4	Q_u= 3.16 tsf	
25												
												10
				X		9	4/5/8 (13)		2.1	19.6		
30			30.0									
		Boring Terminated at 30 ft										

NOTES:

1. Weather: Sunny, 44°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger
= Geoprobe
= Grab Sample
= No Recovery
= Core Sample
= Shelby Tube
= Split-Spoon Sample
= Vane Shear Test

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-04

Location: N 41.775081, E -87.758505

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/12/2018
Completed: 12/12/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 38.0

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.5									
		Moist, very stiff to stiff, brown to dark gray, LEAN CLAY, trace gravel and organics FILL (CL)		X		1	2/4/4 (8)		2.2	23.9		35
				X		2	3/3/5 (8)	2.6	1.9	26.6		
5			5.5									
		Moist, very stiff, brown & brownish gray, LEAN CLAY, trace gravel (CL)		X		3	2/3/4 (7)		2.1	23.6		30
				X		4	3/4/6 (10)		3.5	20.6		
10				X		5	4/7/8 (15)		3.5	18.8		
			13.0									25
		Moist, very stiff, gray, LEAN CLAY, trace gravel (CL)		X		6	4/6/8 (14)		3.3	18.5		
15												
												20
				X		7	3/5/6 (11)		2.2	20.1		
20												
												15
				X		8	5/5/6 (11)		2.0	18.7		
25												
												10
						9			2.0	19.3	Q_u= 3.81 tsf	
30			30.0									
		Boring Terminated at 30 ft										

NOTES:

1. Weather: Partly Cloudy, 42°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger
= No Recovery
= Split-Spoon Sample
= Geoprobe
= Core Sample
= Vane Shear Test
= Grab Sample
= Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-05

Location: N 41.774789, E -87.758471

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/13/2018
Completed: 12/13/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 38.1

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.5									
		Moist, very stiff, gray to dark gray, LEAN CLAY, trace gravel and organics FILL (CL)		X		1	3/5/8 (13)	3.2	2.1	30.9		
		Moist, very stiff, black, ORGANIC LEAN CLAY (CL-OL)	3.0									35
				X		2	4/4/5 (9)	4.1	2.1	30.0		
5												
		Moist, stiff to hard, brown, LEAN CLAY, trace gravel (CL)	5.5	X		3	3/3/4 (7)		1.8	22.5		
			8.0									30
		Moist, very stiff to hard, brown, LEAN CLAY, trace gravel (CL)		X		4	3/3/5 (8)		3.0	22.6		
10												
				X		5	6/8/11 (19)		5.3	17.4		
			13.0									25
		Moist, hard to very stiff, gray, LEAN CLAY, trace gravel (CL)		X		6	4/7/9 (16)		4.8	18.5		
15												
												20
				X		7	4/6/8 (14)		2.3	21.4		
20												
												15
				X		8	4/5/7 (12)		2.5	18.9		
25												
				■		9			2.3			10
				X		10	5/8/9 (17)		2.7	19.3		
30			30.0									
		Boring Terminated at 30 ft										

NOTES:

1. Weather: Sunny, 44°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger
= No Recovery
= Split-Spoon Sample
= Geoprobe
= Core Sample
= Vane Shear Test
= Grab Sample
= Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-06

Location: N 41.775211, E -87.758118

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
__ ft At __ Hrs. A.D.*
__ ft At __ Days A.D.***

Started: 12/12/2018
Completed: 12/12/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 37.6

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.5									
		Moist, very stiff, black, ORGANIC LEAN CLAY, with cinder and brick rubble FILL (CL)	3.0			1	3/4/4 (8)	10.7	2.0	44.3		35
		Moist, very stiff, greenish gray, LEAN CLAY, trace gravel (CL)				2	2/3/3 (6)		2.0	22.5		
5			5.5									
		Moist, very stiff to hard, brown, LEAN CLAY, trace gravel (CL)				3			2.5		Q_u= 3.24 tsf	30
						4	5/10/12 (22)		2.8	19.9		
10						5	5/8/9 (17)		5.5	18.2		25
						6	5/7/9 (16)		4.4	18.2		
15			16.0									
		Moist, hard to very stiff, gray, LEAN CLAY, trace gravel (CL)										20
						7	6/8/9 (17)		5.3	19.8		
20												
												15
						8	4/6/8 (14)		2.1	19.0		
25												
												10
						10	5/6/8 (14)		2.7	20.4		
30		Boring Terminated at 30 ft	30.0									

NOTES:

1. Weather: Cloudy, 53°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger = No Recovery = Split-Spoon Sample
= Geoprobe = Core Sample = Vane Shear Test
= Grab Sample = Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-07

Location: N 41.774924, E -87.758118

File No.: 1012-327-19-01 Sheet 1 of 2

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/11/2018
Completed: 12/11/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA/Mud Rotary

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 38.6

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.6									
		Moist, stiff, dark gray to black, LEAN CLAY, little organics FILL (CL)				1	3/3/4 (7)	3.5	1.5	26.9		
						2	3/3/4 (7)	3.5	1.5	22.8		35
5			5.5									
		Moist, very stiff, brown and mottled gray, LEAN CLAY, trace gravel (CL)				3	3/5/5 (10)		2.3	20.6		
			8.0									
		Moist, hard, brown, LEAN CLAY, trace gravel (CL)				4	6/7/10 (17)		6.6	18.8	Switch to mud rotary	30
10						5	4/9/11 (20)		6.1	18.6		
			13.0									
		Moist, stiff to very stiff, gray, LEAN CLAY, trace gravel (CL)				6	6/7/18 (25)		3.9	19.5		25
15												
						7	4/6/7 (13)		1.0	21.8		20
20												
						8	6/5/7 (12)		2.1	20.5		15
25												
						10	4/6/9 (15)		3.0	20.1		10
30												

NOTES:

1. Weather: Sunny, 39°F
2. Used automatic hammer
3. Backfilled with auger cuttings & bentonite chips
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger = No Recovery = Split-Spoon Sample
= Geoprobe = Core Sample = Vane Shear Test
= Grab Sample = Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

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7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-07

Location: N 41.774924, E -87.758118

File No.: 1012-327-19-01

DATUM: SURFACE ELEVATION (ft): 38.6

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		Moist, stiff to very stiff, gray, LEAN CLAY, trace gravel (CL) *(continued)*										
						11	5/7/11 (18)		2.7	13.8		5
35												
						12			3.0	21.5	Q_u= 2.34 tsf Q_u= 4.89 tsf	0
40												
						13	5/6/10 (16)		2.5	15.9		-5
45												
		Moist, hard, gray, LEAN CLAY, trace gravel (CL)	46.8									
						14	28/32/35 (67)		4.5	18.1		-10
50		Boring Terminated at 50 ft	50.0									
												-15
55												
												-20
60												
												-25
65												
												-30
70												

Weaver Consultants Group

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LOG OF SOIL BORING NO.: B-08

Location: N 41.774694, E -87.758075

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/13/2018
Completed: 12/13/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 38.1

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 3"	0.2									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.4									
		Moist, stiff to very stiff, dark gray & black, LEAN CLAY, with cinder seams, trace gravel FILL (CL)				1	2/3/4 (7)	3.4	1.0	33.8		35
			4.0			2	2/3/4 (7)	3.2	2.3	26.9		
5		Moist, very stiff to stiff, gray and brown, LEAN CLAY, trace gravel (CL)				3	3/3/4 (7)		1.7	21.8		
			8.0									30
		Moist, hard, brown, LEAN CLAY, trace gravel (CL)				4	3/6/9 (15)		6.6	18.7		
10						5	5/7/9 (16)		4.9	19.4		
			13.0									25
		Moist, hard to very stiff, gray, LEAN CLAY, trace gravel (CL)				6	4/7/10 (17)		6.6	17.2		
15												
						7	4/6/10 (16)		3.9	17.5		20
20						8			1.25	17.7	LL = 35 PL = 16 PI = 19 Q_u= 3.36 tsf	
												15
						10	4/5/7 (12)		2.7	19.7		
25												
												10
						11	4/6/7 (13)		2.1	20.0		
30		Boring Terminated at 30 ft	30.0									

NOTES:

1. Weather: Sunny, 44°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger
= Geoprobe
= Grab Sample
= No Recovery
= Core Sample
= Shelby Tube
= Split-Spoon Sample
= Vane Shear Test

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-09

Location: N 41.774715, E -87.757529

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/14/2018
Completed: 12/14/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 37.8

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.5									
		Moist, stiff to very stiff, greenish gray, LEAN CLAY, trace gravel FILL (CL)				1	2/3/3 (6)	2.2	1.5	24.6		35
						2	2/2/3 (5)		3.4	21.6		
5			5.5									
		Moist, very stiff, gray and mottled brown, LEAN CLAY, trace gravel (CL)				3	3/4/3 (7)		3.0	23.2		30
			8.0									
		Moist, very stiff to hard, brown, LEAN CLAY, trace gravel (CL)				4	4/8/10 (18)		3.9	19.6		
10						5	7/10/14 (24)		5.9	17.7		25
			13.0									
		Moist, very stiff to stiff, gray, LEAN CLAY, trace gravel (CL)				6	4/6/8 (14)		3.3	20.6		
15												20
						7	4/6/8 (14)		2.6	21.1		
20						8			1.0	18.9	Q_u= 3.13 tsf	15
						10			1.0	18.9		
25												10
						11	6/8/10 (18)		3.3	20.1		
30		Boring Terminated at 30 ft	30.0									

NOTES:

1. Weather: Cloudy, 41°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger = No Recovery = Split-Spoon Sample
= Geoprobe = Core Sample = Vane Shear Test
= Grab Sample = Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
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LOG OF SOIL BORING NO.: B-10

Location: N 41.774737, E -87.757077

File No.: 1012-327-19-01 Sheet 1 of 2

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
ft At Hrs. A.D.*
ft At Days A.D.***

Started: 12/12/2018
Completed: 12/12/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA/Mud Rotary

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 37.5

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 3"	0.2									
		Moist, very stiff, black, ORGANIC LEAN CLAY FILL (CL)	2.0	X		1	4/4/5 (9)		2.7	33.1		35
		Moist, very stiff, greenish gray, LEAN CLAY, trace gravel (CL)		X		2	3/5/5 (10)		2.4	19.1		
5			5.5									
		Moist, very stiff to hard, brown, LEAN CLAY, trace gravel (CL)		X		3	4/6/7 (13)		2.2	19.3		30
				X		4	5/7/10 (17)		4.5	19.8	Switch to mud rotary	
10				X		5	4/9/10 (19)		5.1	18.8		
			13.0									25
		Moist, stiff to hard, gray, LEAN CLAY, trace gravel (CL)		■		6			2.3	18.2	Q_u= 4.76 tsf	
15												
												20
				■		7			1.8			
20												
												15
				X		8	4/6/8 (14)		2.9	20.6		
25												
												10
				X		10	4/8/10 (18)		2.8	21.0		
30												

NOTES:

1. Weather: Cloudy, 53°F
2. Used automatic hammer
3. Backfilled with auger cuttings & bentonite chips
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger
= No Recovery
= Split-Spoon Sample
= Geoprobe
= Core Sample
= Vane Shear Test
= Grab Sample
= Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group
7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-10

Location: N 41.774737, E -87.757077

File No.: 1012-327-19-01

DATUM: SURFACE ELEVATION (ft): 37.5

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		Moist, stiff to hard, gray, LEAN CLAY, trace gravel (CL) *(continued)*										5
35						11	7/7/12 (19)		3.9	15.1		0
40						12	7/8/12 (20)		2.7	20.9		-5
		Moist, very hard, gray, LEAN CLAY, trace gravel (CL)	41.8									
45						13	8/13/16 (29)		>4.5	14.4		-10
50						14	9/14/17 (31)		8.6	14.9		-15
		Boring Terminated at 50 ft	50.0									
55												-20
60												-25
65												-30
70												

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LOG OF SOIL BORING NO.: B-11

Location: N 41.775088, E -87.757819

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
__ ft At __ Hrs. A.D.*
__ ft At __ Days A.D.***

Started: 12/12/2018
Completed: 12/12/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 37.9

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.5									
		Moist, very stiff, black, ORGANIC CLAY, trace gravel (CL)		X		1	4/3/5 (8)	6.4	2.3	30.6		
		Moist, very stiff, greenish gray, FAT CLAY, trace gravel (CH)	3.0	X		2	2/2/4 (6)		2.9	22.5	LL = 55 PL = 18 PI = 37	35
5		Moist, very stiff, brown, LEAN CLAY, trace gravel (CL)	5.5	X		3	4/5/6 (11)		2.5	20.4		
				X		4	6/8/10 (18)		3.9	19.6		30
10		Boring Terminated at 10 ft	10.0									
15												25
20												20
25												15
30												10

NOTES:

1. Weather: Cloudy, 53°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger = No Recovery = Split-Spoon Sample
= Geoprobe = Core Sample = Vane Shear Test
= Grab Sample = Shelby Tube

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

Weaver Consultants Group

7121 Grape Road, Granger, Indiana 46530
574-271-3447(Phone)/574-271-3343(Fax)

LOG OF SOIL BORING NO.: B-12

Location: N 41.775091, E -87.757244

File No.: 1012-327-19-01 Sheet 1 of 1

WATER LEVEL DATA
NE = Not Encountered

NE ft While Drilling
NE ft At Completion**
__ ft At __ Hrs. A.D.*
__ ft At __ Days A.D.***

Started: 12/12/2018
Completed: 12/12/2018
Engineer: S. Schubert
Driller: Wang Eng.
Drilling Equip.: CME-55
Drilling Method: 3 1/4" ID HSA

PROJECT: Hancock Replacment School
65th Street & Long Avenue
Chicago, Illinois 60638

CLIENT: Public Building Commision of Chicago
Chicago, Illinois

DATUM: SURFACE ELEVATION (ft): 37.6

Depth (ft)	Symbol	SOIL DESCRIPTION, CLASSIFICATION and USCS or AASHTO GROUP SYMBOL	Strata Depth (ft)	Type	Recovery	Number	Standard Penetration Test-Blows/6" (#)= "N" Value	LOI (%)	Qp (tsf)	Moisture Content %	BORING AND SAMPLING NOTES	Elevations (ft)
		ASPHALT PAVEMENT 4"	0.3									
		Moist, SAND AND GRAVEL AGGREGATE SUBBASE (FILL)	0.6									
		Moist, very stiff, black, ORGANIC LEAN CLAY, trace gravel FILL (CL)		X		1	3/4/6 (10)		3.0	30.0		35
		Moist, very stiff, greenish gray to dark gray, LEAN CLAY, trace gravel FILL (CL)	3.0									
5		Moist, very stiff, greenish gray, LEAN CLAY, trace gravel (CL)	4.5	X		2	3/4/5 (9)		2.7	30.0		
		Moist, very stiff, brown, LEAN CLAY, trace gravel (CL)	6.0	X		3	4/4/4 (8)		2.1	21.8		30
10		Boring Terminated at 10 ft	10.0	X		4	5/7/9 (16)		3.7	20.5		
15												25
												20
20												
												15
25												
												10
30												

NOTES:

1. Weather: Cloudy, 53°F
2. Used automatic hammer
3. Backfilled with auger cuttings
4. Northing, Easting and Elevation surveyed by Weaver Consultant Group

LEGEND

= Auger
= Geoprobe
= Grab Sample
= No Recovery
= Core Sample
= Shelby Tube
= Split-Spoon Sample
= Vane Shear Test

LLC- ELEVATIONS-W NORTH EAST 1012-327-19-01 HANCOCK.GPJ 1/10/19

APPENDIX B

Field Exploration

WEAVER CONSULTANTS GROUP, LLC
☒ **35 East Wacker Drive, Suite 1250, Chicago, IL 60601** • **(312) 922-0201**
☐ 6420 Southwest Boulevard, Suite 206, Fort Worth, TX 76109 • (817) 735-9770
☐ 7121 Grape Road, Granger, IN 46530 • (574) 271-3447

LOG OF SOIL BORING - GENERAL NOTES

In order to provide uniformity throughout our projects, the following system has been adopted to describe each soil sample. Rock, shale and other materials will be described in detail as encountered.

CONSISTENCY OF COHESIVE SOILS

UNCONFINED COMPRESSIVE STRENGTH, Q_U (tsf)	CONSISTENCY
<0.25	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Medium Stiff
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
4.00 - 8.00	Hard
>8.00	Very Hard

RELATIVE DENSITY OF GRANULAR SOILS

SPT "N" VALUE*		RELATIVE DENSITY
Safety Hammer	Automatic Hammer	
<4	<3	Very Loose
4 - 9	3 - 7	Loose
10 - 29	8 - 21	Medium Dense
30 - 50	22 - 35	Dense
51 - 80	36 - 60	Very Dense
>80	>60	Extremely Dense

*Number of blows per foot required to drive a 2-in. O.D. split-spoon sampler using a 140-lb. weight falling freely for 30 in., except where otherwise noted.

COLOR - AS DETERMINED ON THE FRESH, MOIST SAMPLES

PREDOMINATE COLORS

Black	Yellow
Brown	Red
Gray	Blue

SHADES	MODIFYING ADJECTIVES
Light	Vari-colored
Dark	Streaked
	Mottled

GRADATION DESCRIPTION AND TERMINOLOGY

COMPONENTS	SIZE RANGE
Boulders	Over 8 inches
Cobbles	8 inches to 3 inches
Gravel	3 inches to # 4 sieve (4.75 mm)
Sand	#4 sieve to #200 sieve (0.075 mm)
Silt	Passing #200 sieve to 0.005 mm
Clay	Smaller than 0.005 mm

DESCRIPTION OF COMPONENT ALSO PRESENT IN SAMPLE	PERCENT OF DRY WEIGHT
Trace	1 - 9
Little	10 - 19
Some	20 - 34
And	35 - 50

GROUNDWATER LEVELS

Water levels are those observed when borings were drilled, or as noted. Porosity of soil strata, variations of rainfall, site topography, etc., may cause changes in these levels.

ABBREVIATIONS

DRILLING AND SAMPLING

A.D. - After Drilling
BA - Bucket Auger (3¼-in. O.D.), except where noted
CFA - Continuous Flight Auger
C.I. - Cave-In Depth
CS - Continuous Sampling
DP - Direct Push
GP - Geoprobe
HA - Hand Auger
HSA - Hollow Stem Auger
HPR - Hollow Probe Rod
MR - Mud Rotary
NR - No Recovery
PMT - Pressuremeter Test
Q_C - Static Cone Penetrometer Reading (tsf)
RC - Rock Core with diamond bit NX size, except where noted
RQD - Rock Quality Designation
SPT - Standard Penetration Test
SS - 1 3/8-in. I.D. Split-Spoon Sample (2-in.O.D.)
ST - 3-in. O.D. Thin-Walled Shelby Tube Sample, except where noted
WOH - Weight of Hammer

LABORATORY TESTS

DD - Dry Density (pcf)
LL - Liquid Limit %
LOI - Loss-on-Ignition, Organic Content (%)
MC - Moisture Content (%)
P200 - Percentage of Soil Particles, by dry weight, Passing a No. 200 U.S. Standard Sieve
MD - Moist Density (pcf)
pH - Soil Alkalinity/Acidity
PID - Photoionization Detector (ppm)
PI - Plasticity Index (%)
PL - Plastic Limit (%)
Q_P - Calibrated Hand Penetrometer Reading (tsf)
Q_U - Unconfined Compressive Strength (tsf)

WATER LEVEL MEASUREMENTS

BF - Backfilled
D - Dry
D@C.I. - Dry at Cave-In Depth
NE - Not Encountered

ORGANIC CLASSIFICATION BY LOSS-ON-IGNITION [1]

Category	Name	Organic Content (% by dry weight)	Group Symbols	Category	Name	Organic Content (% by dry weight)	Group Symbols
ORGANIC MATTER	FIBROUS PEAT (woody, mats, etc.)	75 to 100 % Organics either visible or inferred	PT	ORGANIC SOILS	Clayey ORGANIC SILT	5 to 30% Organics either visible or inferred	OH
	FINE GRAINED PEAT (amorphous)				Organic SAND or SILT		OL
HIGHLY ORGANIC SOILS	Silty Peat	30 to 75% Organics either visible or inferred	PT	SLIGHTLY ORGANIC SOILS	SOIL FRACTION add slightly Organic	Less than 5% Organics combined visible and inferred	Depend upon inorganic fraction
	Sandy Peat						

[1] U.S. Navy, (May 1982), Naval Facilities Engineering Command, Design Manual DM 7.1, *"Soil Mechanics,"* Dept. of Navy, Alexandria, VA.

WEAVER CONSULTANTS GROUP

x **35 East Wacker Drive, Suite 1250, Chicago, IL 60601** • **(312) 922-0201**
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o 1316 Bond Street, Suite 108, Naperville, IL 60563 • (630) 717-4848
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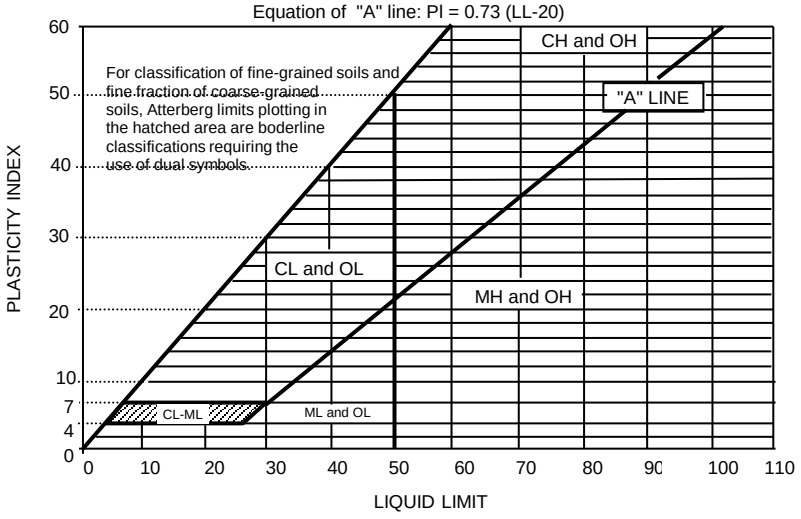
UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Group Symbol	Typical Names	Classification on basis of percentage of fines by dry wt.	Laboratory Classification Criteria	
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	GRAVELS 50% or more of coarse fraction retained on #4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	< 5% passing #200 sieve= GW, GP, SW, SP	$C_u = D_{60}/D_{10}$ Greater Than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		Gravels w/fines	GM	Silty gravels, gravel-sand-silt mixtures	> 12% passing #200 sieve= GM, GC, SM, SC	Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classification requiring use of dual symbols
			GC	Clayey gravels and gravel-sand-clay mixtures		Atterberg limits plot above "A" line and plasticity index greater than 7	
	SANDS More than 50% of coarse fraction passes #4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines	5% to 12% passing #200 sieve= Borderline Classifications requiring use of dual symbols	$C_u = D_{60}/D_{10}$ Greater Than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly-graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW	
		Sands w/fines	SM	Silty sands and sand-silt mixtures		Atterberg limits plot below "A" line and platicity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands and sand-clay mixtures		Atterberg limits plot above "A" line and plasticity index greater than 7	
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILTS & CLAYS Liquid Limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands			
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays silty clays, lean clays			
			OL	Organic silts and organic silty clays of low plasticity			
	SILTS & CLAYS Liquid Limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
			CH	Inorganic clays of high plasticity Fat clays			
			OH	Organic clays of medium to high plasticity			
HIGHLY ORGANIC SOILS			PT	Peat, Muck and other highly organic soils			



Plasticity Chart

FIELD EXPLORATION PROCEDURES

Standard Penetration Test Soil Borings

General

We wish to point out that the soils actually recovered from our borings for observation and testing represent a very small percentage of the site soils. Our records depict subsurface conditions only at specific locations and at the particular time when drilling. Soil conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in a change in the subsurface soil and groundwater conditions at the boring locations. The interface between differing subsurface materials on the logs and profiles represent approximate boundaries. The transition between materials may be gradual. Also, thin strata that occur between sample depths may be present, but remain undetected by routine sampling procedures.

Drilling Procedures

Soil borings were performed at the approximate locations shown on the attached boring plan. The soil borings were advanced by mechanically twisting a continuous steel-flight, solid-stem augers and rotary bits into the soil. The outside diameter (O.D.) of the solid-stem auger is typically 4 in. When mud rotary is used, cuttings are circulated out of the borehole in drilling mud.

The auger is turned into the ground, which displaces the soil upwards as it advances. Once the desired sample depth is achieved, the advancement of the auger is stopped. The borehole is then cleaned of any soil and the sampling tools are inserted, and the sampling is performed. When drilling below the water table in pervious soils, a head of water is maintained in the hollow-stem, to prevent a "quick" condition at the auger tip.

Penetration Testing and Split-Barrel Sampling

Standard Penetration Testing and split-barrel sampling are normally conducted in the borings to provide relative density information and soil samples for visual classification and laboratory testing. The standard split-barrel (commonly called split-spoon) sampler is a 2-in. O.D., 1.375-in. I.D., typically 18 to 24 in. long and is connected to an AW or N size drilling rod. The sampler is then driven into the soil with a force of a 140 lb. hammer free-falling a distance of 30 in. The number of hammer blows required to drive the sampler into the soil is recorded for each 6-in. interval. The sampler is typically driven a total of 18 in., and the last two 6-in.

interval blow counts are added together and commonly referred to as the "N" value, blow count or penetration resistance. Representative samples are placed in airtight glass jars and returned to our laboratory for further observation and testing. Descriptions of the spilt-barrel samples and the penetration resistances are shown on the boring logs.

Shelby Tube Sampling Procedure

In the Shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Calibrated Pocket Penetrometer Testing

The strength of cohesive soils does not correlate as well as granular materials with the Standard Penetration Testing described above. Typically, we test split-barrel samples of cohesive soils with a calibrated pocket penetrometer in the field. This test involves pushing a spring-loaded piston, 0.25-in. in diameter, into the sample and measuring the spring deflection, which has been correlated to shear strength. This test is used as a rough approximation method only. More refined results require undisturbed Shelby tube sampling and laboratory unconfined compressive strength testing.

Water Level Readings

When the drilling crew notices groundwater or significant variations in soil moisture, they are recorded on the boring logs. Generally, the level of water at the time of drilling is measured and recorded. The readings may indicate the approximate level of the hydrostatic water table at the time of our drilling activities.

Where low permeability soils are encountered, the water seeps into the borings at a slow rate, and it is generally not possible to establish accurate groundwater level readings in an open borehole during the drilling operations. If water-drilling methods are used, a local groundwater "mound" could be created, taking several days to dissipate. Also, the groundwater level typically fluctuates on a long-term or seasonal basis, due to variations in precipitation, surface run-off, evaporation, etc. When these long-term readings are required, piezometers or monitoring wells are necessary to maintain an open hole.

Boring Log Preparation

The subsurface conditions encountered during drilling are reported on a field log recorded by the chief driller. The driller's field record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these records contain both factual and interpretive information. The field logs are on file in our office.

The soil samples, plus the field logs, are reviewed by a geotechnical engineer, geologist, or geotechnician. The engineer/geologist/geotechnician then classifies the soil in general accordance with the Unified Soil Classification System and prepares the final boring logs, which are the basis for our evaluations and recommendations. The group symbol for each soil type is indicated in parentheses following the soil descriptions on the boring logs. The final boring logs represent our interpretation of the contents of the field logs based on the results of the engineering review and laboratory testing of the field samples. The final boring logs are included in this section.

Atterberg Limits

To provide a quantitative appraisal of the soil and define the plastic characteristics, Atterberg limits are determined. The liquid limit is defined as the moisture content above which the soil would tend to act as a liquid, and below which the soil would tend to act as a solid. The difference between the liquid and the plastic limits is the plasticity index, which provides a measure of the plasticity of the soil.

Past experience and research studies indicate that if the natural moisture content of the soil is close to the liquid limit, the soil is likely normally consolidated and could be expected to settle under any increase in effective stress. However, if the moisture content is close to the plastic limit, the soil is likely over-consolidated and would not readily settle under a small increase in effective stress.

Loss-On-Ignition Tests

Loss-on-ignition (L.O.I.) tests are performed on samples to determine the percent of organic material present. Generally, organic material is undesirable when present in soil to be used as the foundation for structures or as engineered (structural) fill.

Moisture Content Tests

Moisture content tests were performed on selected soil samples. The moisture content has a significant effect on the strength, compressibility and general behavior of the soil.

Unconfined Compressive Strength (Q_U)

Unconfined compressive strength tests were performed on selected cohesive samples. A hydraulically-operated testing machine is used to provide a controlled rate of strain. This information is used in evaluating the shear strength of cohesive soil, which is useful in bearing capacity and slope stability calculations.

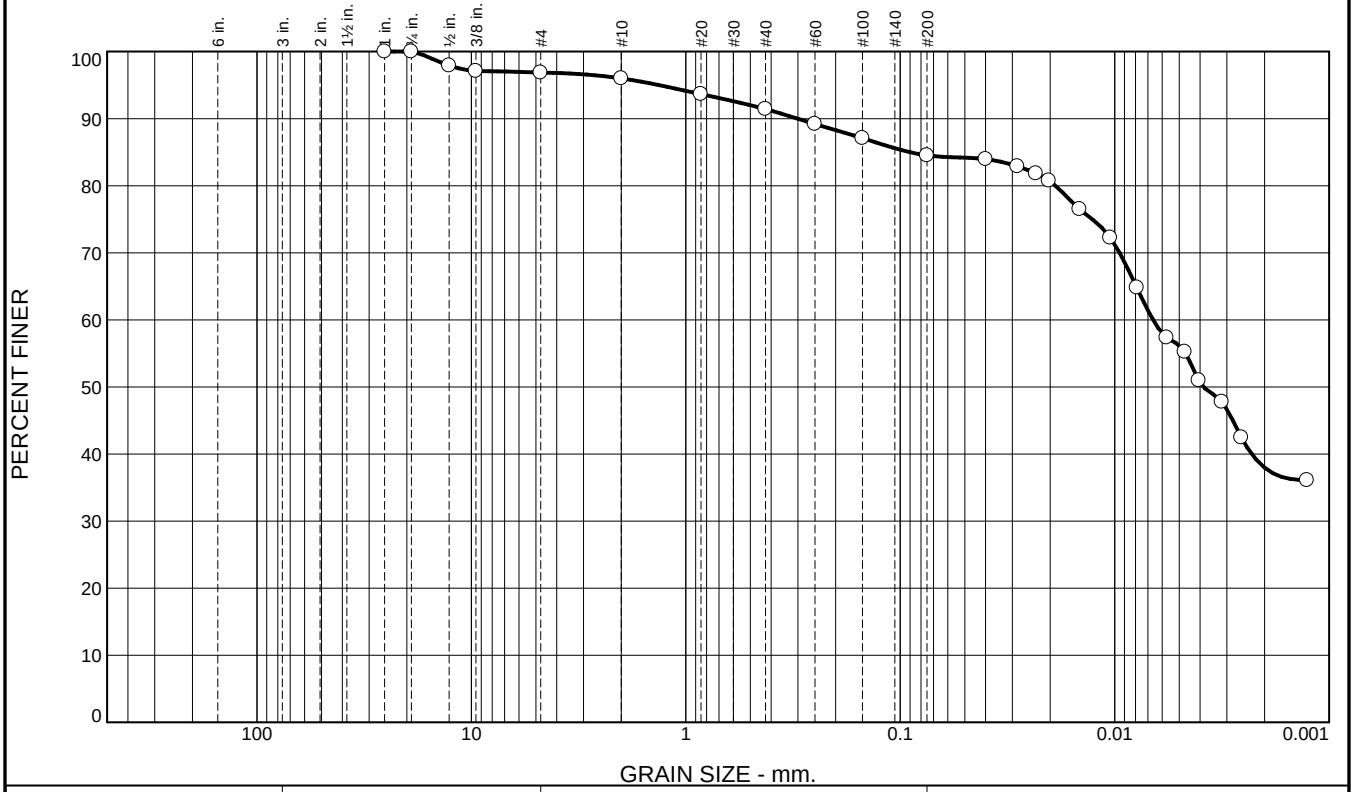
Calibrated Pocket (Hand) Penetrometer Testing (Q_P)

This test involves pushing a spring-loaded piston, 0.25-in. in diameter, into the sample and measuring the spring deflection, which has been correlated to shear strength. This test is used as a rough approximation method only. More refined results require undisturbed Shelby tube sampling and laboratory unconfined compressive strength testing.

APPENDIX C

Laboratory Test Results

ASTM D 7928 (Air Dried) & ASTM D 6913: Method B (Oven-Dried)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	0.9	4.6	6.9	28.3	56.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
0.75"	100.0		
0.50"	97.9		
0.375"	97.1		
#4	96.9		
#10	96.0		
#20	93.7		
#40	91.4		
#60	89.2		
#100	87.1		
#200	84.5		
0.0400 mm.	84.0		
0.0284 mm.	82.9		
0.0233 mm.	81.8		
0.0203 mm.	80.8		
0.0146 mm.	76.5		
0.0105 mm.	72.3		
0.0079 mm.	64.8		
0.0057 mm.	57.4		
0.0047 mm.	55.2		
0.0041 mm.	51.0		
0.0032 mm.	47.8		
0.0026 mm.	42.5		
0.0013 mm.	36.1		

* (no specification provided)

Soil Description

Light Brown LEAN CLAY with sand

Atterberg Limits

PL= 18 LL= 43 PI= 25

Coefficients

D_{90}= 0.3012 D_{85}= 0.0902 D_{60}= 0.0066
D_{50}= 0.0039 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(21)

Remarks

Source of Sample: B-2 **Depth:** 6.0 - 7.5 ft

Date: 1-7-2019

Weaver Consultants Group

Granger, Indiana

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638

Project No: 1012-327-19-01 **Figure**

Tested By: pl **Checked By:** jjw

GRAIN SIZE DISTRIBUTION TEST DATA

1/7/2019

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638
Project Number: 1012-327-19-01
Location: B-2
Depth: 6.0 - 7.5 ft
Material Description: Light Brown LEAN CLAY with sand
Date: 1-7-2019 **PL:** 18 **LL:** 43 **PI:** 25
USCS Classification: CL **AASHTO Classification:** A-7-6(21)
Tested by: pl **Checked by:** jjw

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
158.50	0.00	0.00	1"	0.00	100.0
			0.75"	0.00	100.0
			0.50"	3.32	97.9
			0.375"	4.61	97.1
			#4	4.99	96.9
			#10	6.34	96.0
45.91	0.00	0.00	#20	1.12	93.7
			#40	2.19	91.4
			#60	3.25	89.2
			#100	4.26	87.1
			#200	5.49	84.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 96.0
Weight of hydrometer sample =45.91
Hygroscopic moisture correction:
Moist weight and tare = 23.95
Dry weight and tare = 23.67
Tare weight = 13.99
Hygroscopic moisture = 2.9%
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5
Meniscus correction only = 1.0
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294967 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.0	44.5	39.5	0.0134	45.5	8.8	0.0400	84.0
2.00	20.0	44.0	39.0	0.0134	45.0	8.9	0.0284	82.9
3.00	20.0	43.5	38.5	0.0134	44.5	9.0	0.0233	81.8
4.00	20.0	43.0	38.0	0.0134	44.0	9.1	0.0203	80.8
8.00	20.0	41.0	36.0	0.0134	42.0	9.4	0.0146	76.5
16.00	20.0	39.0	34.0	0.0134	40.0	9.7	0.0105	72.3
30.00	20.0	35.5	30.5	0.0134	36.5	10.3	0.0079	64.8

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
60.00	20.0	32.0	27.0	0.0134	33.0	10.9	0.0057	57.4
90.00	20.0	31.0	26.0	0.0134	32.0	11.0	0.0047	55.2
125.00	20.0	29.0	24.0	0.0134	30.0	11.4	0.0041	51.0
210.00	20.0	27.5	22.5	0.0134	28.5	11.6	0.0032	47.8
330.00	20.0	25.0	20.0	0.0134	26.0	12.0	0.0026	42.5
1410.00	20.0	22.0	17.0	0.0134	23.0	12.5	0.0013	36.1

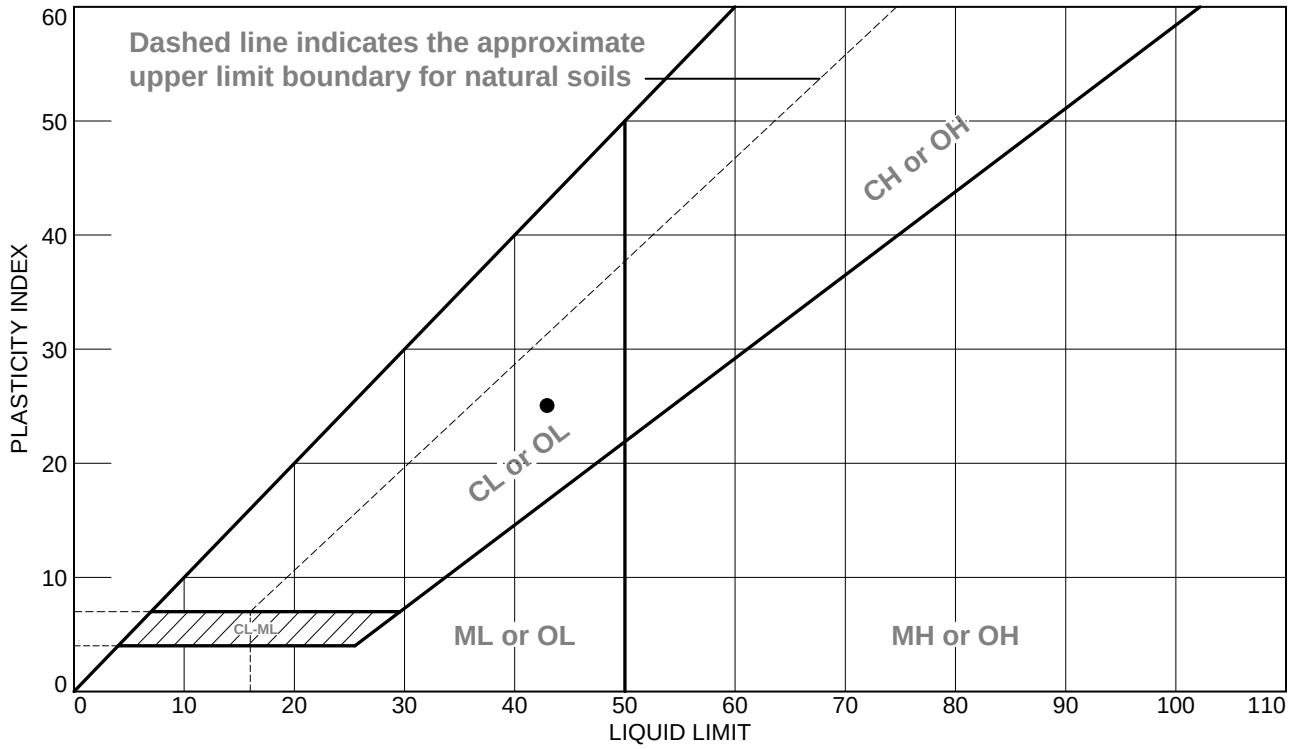
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.1	3.1	0.9	4.6	6.9	12.4	28.3	56.2	84.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0023	0.0039	0.0066	0.0189	0.0902	0.3012	1.3342

Fineness Modulus
0.45

ATTERBERG LIMITS TEST REPORT ASTM D 4318



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-2		6.0 - 7.5 ft		18	43	25		CL

Weaver Consultants Group

Granger, Indiana

Client: Public Building Commission of Chicago

Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638

Project No.: 1012-327-19-01 **Figure**

Tested By: jm **Checked By:** jjw

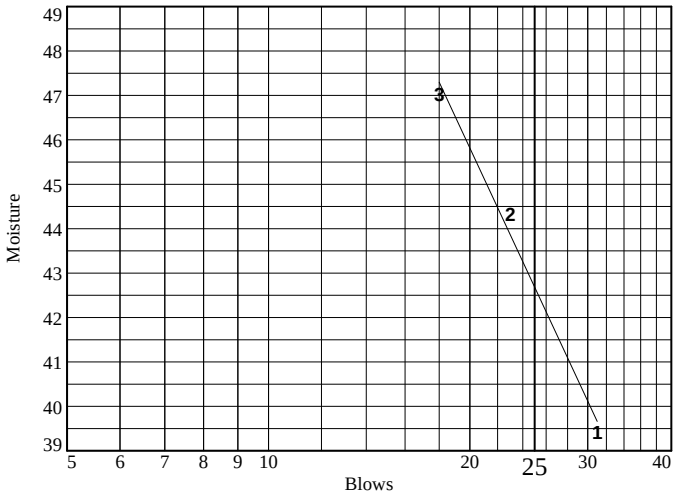
LIQUID AND PLASTIC LIMIT TEST DATA

1/7/2019

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638
Project Number: 1012-327-19-01
Location: B-2
Depth: 6.0 - 7.5 ft
Material Description: Light Brown LEAN CLAY with sand
USCS: CL **AASHTO:** A-7-6(21)
Tested by: jm **Checked by:** jjw

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	22.94	22.33	19.66			
Dry+Tare	20.40	19.94	17.60			
Tare	13.96	14.55	13.22			
# Blows	31	23	18			
Moisture	39.4	44.3	47.0			

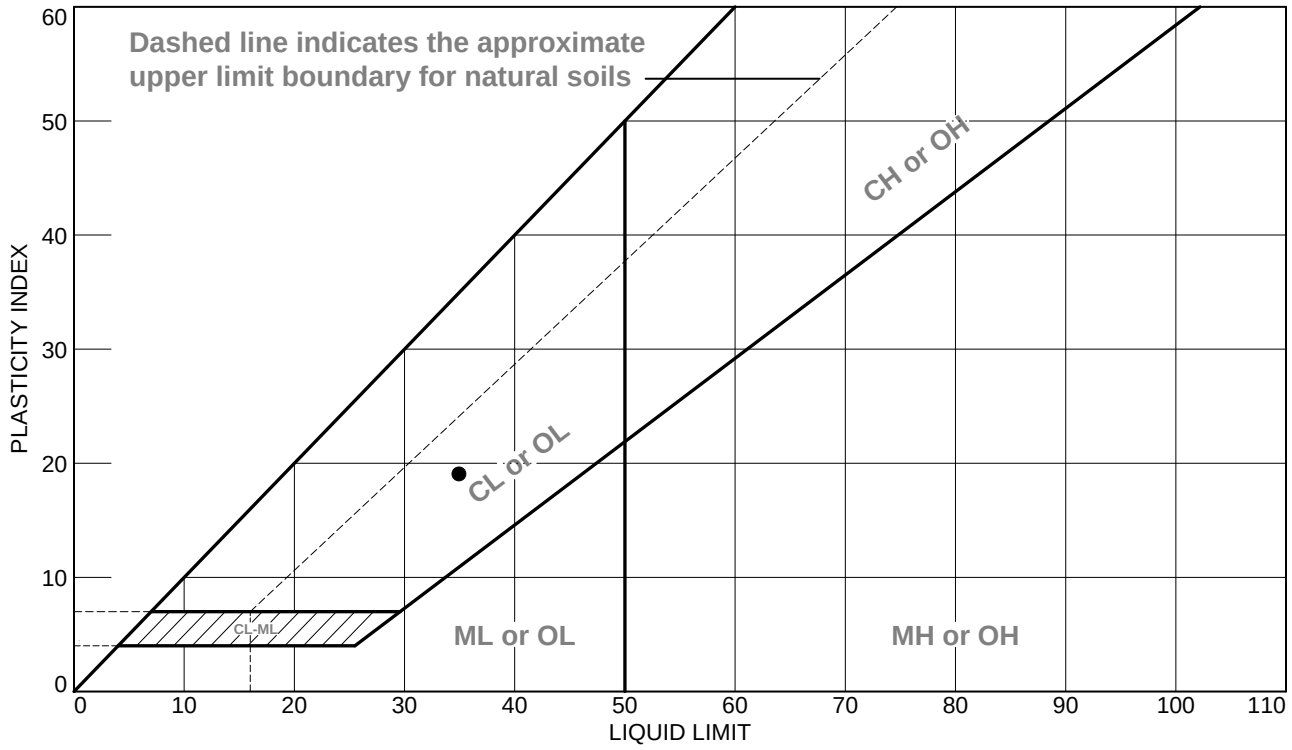


Liquid Limit= 43
Plastic Limit= 18
Plasticity Index= 25

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	23.19	20.88	25.14		
Dry+Tare	21.83	19.72	23.52		
Tare	14.42	13.27	14.28		
Moisture	18.4	18.0	17.5		

ATTERBERG LIMITS TEST REPORT ASTM D 4318



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-8		21.0 - 23.0 ft		16	35	19		CL

Weaver Consultants Group

Granger, Indiana

Client: Public Building Commission of Chicago

Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638

Project No.: 1012-327-19-01 **Figure**

Tested By: jm **Checked By:** jjw

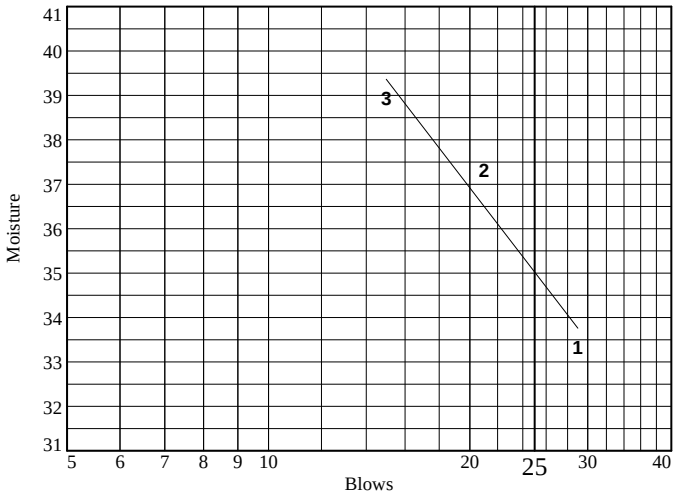
LIQUID AND PLASTIC LIMIT TEST DATA

1/7/2019

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638
Project Number: 1012-327-19-01
Location: B-8
Depth: 21.0 - 23.0 ft
Material Description: Gray LEAN CLAY
USCS: CL **AASHTO:** A-6(15)
Tested by: jm **Checked by:** jjw

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	18.44	21.60	18.22			
Dry+Tare	17.05	19.58	16.28			
Tare	12.88	14.17	11.30			
# Blows	29	21	15			
Moisture	33.3	37.3	39.0			

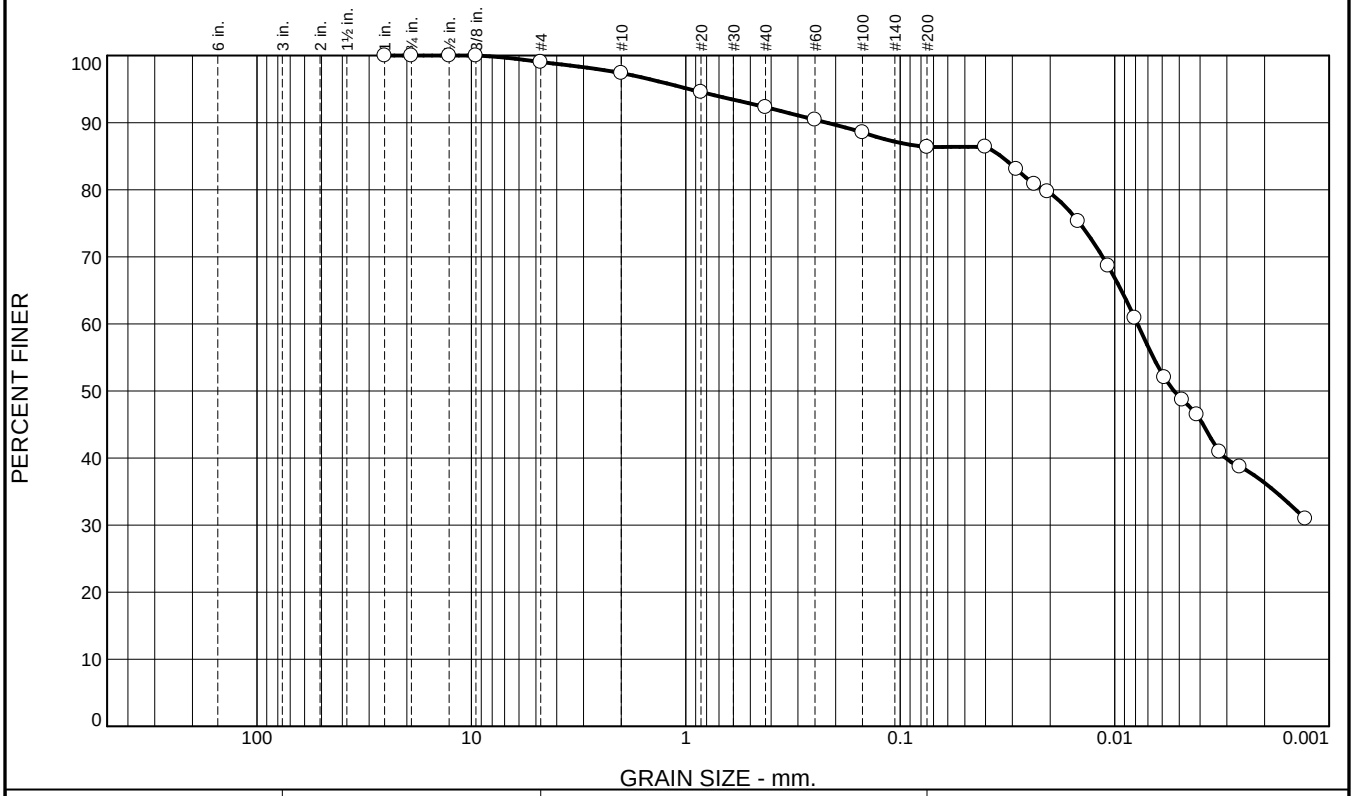


Liquid Limit= 35
Plastic Limit= 16
Plasticity Index= 19

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	23.54	24.19	21.64		
Dry+Tare	22.26	22.97	20.75		
Tare	14.35	15.37	14.86		
Moisture	16.2	16.1	15.1		

ASTM D 7928 (Air Dried) & ASTM D 6913: Method B (Oven-Dried)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	1.6	5.1	5.9	37.3	49.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
0.75"	100.0		
0.50"	100.0		
0.375"	100.0		
#4	99.0		
#10	97.4		
#20	94.6		
#40	92.3		
#60	90.4		
#100	88.6		
#200	86.4		
0.0401 mm.	86.4		
0.0288 mm.	83.1		
0.0237 mm.	80.9		
0.0206 mm.	79.8		
0.0148 mm.	75.3		
0.0107 mm.	68.7		
0.0081 mm.	60.9		
0.0059 mm.	52.0		
0.0048 mm.	48.7		
0.0041 mm.	46.5		
0.0033 mm.	40.9		
0.0026 mm.	38.7		
0.0013 mm.	31.0		

* (no specification provided)

Soil Description

Gray LEAN CLAY

Atterberg Limits

PL= 16 LL= 35 PI= 19

Coefficients

D_{90}= 0.2203 D_{85}= 0.0339 D_{60}= 0.0078
D_{50}= 0.0053 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(15)

Remarks

Source of Sample: B-8 **Depth:** 21.0 - 23.0 ft

Date: 1-7-2019

Weaver Consultants Group

Granger, Indiana

Client: Public Building Commission of Chicago

Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638

Project No: 1012-327-19-01 **Figure**

Tested By: pl **Checked By:** jjw

GRAIN SIZE DISTRIBUTION TEST DATA

1/7/2019

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638
Project Number: 1012-327-19-01
Location: B-8
Depth: 21.0 - 23.0 ft
Material Description: Gray LEAN CLAY
Date: 1-7-2019 **PL:** 16 **LL:** 35 **PI:** 19
USCS Classification: CL **AASHTO Classification:** A-6(15)
Tested by: pl **Checked by:** jjw

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
169.40	0.00	0.00	1"	0.00	100.0
			0.75"	0.00	100.0
			0.50"	0.00	100.0
			0.375"	0.00	100.0
			#4	1.61	99.0
			#10	4.43	97.4
45.00	0.00	0.00	#20	1.30	94.6
			#40	2.35	92.3
			#60	3.21	90.4
			#100	4.08	88.6
			#200	5.09	86.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 97.4
Weight of hydrometer sample =45.00
Hygroscopic moisture correction:
Moist weight and tare = 21.56
Dry weight and tare = 21.20
Tare weight = 11.29
Hygroscopic moisture = 3.6%
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5
Meniscus correction only = 1.0
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294967 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.0	44.0	39.0	0.0134	45.0	8.9	0.0401	86.4
2.00	20.0	42.5	37.5	0.0134	43.5	9.2	0.0288	83.1
3.00	20.0	41.5	36.5	0.0134	42.5	9.3	0.0237	80.9
4.00	20.0	41.0	36.0	0.0134	42.0	9.4	0.0206	79.8
8.00	20.0	39.0	34.0	0.0134	40.0	9.7	0.0148	75.3
16.00	20.0	36.0	31.0	0.0134	37.0	10.2	0.0107	68.7
30.00	20.0	32.5	27.5	0.0134	33.5	10.8	0.0081	60.9

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
60.00	20.0	28.5	23.5	0.0134	29.5	11.5	0.0059	52.0
90.00	20.0	27.0	22.0	0.0134	28.0	11.7	0.0048	48.7
125.00	20.0	26.0	21.0	0.0134	27.0	11.9	0.0041	46.5
210.00	20.0	23.5	18.5	0.0134	24.5	12.3	0.0033	40.9
330.00	20.0	22.5	17.5	0.0134	23.5	12.4	0.0026	38.7
1410.00	20.0	19.0	14.0	0.0134	20.0	13.0	0.0013	31.0

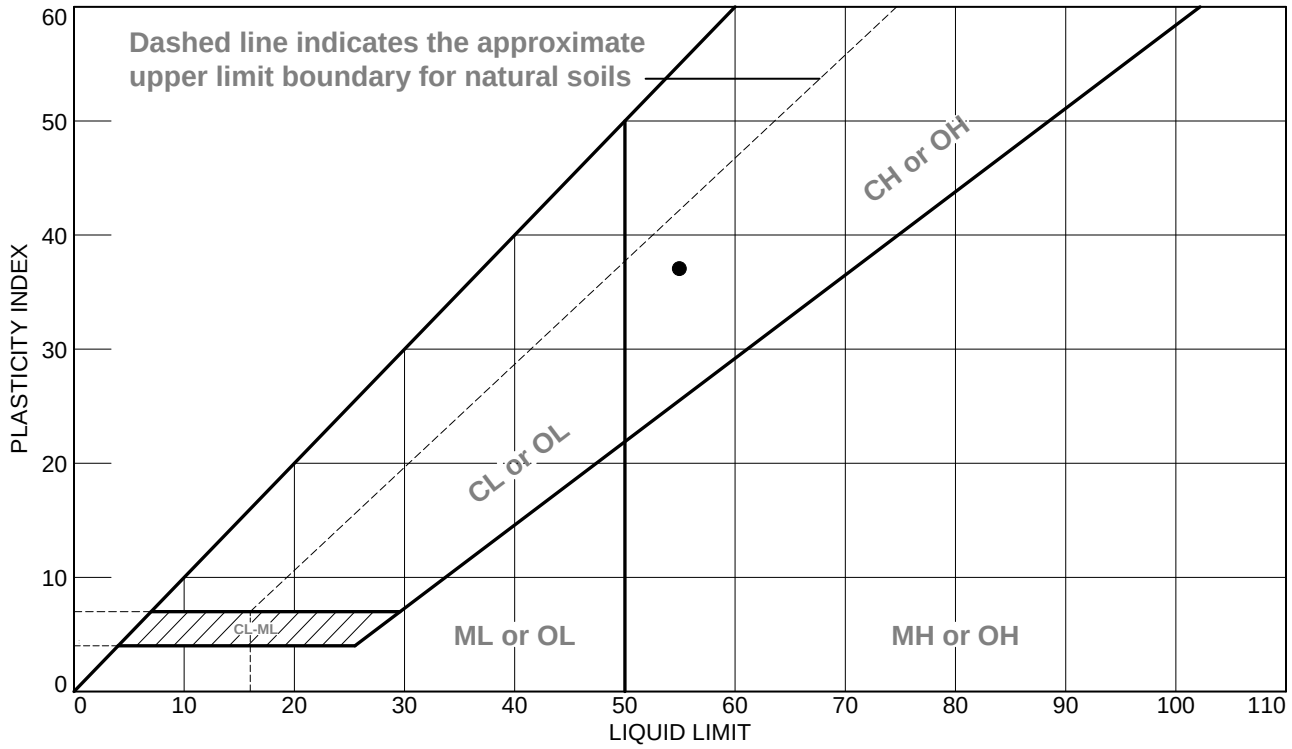
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.0	1.0	1.6	5.1	5.9	12.6	37.3	49.1	86.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0030	0.0053	0.0078	0.0213	0.0339	0.2203	0.9624

Fineness Modulus
0.34

ATTERBERG LIMITS TEST REPORT ASTM D 4318



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-11		3.5 - 5.0 ft		18	55	37		CH

Weaver Consultants Group

Granger, Indiana

Client: Public Building Commission of Chicago

Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638

Project No.: 1012-327-19-01 **Figure**

Tested By: jm **Checked By:** jjw

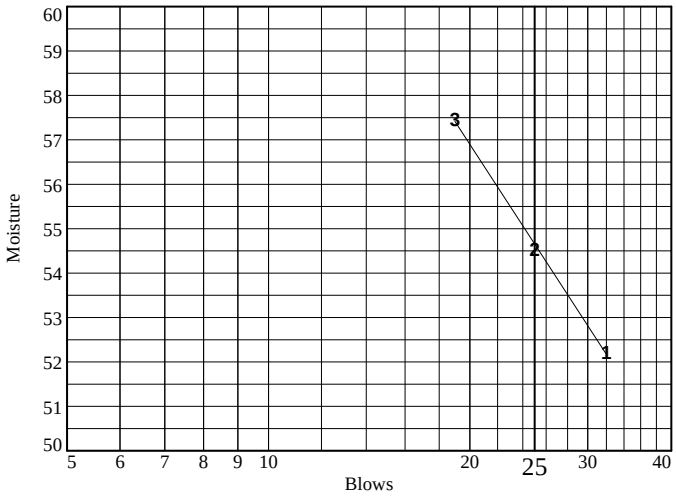
LIQUID AND PLASTIC LIMIT TEST DATA

1/7/2019

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638
Project Number: 1012-327-19-01
Location: B-11
Depth: 3.5 - 5.0 ft
Material Description: Greenish-Gray FAT CLAY
USCS: CH **AASHTO:** A-7-6(38)
Tested by: jm **Checked by:** jjw

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	18.57	22.54	21.82			
Dry+Tare	16.58	20.08	19.05			
Tare	12.77	15.57	14.23			
# Blows	32	25	19			
Moisture	52.2	54.5	57.5			

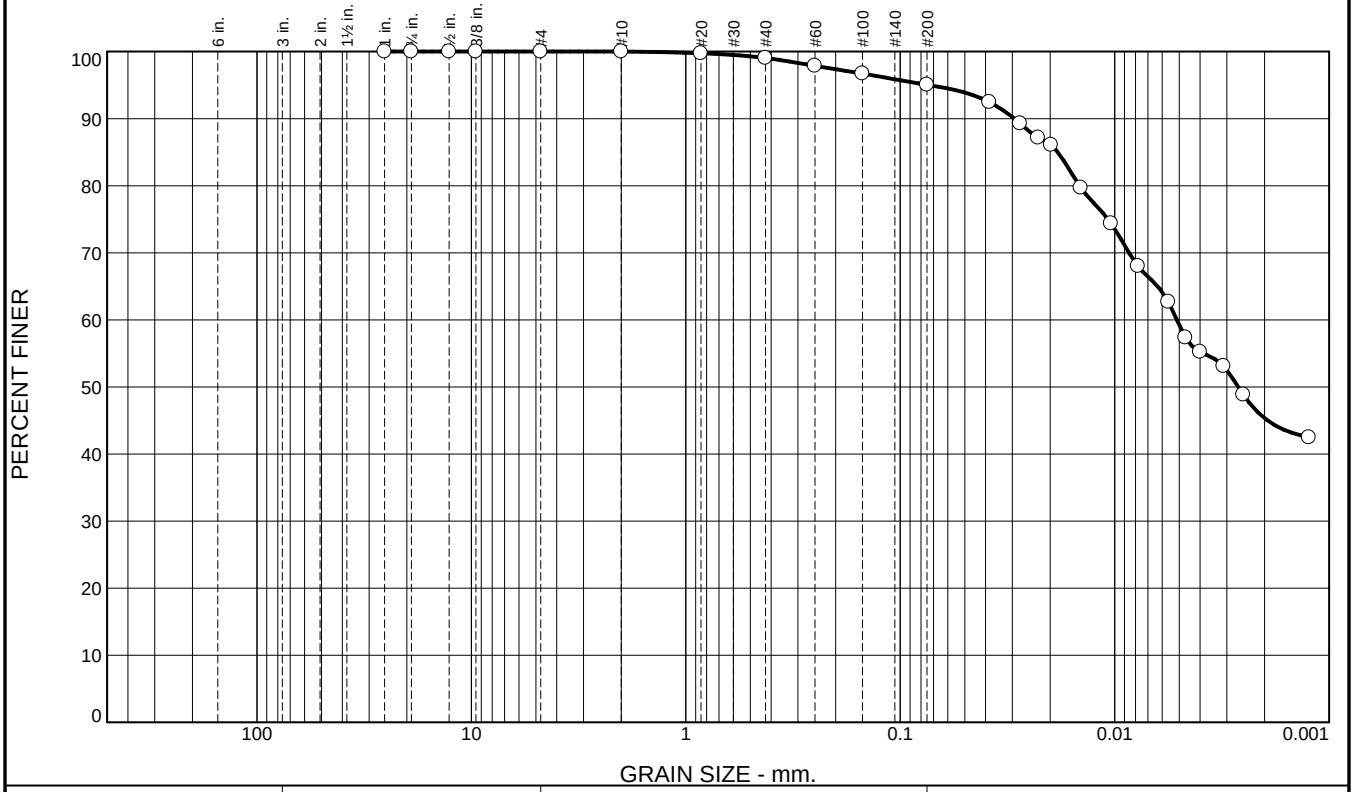


Liquid Limit= 55
Plastic Limit= 18
Plasticity Index= 37

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.82	23.77	22.00		
Dry+Tare	21.51	22.63	20.91		
Tare	14.34	16.04	14.61		
Moisture	18.3	17.3	17.3		

ASTM D 7928 (Air Dried) & ASTM D 6913: Method B (Oven-Dried)



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.0	4.0	35.8	59.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
0.75"	100.0		
0.50"	100.0		
0.375"	100.0		
#4	100.0		
#10	100.0		
#20	99.8		
#40	99.0		
#60	97.9		
#100	96.7		
#200	95.0		
0.0384 mm.	92.5		
0.0276 mm.	89.3		
0.0227 mm.	87.2		
0.0198 mm.	86.1		
0.0144 mm.	79.7		
0.0104 mm.	74.4		
0.0078 mm.	68.0		
0.0056 mm.	62.7		
0.0047 mm.	57.4		
0.0040 mm.	55.2		
0.0031 mm.	53.1		
0.0025 mm.	48.9		
0.0012 mm.	42.5		

* (no specification provided)

Soil Description

Greenish-Gray FAT CLAY

Atterberg Limits

PL= 18 LL= 55 PI= 37

Coefficients

D_{90}= 0.0294 D_{85}= 0.0184 D_{60}= 0.0051
D_{50}= 0.0027 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(38)

Remarks

Source of Sample: B-11 **Depth:** 3.5 - 5.0 ft

Date: 1-7-2019

Weaver Consultants Group

Granger, Indiana

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638

Project No: 1012-327-19-01 **Figure**

Tested By: pl **Checked By:** jjw

GRAIN SIZE DISTRIBUTION TEST DATA

1/7/2019

Client: Public Building Commission of Chicago
Project: Hancock Elementary School 5400 W. 65th Street Chicago, IL 60638
Project Number: 1012-327-19-01
Location: B-11
Depth: 3.5 - 5.0 ft
Material Description: Greenish-Gray FAT CLAY
Date: 1-7-2019 **PL:** 18 **LL:** 55 **PI:** 37
USCS Classification: CH **AASHTO Classification:** A-7-6(38)
Tested by: pl **Checked by:** jjw

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
140.67	0.00	0.00	1"	0.00	100.0
			0.75"	0.00	100.0
			0.50"	0.00	100.0
			0.375"	0.00	100.0
			#4	0.00	100.0
			#10	0.00	100.0
48.02	0.00	0.00	#20	0.12	99.8
			#40	0.46	99.0
			#60	1.02	97.9
			#100	1.58	96.7
			#200	2.38	95.0

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =48.02
Hygroscopic moisture correction:
Moist weight and tare = 26.04
Dry weight and tare = 25.67
Tare weight = 14.54
Hygroscopic moisture = 3.3%
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5
Meniscus correction only = 1.0
Specific gravity of solids = 2.70
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294967 **-** 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.0	48.5	43.5	0.0134	49.5	8.2	0.0384	92.5
2.00	20.0	47.0	42.0	0.0134	48.0	8.4	0.0276	89.3
3.00	20.0	46.0	41.0	0.0134	47.0	8.6	0.0227	87.2
4.00	20.0	45.5	40.5	0.0134	46.5	8.7	0.0198	86.1
8.00	20.0	42.5	37.5	0.0134	43.5	9.2	0.0144	79.7
16.00	20.0	40.0	35.0	0.0134	41.0	9.6	0.0104	74.4
30.00	20.0	37.0	32.0	0.0134	38.0	10.1	0.0078	68.0

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
60.00	20.0	34.5	29.5	0.0134	35.5	10.5	0.0056	62.7
90.00	20.0	32.0	27.0	0.0134	33.0	10.9	0.0047	57.4
125.00	20.0	31.0	26.0	0.0134	32.0	11.0	0.0040	55.2
210.00	20.0	30.0	25.0	0.0134	31.0	11.2	0.0031	53.1
330.00	20.0	28.0	23.0	0.0134	29.0	11.5	0.0025	48.9
1410.00	20.0	25.0	20.0	0.0134	26.0	12.0	0.0012	42.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.0	4.0	5.0	35.8	59.2	95.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.0027	0.0051	0.0146	0.0184	0.0294	0.0736

Fineness Modulus
0.06

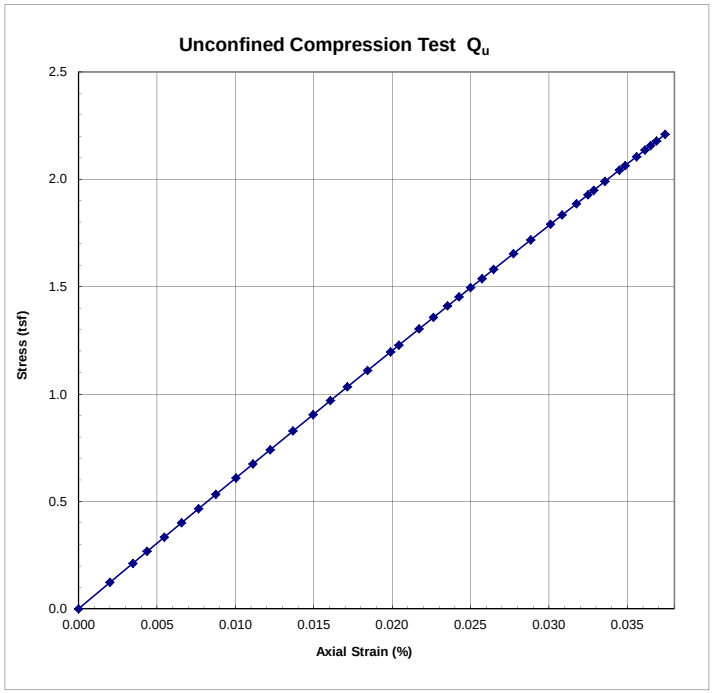
Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-1 **Depth (ft):** 23.5-25.0 **Date:** 12/20/2018
Visual Classification: Light Gray, Lean Clay, trace gravel
Sample Diameter (in): 2.86 **Height (in):** 5.48 **Moisture (%):** 18.5% **Wet Density (pcf):** 132.5
Area of Sample (in^2): 6.43 **Dry Density (pcf):** 111.8
Strain Rate (in/min): 0.05 **L/D Ratio:** 1.9 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	11	0.011	0.002	11.0	1.71	0.12
60	19	0.019	0.003	19.0	2.94	0.21
90	24	0.024	0.004	24.0	3.71	0.27
120	30	0.030	0.005	30.0	4.64	0.33
150	36	0.036	0.007	36.0	5.56	0.40
180	42	0.042	0.008	42.0	6.48	0.47
210	48	0.048	0.009	48.0	7.40	0.53
240	55	0.055	0.010	55.0	8.46	0.61
270	61	0.061	0.011	61.0	9.38	0.68
300	67	0.067	0.012	67.0	10.29	0.74
330	75	0.075	0.014	75.0	11.50	0.83
360	82	0.082	0.015	82.0	12.56	0.90
390	88	0.088	0.016	88.0	13.46	0.97
420	94	0.094	0.017	94.0	14.36	1.03
450	101	0.101	0.018	101.0	15.41	1.11
480	109	0.109	0.020	109.0	16.61	1.20
510	112	0.112	0.020	112.0	17.05	1.23
540	119	0.119	0.022	119.0	18.10	1.30
570	124	0.124	0.023	124.0	18.84	1.36
600	129	0.129	0.024	129.0	19.58	1.41
630	133	0.133	0.024	133.0	20.17	1.45
660	137	0.137	0.025	137.0	20.76	1.49
690	141	0.141	0.026	141.0	21.35	1.54
720	145	0.145	0.026	145.0	21.94	1.58
780	152	0.152	0.028	152.0	22.97	1.65
840	158	0.158	0.029	158.0	23.85	1.72
900	165	0.165	0.030	165.0	24.88	1.79
960	169	0.169	0.031	169.0	25.46	1.83
1,020	174	0.174	0.032	174.0	26.19	1.89
1,080	178	0.178	0.032	178.0	26.77	1.93
1,140	180	0.180	0.033	180.0	27.06	1.95
1,200	184	0.184	0.034	184.0	27.64	1.99
1,260	189	0.189	0.034	189.0	28.37	2.04
1,320	191	0.191	0.035	191.0	28.65	2.06
1,380	195	0.195	0.036	195.0	29.23	2.10
1,440	198	0.198	0.036	198.0	29.67	2.14
1,500	200	0.200	0.037	200.0	29.95	2.16
1,560	202	0.202	0.037	202.0	30.24	2.18
1,620	205	0.205	0.037	205.0	30.67	2.21
1,680	206	0.206	0.038	206.0	30.82	2.22
1,740	208	0.208	0.038	208.0	31.10	2.24
1,800	208	0.208	0.038	208.0	31.10	2.24



Maximum Stress (tsf): 2.24

Failure Type: Bulge

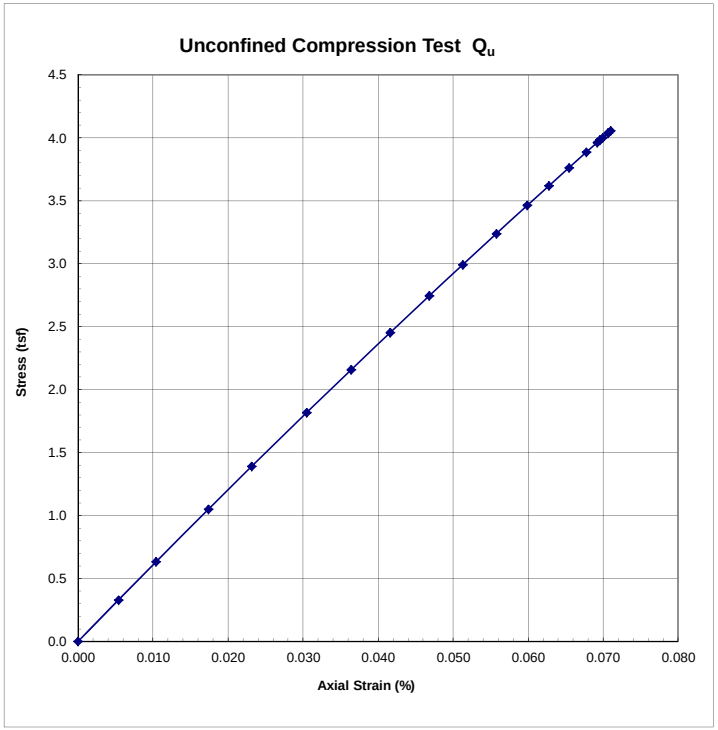
Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-2 **Depth (ft):** 8.0-10.0 **Date:** 1/8/2019
Visual Classification: Light Gray, Lean Clay, trace gravel
Sample Diameter (in): 2.88 **Height (in):** 5.58 **Moisture (%):** -275.6% **Wet Density (pcf):** 132.0
Area of Sample (in^2): 6.53 **Dry Density (pcf):** -75.2
Strain Rate (in/min): 0.05 **L/D Ratio:** 1.9 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	30	0.030	0.005	30.0	4.57	0.33
60	58	0.058	0.010	58.0	8.79	0.63
90	97	0.097	0.017	97.0	14.60	1.05
120	129	0.129	0.023	129.0	19.30	1.39
150	170	0.170	0.030	170.0	25.25	1.82
180	203	0.203	0.036	203.0	29.96	2.16
210	232	0.232	0.042	232.0	34.06	2.45
240	261	0.261	0.047	261.0	38.11	2.74
270	286	0.286	0.051	286.0	41.56	2.99
300	311	0.311	0.056	311.0	44.98	3.24
330	334	0.334	0.060	334.0	48.10	3.46
360	350	0.350	0.063	350.0	50.25	3.62
390	365	0.365	0.065	365.0	52.25	3.76
420	378	0.378	0.068	378.0	53.97	3.89
450	388	0.388	0.070	388.0	55.30	3.98
480	394	0.394	0.071	394.0	56.09	4.04
510	396	0.396	0.071	396.0	56.35	4.06
540	394	0.394	0.071	394.0	56.09	4.04
570	390	0.390	0.070	390.0	55.56	4.00
600	388	0.388	0.070	388.0	55.30	3.98
630	386	0.386	0.069	386.0	55.03	3.96



Maximum Stress (tsf): 4.06

Failure Type: Vertical Shear

Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-3 **Depth (ft):** 23.0-25.0 **Date:** 12/20/2018

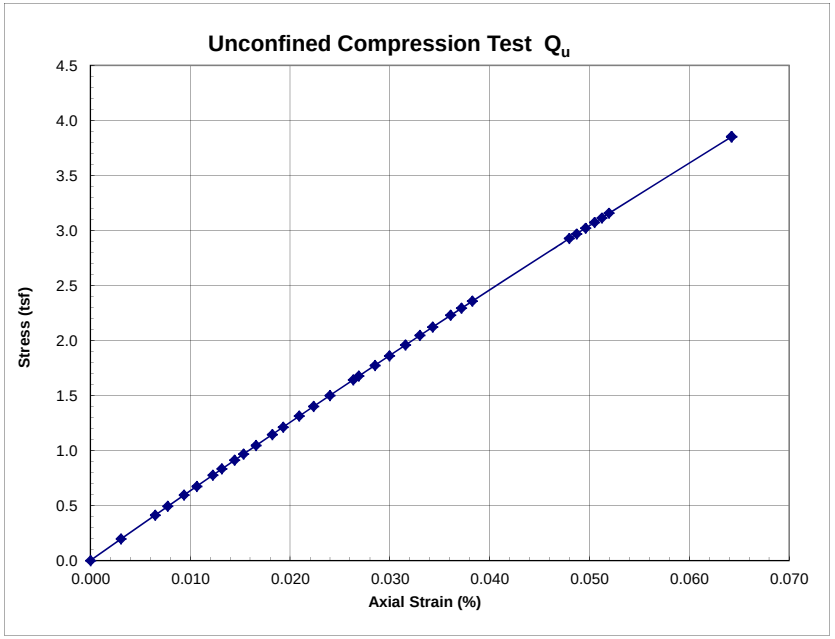
Visual Classification: Gray, Lean Clay, trace gravel

Sample Diameter (in): 2.82 **Height (in):** 5.54 **Moisture (%):** 18.4% **Wet Density (pcf):** 133.1

Area of Sample (in^2): 6.23 **Dry Density (pcf):** 112.4

Strain Rate (in/min): 0.05 **L/D Ratio:** 2.0 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	17	0.017	0.003	17.0	2.72	0.20
60	36	0.036	0.006	36.0	5.74	0.41
90	43	0.043	0.008	43.0	6.85	0.49
120	52	0.052	0.009	52.0	8.27	0.60
150	59	0.059	0.011	59.0	9.37	0.67
180	68	0.068	0.012	68.0	10.78	0.78
210	73	0.073	0.013	73.0	11.57	0.83
240	80	0.080	0.014	80.0	12.66	0.91
270	85	0.085	0.015	85.0	13.44	0.97
300	92	0.092	0.017	92.0	14.52	1.05
330	101	0.101	0.018	101.0	15.92	1.15
360	107	0.107	0.019	107.0	16.85	1.21
390	116	0.116	0.021	116.0	18.23	1.31
420	124	0.124	0.022	124.0	19.46	1.40
450	133	0.133	0.024	133.0	20.84	1.50
480	146	0.146	0.026	146.0	22.82	1.64
510	149	0.149	0.027	149.0	23.28	1.68
540	158	0.158	0.029	158.0	24.64	1.77
570	166	0.166	0.030	166.0	25.85	1.86
600	175	0.175	0.032	175.0	27.21	1.96
630	183	0.183	0.033	183.0	28.41	2.05
660	190	0.190	0.034	190.0	29.46	2.12
690	200	0.200	0.036	200.0	30.95	2.23
720	206	0.206	0.037	206.0	31.84	2.29
750	212	0.212	0.038	212.0	32.73	2.36
1,020	266	0.266	0.048	266.0	40.66	2.93
1,050	270	0.270	0.049	270.0	41.24	2.97
1,080	275	0.275	0.050	275.0	41.96	3.02
1,110	280	0.280	0.051	280.0	42.68	3.07
1,140	284	0.284	0.051	284.0	43.26	3.11
1,170	288	0.288	0.052	288.0	43.83	3.16



Maximum Stress (tsf): 3.16

Failure Type: Vertical Shear

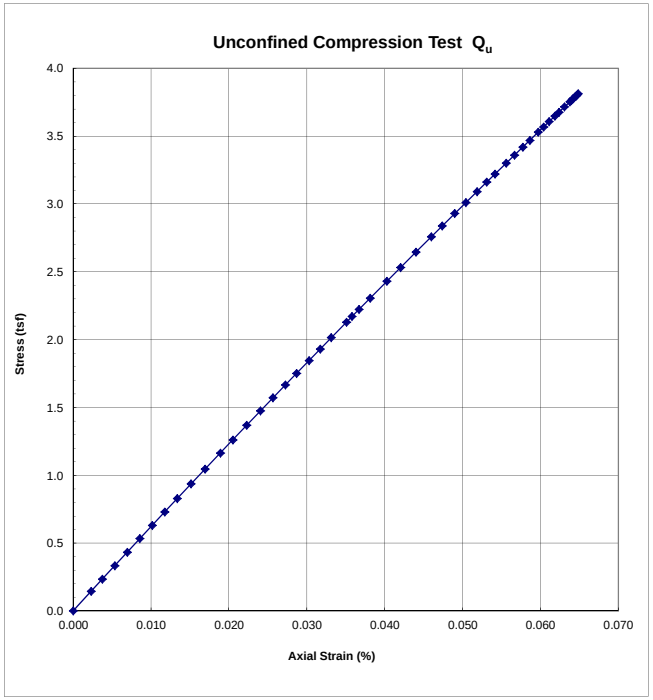
Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-4 **Depth (ft):** 28.0-30.0 **Date:** 12/20/2018
Visual Classification: Light Gray, Lean Clay, trace gravel
Sample Diameter (in): 2.86 **Height (in):** 5.61 **Moisture (%):** 19.3% **Wet Density (pcf):** 129.5
Area of Sample (in^2): 6.43 **Dry Density (pcf):** 108.6
Strain Rate (in/min): 0.05 **L/D Ratio:** 2.0 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	13	0.013	0.002	13.0	2.02	0.15
60	21	0.021	0.004	21.0	3.26	0.23
90	30	0.030	0.005	30.0	4.64	0.33
120	39	0.039	0.007	39.0	6.03	0.43
150	48	0.048	0.009	48.0	7.40	0.53
180	57	0.057	0.010	57.0	8.78	0.63
210	66	0.066	0.012	66.0	10.15	0.73
240	75	0.075	0.013	75.0	11.51	0.83
270	85	0.085	0.015	85.0	13.02	0.94
300	95	0.095	0.017	95.0	14.53	1.05
330	106	0.106	0.019	106.0	16.18	1.17
360	115	0.115	0.020	115.0	17.53	1.26
390	125	0.125	0.022	125.0	19.02	1.37
420	135	0.135	0.024	135.0	20.50	1.48
450	144	0.144	0.026	144.0	21.83	1.57
480	153	0.153	0.027	153.0	23.16	1.67
510	161	0.161	0.029	161.0	24.33	1.75
540	170	0.170	0.030	170.0	25.65	1.85
570	178	0.178	0.032	178.0	26.82	1.93
600	186	0.186	0.033	186.0	27.98	2.01
630	197	0.197	0.035	197.0	29.57	2.13
660	201	0.201	0.036	201.0	30.15	2.17
690	206	0.206	0.037	206.0	30.87	2.22
720	214	0.214	0.038	214.0	32.03	2.31
780	226	0.226	0.040	226.0	33.75	2.43
840	236	0.236	0.042	236.0	35.17	2.53
900	247	0.247	0.044	247.0	36.74	2.65
960	258	0.258	0.046	258.0	38.30	2.76
1,020	266	0.266	0.047	266.0	39.42	2.84
1,080	275	0.275	0.049	275.0	40.69	2.93
1,140	283	0.283	0.050	283.0	41.81	3.01
1,200	291	0.291	0.052	291.0	42.93	3.09
1,260	298	0.298	0.053	298.0	43.90	3.16
1,320	304	0.304	0.054	304.0	44.74	3.22
1,380	312	0.312	0.056	312.0	45.84	3.30
1,440	318	0.318	0.057	318.0	46.67	3.36
1,500	324	0.324	0.058	324.0	47.50	3.42
1,560	329	0.329	0.059	329.0	48.19	3.47
1,620	335	0.335	0.060	335.0	49.01	3.53
1,680	339	0.339	0.060	339.0	49.56	3.57
1,740	343	0.343	0.061	343.0	50.11	3.61
1,800	347	0.347	0.062	347.0	50.65	3.65
1,860	350	0.350	0.062	350.0	51.06	3.68
1,920	354	0.354	0.063	354.0	51.60	3.72
1,980	358	0.358	0.064	358.0	52.15	3.75
2,040	360	0.360	0.064	360.0	52.42	3.77
2,100	362	0.362	0.064	362.0	52.69	3.79
2,160	363	0.363	0.065	363.0	52.83	3.80
2,220	364	0.364	0.065	364.0	52.96	3.81



Maximum Stress (tsf): 3.81

Failure Type: Vertical Shear

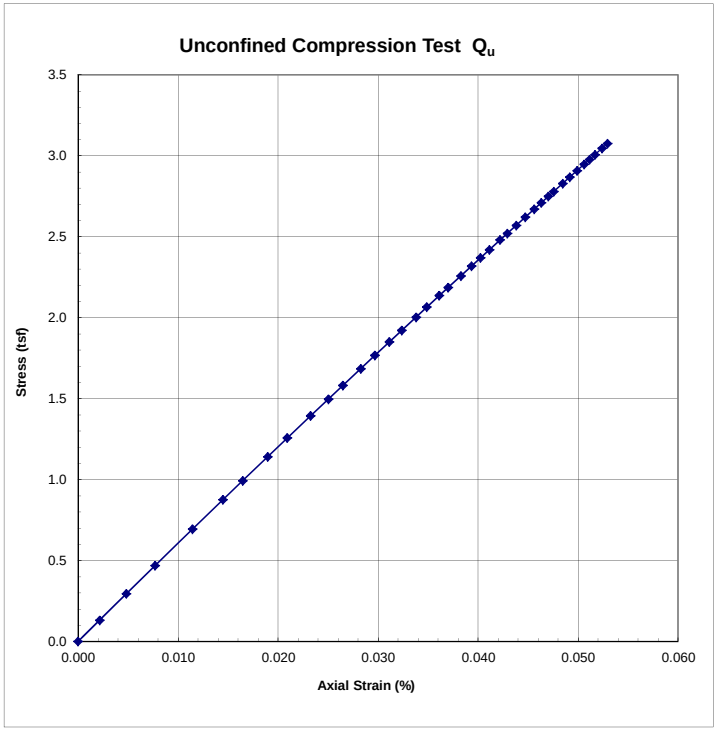
Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-6 **Depth (ft):** 6.0-8.0 **Date:** 1/8/2019
Visual Classification: Light Gray, Lean Clay, trace gravel
Sample Diameter (in): 2.89 **Height (in):** 5.59 **Moisture (%):** -265.5% **Wet Density (pcf):** 127.0
Area of Sample (in^2): 6.56 **Dry Density (pcf):** -76.8
Strain Rate (in/min): 0.05 **L/D Ratio:** 1.9 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	12	0.012	0.002	12.0	1.82	0.13
60	27	0.027	0.005	27.0	4.09	0.29
90	43	0.043	0.008	43.0	6.50	0.47
120	64	0.064	0.011	64.0	9.64	0.69
150	81	0.081	0.014	81.0	12.16	0.88
180	92	0.092	0.016	92.0	13.79	0.99
210	106	0.106	0.019	106.0	15.85	1.14
240	117	0.117	0.021	117.0	17.45	1.26
270	130	0.130	0.023	130.0	19.35	1.39
300	140	0.140	0.025	140.0	20.80	1.50
330	148	0.148	0.026	148.0	21.95	1.58
360	158	0.158	0.028	158.0	23.40	1.68
390	166	0.166	0.030	166.0	24.54	1.77
420	174	0.174	0.031	174.0	25.69	1.85
450	181	0.181	0.032	181.0	26.69	1.92
480	189	0.189	0.034	189.0	27.83	2.00
510	195	0.195	0.035	195.0	28.68	2.06
540	202	0.202	0.036	202.0	29.67	2.14
570	207	0.207	0.037	207.0	30.37	2.19
600	214	0.214	0.038	214.0	31.36	2.26
630	220	0.220	0.039	220.0	32.20	2.32
660	225	0.225	0.040	225.0	32.91	2.37
690	230	0.230	0.041	230.0	33.61	2.42
720	236	0.236	0.042	236.0	34.44	2.48
750	240	0.240	0.043	240.0	35.00	2.52
780	245	0.245	0.044	245.0	35.70	2.57
810	250	0.250	0.045	250.0	36.39	2.62
840	255	0.255	0.046	255.0	37.08	2.67
870	259	0.259	0.046	259.0	37.64	2.71
900	263	0.263	0.047	263.0	38.19	2.75
930	266	0.266	0.048	266.0	38.60	2.78
960	271	0.271	0.048	271.0	39.29	2.83
990	275	0.275	0.049	275.0	39.84	2.87
1,020	279	0.279	0.050	279.0	40.39	2.91
1,050	283	0.283	0.051	283.0	40.94	2.95
1,080	286	0.286	0.051	286.0	41.35	2.98
1,110	289	0.289	0.052	289.0	41.76	3.01
1,140	293	0.293	0.052	293.0	42.31	3.05
1,170	296	0.296	0.053	296.0	42.72	3.08
1,200	298	0.298	0.053	298.0	42.99	3.10
1,230	301	0.301	0.054	301.0	43.40	3.12



Maximum Stress (tsf): 3.24

Failure Type: Diameter Shear

Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-7 **Depth (ft):** 38.0-40.0 **Date:** 12/20/2018

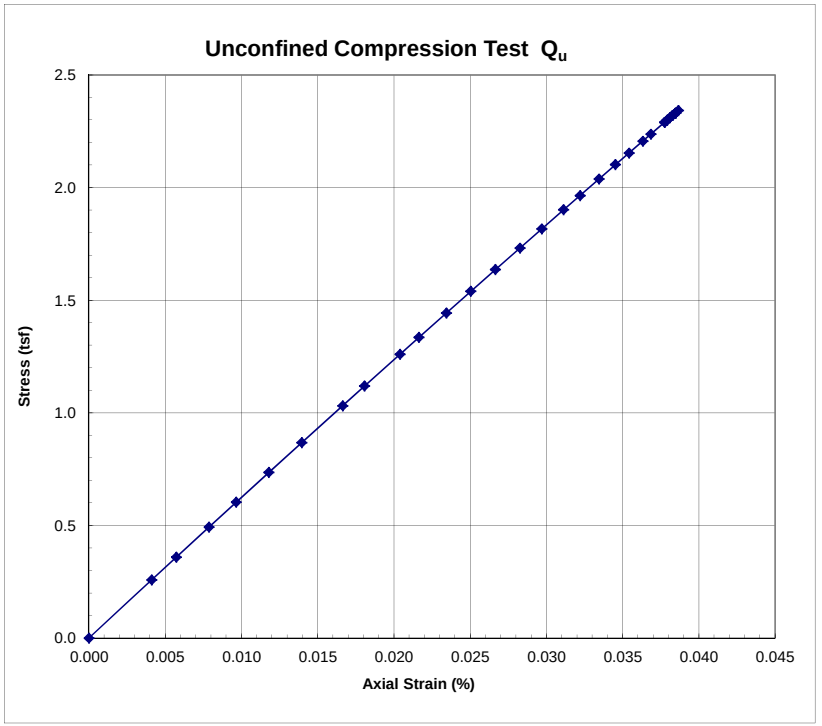
Visual Classification: Light Gray, Lean Clay, trace gravel

Sample Diameter (in): 2.85 **Height (in):** 5.59 **Moisture (%):** 21.5% **Wet Density (pcf):** 129.3

Area of Sample (in^2): 6.38 **Dry Density (pcf):** 106.4

Strain Rate (in/min): 0.05 **L/D Ratio:** 2.0 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	23	0.023	0.004	23.0	3.59	0.26
60	32	0.032	0.006	32.0	4.98	0.36
90	44	0.044	0.008	44.0	6.84	0.49
120	54	0.054	0.010	54.0	8.38	0.60
150	66	0.066	0.012	66.0	10.22	0.74
180	78	0.078	0.014	78.0	12.05	0.87
210	93	0.093	0.017	93.0	14.32	1.03
240	101	0.101	0.018	101.0	15.53	1.12
270	114	0.114	0.020	114.0	17.49	1.26
300	121	0.121	0.022	121.0	18.54	1.33
330	131	0.131	0.023	131.0	20.04	1.44
360	140	0.140	0.025	140.0	21.38	1.54
390	149	0.149	0.027	149.0	22.72	1.64
420	158	0.158	0.028	158.0	24.05	1.73
450	166	0.166	0.030	166.0	25.23	1.82
480	174	0.174	0.031	174.0	26.40	1.90
510	180	0.180	0.032	180.0	27.28	1.96
540	187	0.187	0.033	187.0	28.31	2.04
570	193	0.193	0.035	193.0	29.19	2.10
600	198	0.198	0.035	198.0	29.91	2.15
630	203	0.203	0.036	203.0	30.64	2.21
660	206	0.206	0.037	206.0	31.08	2.24
690	211	0.211	0.038	211.0	31.80	2.29
720	213	0.213	0.038	213.0	32.09	2.31
750	215	0.215	0.038	215.0	32.38	2.33
780	215	0.215	0.038	215.0	32.38	2.33
810	216	0.216	0.039	216.0	32.52	2.34
840	215	0.215	0.038	215.0	32.38	2.33
870	214	0.214	0.038	214.0	32.23	2.32
1,050	214	0.214	0.038	214.0	32.23	2.32
1,080	212	0.212	0.038	212.0	31.95	2.30
1,110	211	0.211	0.038	211.0	31.80	2.29
1,140	212	0.212	0.038	212.0	31.95	2.30



Maximum Stress (tsf): 2.34

Failure Type: Vertical Shear

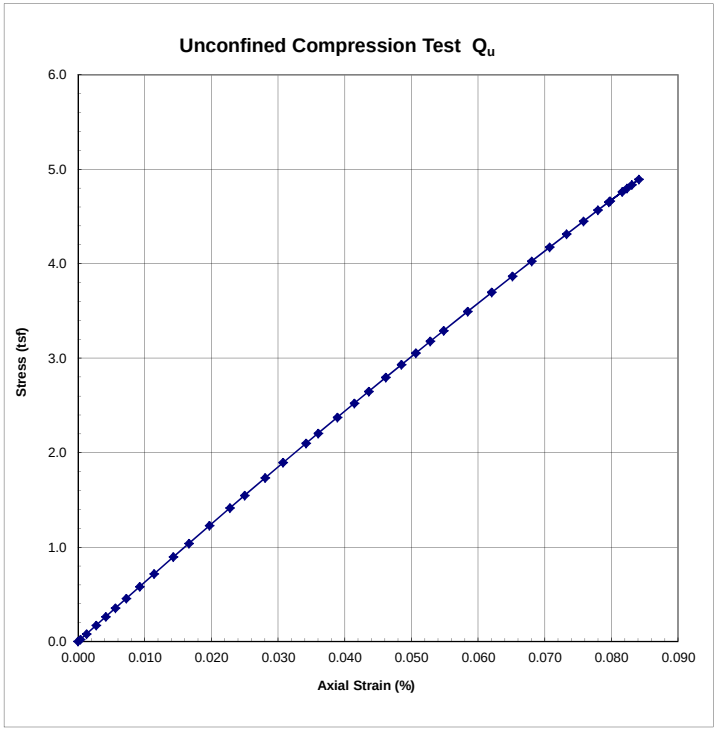
Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-7 **Depth (ft):** 38.0-40.0 **Date:** 12/20/2018
Visual Classification: Light Gray, Lean Clay, trace gravel
Sample Diameter (in): 2.82 **Height (in):** 5.53 **Moisture (%):** 14.1% **Wet Density (pcf):** 140.2
Area of Sample (in^2): 6.27 **Dry Density (pcf):** 122.9
Strain Rate (in/min): 0.05 **L/D Ratio:** 2.0 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	2	0.002	0.000	2.0	0.32	0.02
60	7	0.007	0.001	7.0	1.12	0.08
90	15	0.015	0.003	15.0	2.39	0.17
120	23	0.023	0.004	23.0	3.66	0.26
150	31	0.031	0.006	31.0	4.92	0.35
180	40	0.040	0.007	40.0	6.34	0.46
210	51	0.051	0.009	51.0	8.06	0.58
240	63	0.063	0.011	63.0	9.94	0.72
270	79	0.079	0.014	79.0	12.43	0.89
300	92	0.092	0.017	92.0	14.44	1.04
330	109	0.109	0.020	109.0	17.05	1.23
360	126	0.126	0.023	126.0	19.65	1.41
390	138	0.138	0.025	138.0	21.47	1.55
420	155	0.155	0.028	155.0	24.04	1.73
450	170	0.170	0.031	170.0	26.29	1.89
480	189	0.189	0.034	189.0	29.13	2.10
510	199	0.199	0.036	199.0	30.61	2.20
540	215	0.215	0.039	215.0	32.98	2.37
570	229	0.229	0.041	229.0	35.03	2.52
600	241	0.241	0.044	241.0	36.78	2.65
630	255	0.255	0.046	255.0	38.82	2.79
660	268	0.268	0.048	268.0	40.69	2.93
690	280	0.280	0.051	280.0	42.42	3.05
720	292	0.292	0.053	292.0	44.14	3.18
780	303	0.303	0.055	303.0	45.70	3.29
840	323	0.323	0.058	323.0	48.53	3.49
900	343	0.343	0.062	343.0	51.34	3.70
960	360	0.360	0.065	360.0	53.71	3.87
1,020	376	0.376	0.068	376.0	55.92	4.03
1,080	391	0.391	0.071	391.0	57.98	4.17
1,140	405	0.405	0.073	405.0	59.89	4.31
1,200	419	0.419	0.076	419.0	61.80	4.45
1,260	431	0.431	0.078	431.0	63.42	4.57
1,320	441	0.441	0.080	441.0	64.76	4.66
1,380	451	0.451	0.082	451.0	66.10	4.76
1,440	459	0.459	0.083	459.0	67.17	4.84
1,500	465	0.465	0.084	465.0	67.96	4.89
1,560	455	0.455	0.082	455.0	66.63	4.80
1,620	440	0.440	0.080	440.0	64.63	4.65
1,680	418	0.418	0.076	418.0	61.66	4.44
1,740	388	0.388	0.070	388.0	57.57	4.15



Maximum Stress (tsf): 4.89

Failure Type: Vertical Shear

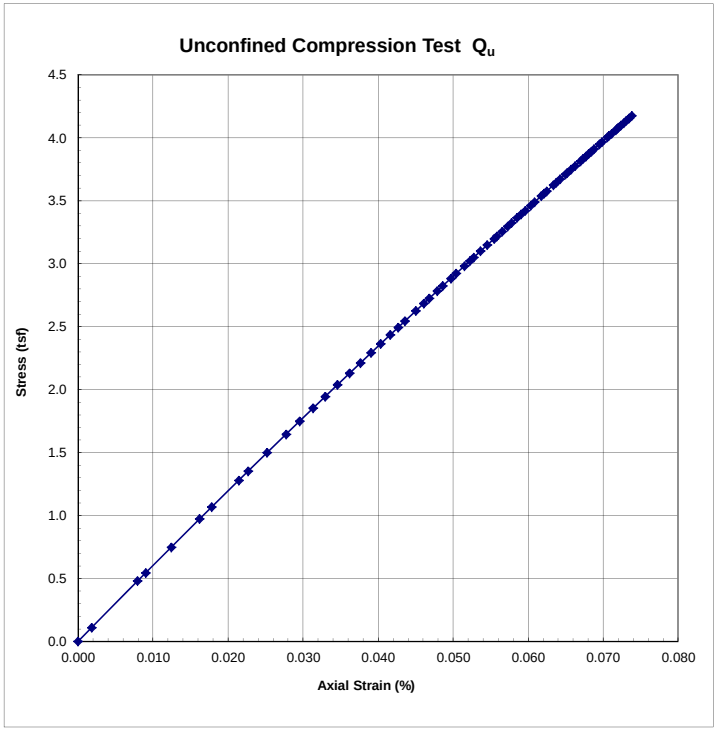
Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-8 **Depth (ft):** 21.0-23.0 **Date:** 12/20/2018
Visual Classification: Light Gray, Lean Clay, trace gravel
Sample Diameter (in): 2.89 **Height (in):** 5.55 **Moisture (%):** 17.7% **Wet Density (pcf):** 131.4
Area of Sample (in^2): 6.55 **Dry Density (pcf):** 111.6
Strain Rate (in/min): 0.05 **L/D Ratio:** 1.9 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	10	0.010	0.002	10.0	1.52	0.11
60	44	0.044	0.008	44.0	6.66	0.48
90	50	0.050	0.009	50.0	7.56	0.54
120	69	0.069	0.012	69.0	10.40	0.75
150	90	0.090	0.016	90.0	13.52	0.97
180	99	0.099	0.018	99.0	14.85	1.07
210	119	0.119	0.021	119.0	17.78	1.28
240	126	0.126	0.023	126.0	18.80	1.35
270	140	0.140	0.025	140.0	20.84	1.50
300	154	0.154	0.028	154.0	22.86	1.65
330	164	0.164	0.030	164.0	24.30	1.75
360	174	0.174	0.031	174.0	25.73	1.85
390	183	0.183	0.033	183.0	27.02	1.95
420	192	0.192	0.035	192.0	28.30	2.04
450	201	0.201	0.036	201.0	29.58	2.13
480	209	0.209	0.038	209.0	30.71	2.21
510	217	0.217	0.039	217.0	31.84	2.29
540	224	0.224	0.040	224.0	32.82	2.36
570	231	0.231	0.042	231.0	33.80	2.43
600	237	0.237	0.043	237.0	34.64	2.49
630	242	0.242	0.044	242.0	35.34	2.54
660	250	0.250	0.045	250.0	36.45	2.62
690	256	0.256	0.046	256.0	37.28	2.68
720	260	0.260	0.047	260.0	37.84	2.72
750	266	0.266	0.048	266.0	38.67	2.78
780	270	0.270	0.049	270.0	39.22	2.82
810	276	0.276	0.050	276.0	40.04	2.88
840	280	0.280	0.050	280.0	40.59	2.92
870	286	0.286	0.051	286.0	41.42	2.98
900	290	0.290	0.052	290.0	41.96	3.02
930	293	0.293	0.053	293.0	42.37	3.05
960	298	0.298	0.054	298.0	43.06	3.10
990	303	0.303	0.055	303.0	43.74	3.15
1,020	308	0.308	0.055	308.0	44.42	3.20
1,050	310	0.310	0.056	310.0	44.69	3.22
1,080	314	0.314	0.057	314.0	45.23	3.26
1,110	318	0.318	0.057	318.0	45.77	3.30
1,140	321	0.321	0.058	321.0	46.18	3.32
1,170	325	0.325	0.059	325.0	46.72	3.36
1,200	328	0.328	0.059	328.0	47.12	3.39
1,230	331	0.331	0.060	331.0	47.52	3.42



Maximum Stress (tsf): 3.36

Failure Type: Vertical Shear

Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-9 **Depth (ft):** 23.5-25.5 **Date:** 12/20/2018

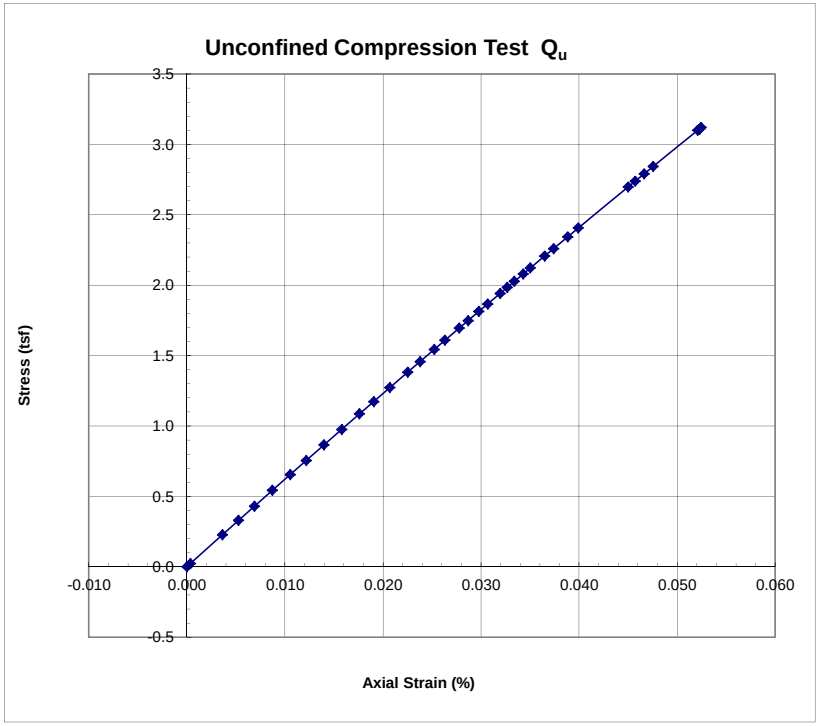
Visual Classification: Light Gray, Lean Clay, trace gravel

Sample Diameter (in): 2.84 **Height (in):** 5.51 **Moisture (%):** 18.9% **Wet Density (pcf):** 133.5

Area of Sample (in^2): 6.32 **Dry Density (pcf):** 112.3

Strain Rate (in/min): 0.05 **L/D Ratio:** 1.9 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	2	0.002	0.000	2.0	0.32	0.02
60	20	0.020	0.004	20.0	3.15	0.23
90	29	0.029	0.005	29.0	4.56	0.33
120	38	0.038	0.007	38.0	5.97	0.43
150	48	0.048	0.009	48.0	7.53	0.54
180	58	0.058	0.011	58.0	9.08	0.65
210	67	0.067	0.012	67.0	10.47	0.75
240	77	0.077	0.014	77.0	12.01	0.86
270	87	0.087	0.016	87.0	13.55	0.98
300	97	0.097	0.018	97.0	15.07	1.09
330	105	0.105	0.019	105.0	16.29	1.17
360	114	0.114	0.021	114.0	17.66	1.27
390	124	0.124	0.023	124.0	19.17	1.38
420	131	0.131	0.024	131.0	20.23	1.46
450	139	0.139	0.025	139.0	21.43	1.54
480	145	0.145	0.026	145.0	22.33	1.61
510	153	0.153	0.028	153.0	23.53	1.69
540	158	0.158	0.029	158.0	24.28	1.75
570	164	0.164	0.030	164.0	25.17	1.81
600	169	0.169	0.031	169.0	25.91	1.87
630	176	0.176	0.032	176.0	26.95	1.94
660	180	0.180	0.033	180.0	27.54	1.98
690	184	0.184	0.033	184.0	28.14	2.03
720	189	0.189	0.034	189.0	28.87	2.08
780	193	0.193	0.035	193.0	29.46	2.12
840	201	0.201	0.036	201.0	30.64	2.21
900	206	0.206	0.037	206.0	31.37	2.26
960	214	0.214	0.039	214.0	32.54	2.34
1,020	220	0.220	0.040	220.0	33.41	2.41
1,380	248	0.248	0.045	248.0	37.47	2.70
1,440	252	0.252	0.046	252.0	38.04	2.74
1,500	257	0.257	0.047	257.0	38.76	2.79
1,560	262	0.262	0.048	262.0	39.48	2.84



Maximum Stress (tsf): 3.13

Failure Type: Vertical Shear

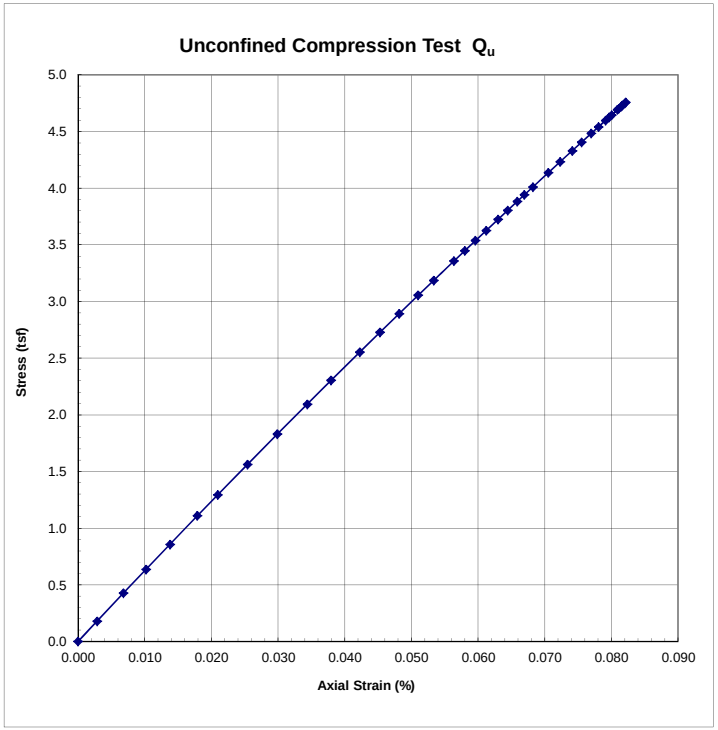
Weaver Consultants Group

ProjectNo.: 1012-327-19-01
Location: W. 65th Street & Long Avenue
City/State: Chicago, IL

UNCONFINED COMPRESSION TEST (QU - TEST)

Boring: B-10 **Depth (ft):** 13.5-15.5 **Date:** 12/20/2018
Visual Classification: Light Gray, Lean Clay, trace gravel
Sample Diameter (in): 2.85 **Height (in):** 5.59 **Moisture (%):** 18.2% **Wet Density (pcf):** 133.1
Area of Sample (in^2): 6.37 **Dry Density (pcf):** 112.7
Strain Rate (in/min): 0.05 **L/D Ratio:** 2.0 **Correction Factor:** 1.0

Time (secs)	Dial Reading	Dial Reading x 10^{-3} (inches) ΔH	Strain (inch/inch) ε $= \Delta H/H$	Load (lbs)	Stress (psi)	Stress (tsf)
0	0	0.000	0.000	0.0	0.00	0.00
30	16	0.016	0.003	16.0	2.50	0.18
60	38	0.038	0.007	38.0	5.92	0.43
90	57	0.057	0.010	57.0	8.85	0.64
120	77	0.077	0.014	77.0	11.91	0.86
150	100	0.100	0.018	100.0	15.41	1.11
180	117	0.117	0.021	117.0	17.97	1.29
210	142	0.142	0.025	142.0	21.71	1.56
240	167	0.167	0.030	167.0	25.41	1.83
270	192	0.192	0.034	192.0	29.08	2.09
300	212	0.212	0.038	212.0	31.99	2.30
330	236	0.236	0.042	236.0	35.46	2.55
360	253	0.253	0.045	253.0	37.89	2.73
390	269	0.269	0.048	269.0	40.17	2.89
420	285	0.285	0.051	285.0	42.43	3.05
450	298	0.298	0.053	298.0	44.25	3.19
480	315	0.315	0.056	315.0	46.63	3.36
510	324	0.324	0.058	324.0	47.88	3.45
540	333	0.333	0.060	333.0	49.12	3.54
570	342	0.342	0.061	342.0	50.36	3.63
600	352	0.352	0.063	352.0	51.74	3.73
630	360	0.360	0.064	360.0	52.83	3.80
660	368	0.368	0.066	368.0	53.92	3.88
690	374	0.374	0.067	374.0	54.74	3.94
720	381	0.381	0.068	381.0	55.69	4.01
780	394	0.394	0.071	394.0	57.45	4.14
840	404	0.404	0.072	404.0	58.79	4.23
900	414	0.414	0.074	414.0	60.13	4.33
960	422	0.422	0.076	422.0	61.20	4.41
1,020	430	0.430	0.077	430.0	62.26	4.48
1,080	436	0.436	0.078	436.0	63.06	4.54
1,140	442	0.442	0.079	442.0	63.85	4.60
1,200	447	0.447	0.080	447.0	64.51	4.64
1,260	453	0.453	0.081	453.0	65.30	4.70
1,320	455	0.455	0.081	455.0	65.56	4.72
1,380	458	0.458	0.082	458.0	65.96	4.75
1,440	459	0.459	0.082	459.0	66.09	4.76
1,500	456	0.456	0.082	456.0	65.69	4.73
1,560	452	0.452	0.081	452.0	65.17	4.69
1,620	445	0.445	0.080	445.0	64.25	4.63



Maximum Stress (tsf): 4.76

Failure Type: Vertical Shear

APPENDIX D

Calculations

Weaver Consultants Group

Project #: 1012-327-19-01
Project: Hancock Replacement School
Calculated By: SAS 1/7/19
Checked By: ___DO_____

Objective:

Determine the allowable end bearing resistance for drilled shafts

Given: Borings B-1 through B-10
Rimac tests, penetrometer tests, UC tests

Assumptions: -Very stiff to hard clay will be the bearing layer
- Shaft diameter = 2.5 feet D = 2.5 ft

Base Resistance:

Use base resistance calculation method described in FHWA *Drilled Shafts: Construction Procedures and LRFD Design Methods*

$$q_{BN} = N^*_c s_u \qquad 13\text{-}16$$

where N^*_c = bearing capacity factor and s_u = mean undrained shear strength of the cohesive soil over a depth of $2B$ below the base. For cases where the shaft depth is at least 3 times the diameter and the mean undrained shear strength is at least 2,000 psf, the bearing capacity factor can be taken as 9.0. For smaller values of undrained shear strength, N^*_c can be approximated as a function of undrained shear strength as given in Table 13-2. Linear interpolation can be used for values between those tabulated. Note that it is unusual to locate the base of a drilled shaft in cohesive soil with s_u less than 2,000 psf when compression loads are supported.

Su = (Qu/Qp)/2, 33rd Percentile of values between 14-25 feet = 2.13 tsf, Su = 2,130 psf

Su = 2130 psf (Refernce minimum Qp value)

Nc = 9.0

q_B = 19170 psf

Allowable Resistance:

**Use Factor of Safety of 3.0 for allowable resistances.

q_B= **19170 psf**

$q_{B\text{ - allowable}}$= **6390 psf**

Settlement:

$$(q_m/q_u) = (\delta/\delta_u)^g$$

q_m/q_u =	**0.333**	**(FS of 3)**	(qm/qu = applied load/ unfactored capacity)
δu =	**0.25 ft**		(Settlement required to mobilize resistance) (D/10, per Coduto 2016)
g =	**0.5**		(assumed for clay)
δ =	**0.02772225 ft** **0.332667 in**		

Conclusion:
Drilled shafts should be designed for a base resistance 6,000 psf and bear into the very stiffclay layer with a Qp of 2 tsf or greater. Side resistance should be neglected when considering axial load

Settlement of the Drilled shaft was caluclated to be less than 0.5 inches

References:

Federal Highway Administration, FHWA-MHI-10-016, Drilled Shafts: Construction Procedures and LRFD Design Methods, May 2010

Coduto, D. (2016). Foundation Design: Principles and Practices. Pearson.

Weaver Consultants Group

Project #: 1012-327-19-01
Project: Hancock Replacement School
Calculated By: SAS 1/2/19
Checked By: ____DO_____

Objective: Determine the squeeze potential of the clays for a 30-inch dimater drilled shaft at the Hancock Replacement School Annex

Given: Borings B-1 through B-10

ASCE Geotechnical Special Publication 312, Advances in Deep Foundations, 2005 Budiman, Keifer, and Baker

Approach: Squeeze can occur if:

$$\frac{\sigma v}{Su} > \left(\frac{D+B}{4}\right) + 5$$

Squeeze Analysis:

Depth	CCD	Overburden Pressure (1)	Su (psf) (3)	D/B (2)	(D/B)/4 + 5	σv/Su	Squeeze (Y or N)
2.5	35.5	312.5	1000	1	5.25	0.3125	N
5	4	625	1250	2	5.5	0.5	N
7.5	1.5	937.5	500	3	5.75	1.875	N
10	-1	1250	250	4	6	5	N
12.5	-3.5	1562.5	3500	5	6.25	0.446429	N
15	-6	1875	3280	6	6.5	0.571646	N
20	-11	2500	1000	8	7	2.5	N
25	-16	2501	1800	10	7.5	1.389444	N
30	-21	2814	2130	12	8	1.321127	N
35	-26	3127	2460	14	8.5	1.271138	N
40	-31	3440	1970	16	9	1.746193	N
45	-36	3753	2460	18	9.5	1.52561	N
50	-41	4066	4510	20	10	0.901552	N

(1) Based on depth x assumed unit weight of 125 pcf; water table at 15 feet
(2) B = 2.5 feet diameter
(3) Based on minimum Qp, Rimac, or Qu test at that depth

Conclusion:

Based on minimum shear strength values, we do not anticipate squeeze in the clay deposits.

APPENDIX E

Qualifications

GENERAL QUALIFICATIONS

This report has been prepared at the request of our client for his use on this project. The work, including the field work, laboratory testing, and engineering analysis, was performed in accordance with generally accepted Geotechnical Engineering practices. For this study, we were not retained to address environmental or land use restriction concerns. This warranty is in lieu of all other warranties either expressed or implied.

This report may not contain sufficient information for purposes of other parties or other uses. Should there be any sufficient differences in structural arrangement, loading or location of the structure, our analysis should be reviewed.

The analysis, conclusions, and recommendations contained in our report are based on site conditions as they existed at the time of our exploration and further assume that the borings are representative of the subsurface conditions throughout the site.

If during construction, different subsurface conditions from those encountered during our exploration are observed or appear to be present beneath excavations, we must be advised promptly so that we can review these conditions and reconsider our recommendations where necessary.

If there is a substantial lapse of time between the submission of our report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, we urge that our report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

We urge that we be retained to review those portions of the plans and specifications that pertain to earthwork and foundations to determine whether they are consistent with our recommendations. In addition, we are available to observe construction, particularly the compaction of structural backfill and preparation of the foundations, and such other field observations as may be necessary.

In order to fairly consider changed or unexpected conditions that might arise during construction, we recommend the following verbiage to be included in the project contract.

STANDARD CLAUSE FOR UNANTICIPATED SUBSURFACE CONDITIONS

The owner has had a subsurface exploration performed by a Geotechnical consultant, the results of which are contained in the consultant's report. The consultant's report presents his conclusions on the subsurface conditions based on his interpretation of the data obtained in the exploration. The contractor acknowledges that he has reviewed the consultant's report and any addenda thereto, and that his bid for earthwork operations is based on the subsurface conditions as described in that report. It is recognized that a subsurface exploration may not disclose all conditions as they actually exist and further, conditions may change, particularly groundwater conditions, between the time of a subsurface exploration and the time of earthwork operations. In recognition of these facts, this clause is entered in the contract to provide a means of equitable additional compensation for the contractor if adverse unanticipated conditions are encountered and to provide a means of rebate to the owner if the conditions are more favorable than anticipated.

Should the contractor encounter conditions that are different than those anticipated by the Geotechnical consultant's report at any time during construction operations, he shall immediately (within 24 hours) bring this fact to the owner's attention. If the owner's representative on the construction site observes subsurface conditions which are different than those anticipated by the consultant's report, he shall immediately (within 24 hours) bring this fact to the contractor's attention. Once a fact of unanticipated conditions has been brought to the attention of either the owner or the contractor, and the consultant has concurred, immediate negotiations will be undertaken between the owner and the contractor to arrive at a change in contract price for additional work or reduction in work. The contractor agrees that the following unit prices would apply for additional or reduced work under the contract. For changed conditions in which unit prices are not provided, the additional work shall be paid for on a time and material basis.