EXHIBIT D

RPS GaiaTech

Environmental Risk. Managed.

September 12, 2015

Ms. Verneta Simon
On-Scene Coordinator
Region 5 US EPA
77 West Jackson Boulevard
Chicago, Illinois 60604

RE: Proposed Work Plan
Proposed Hotel Development Site
224 - 228 East Ontario Street
Chicago, Illinois

Dear Ms. Simon:

SMASHotels Chicago LLC. has retained RPS GaiaTech to develop this proposed radiation screening work plan ("work plan") to survey fill materials (i.e., shallow soils) for potential thorium radiation during foundation construction activities at the subject property (the "Site"), located at 224-228 East Ontario Street, Chicago, Illinois. The proposed development at the Site is a 20-story hotel building, for which construction will be started in the spring or early summer 2015.

US Environmental Protection Agency (USEPA) and the City of Chicago have established a special area as the "Streeterville Thorium Monitoring Area", designated as the Moratorium Area. The Site is within the designated Moratorium Area. The USEPA requires that radiological screening (for potential contamination) be conducted on all potentially disturbed urban fill materials at properties located within the Moratorium Area. This work plan has been completed to provide radiation screening procedures utilized during excavation and handling of the urban fill materials at the Site.

The proposed work plan will radiologically survey the Site in 18-inch lifts to native soil, except for a portion of the Site immediately adjacent to the property on the western boundary of the Site. The foundation of the building immediately to the west of the Site only extends ten feet below surface level, and is, therefore, highly susceptible to being undermined. There is a portion of soil adjacent on the Site and adjacent to the building which is providing shoring for the building's foundation. This portion is approximately two and a half feet in width and approximately 85 feet in length, and extends to the depth of native soil. The upper few feet of this soil will be displaced during construction and will, therefore, be sampled for Lindsey Light material in 18-inch lifts. Our geotechnical engineers have determined that we cannot remove all of this soil without undermining the building's foundation. We have looked into the possibility of conducting sampling in borings in this soil, but the process of doing so would create both compaction and disruption, which would also threaten the integrity of the adjacent foundation. Therefore, we will sample that part of the soil that we disturb and that is safe to sample, but we will leave a portion of this soil undisturbed and unsampled. Subsequent human exposure to this fill material will be highly unlikely due to the presence of the existing foundation of the adjacent building and the new foundation of the planned project.

SITE BACKGROUND

The Site consists of three adjacent parcels comprising approximately 7,200 square feet of total area. The three parcels formerly had two separate multi-story retail/commercial buildings and were identified as 224 and 226-228 Ontario Street. According to the recent Phase I Environmental Site Assessment (ESA) prepared for the Site, the parcels were developed with the recently demolished structures sometime prior to 1906. Several alterations were made to the buildings in the years following the original development, but the structures remained relatively consistent. The basements and foundations of the buildings were observed to extend to a depth of approximately 5-10 feet below ground surface (bgs). All of the structures were removed in December 2014.

Screening activities for potential radiological contamination were performed during the foundation demolition in December 2014. An initial surface walkover survey of the basement slab or the slab at the ground surface was completed prior to the removal of the pavement (see attached surveyed area map Figure 1). The soils underlying the slab were also screened for potential gamma radiation after the pavement/structures were removed. Any soil adhered to the removed concrete slab was also surveyed. Following slab removal, the foundation structures were removed by screening around the foundation structures and subsequently removing screened fill soils in 18-inch lifts. The foundation elements were then removed and the soils underlying the structures were also surveyed. Additionally, several test pits (to investigate the foundation of the building to the west) were completed. Soils were screened and subsequently excavated in 18-inch lifts to the base of the test pit. The radiological survey was conducted in accordance with a USEPA-approved initial screening work plan dated December 5, 2014. The screening investigations have not detected the presence of radiological contamination at the Site in excess of the USEPA threshold of 7.1 picocuries per gram (pCi/g). As required by the plan, a daily screening summary was provided to the USEPA via a series of emails.

SITE GEOLOGY

Shallow geology beneath the Site consists of the upper fill materials extending to depths of approximately 8 to 10 feet. The fill materials are primarily sandy fills mixed with cinders, ash, slag, broken bricks, asphalt, glass chips, and other miscellaneous fill. The underlying native soils consist of fine to medium sand which extends to depths of approximately 23 to 25 feet bgs. Underlying the material sand is gray silty clay which extends to the bedrock surface. The shallow groundwater table was reported at a depth of approximately 14 feet bgs, based on the results of a recent geotechnical exploration for a property immediately to the west of the Site. A copy of the 2015 geotechnical investigation report is included as Appendix A.

PROPOSED RADIATION SCREENING ACTIVITIES

This proposed work plan will be followed during any foundation construction activities when fill materials on the Site could potentially be disturbed. The USEPA requires that all urban fill materials on the Site, which are disturbed during site activities, must be screened for potential thorium contamination. A map of the proposed foundation activities is included as Figure 2.

All screening surveys will be conducted by personnel trained and experienced in performing gamma surveys utilizing properly calibrated instruments. Elevated gamma readings are defined as readings that exceed 3 times the instrument background (if this level does not equal or exceed the instrument evaluation of 7.1 pCi/g total radium). Identified exceedances may require soil sampling to determine the exact level of radioactivity in the fill/soils. Soils that equal or that are in excess of the instrument equivalent of the USEPA cleanup/action level criteria for the Streeterville area (at 7.1 pCi/g total radium) will be considered contaminated until the radioactivity level is confirmed by gamma spectroscopy. The radiological screening activities will be conducted at the Site, in the right-of-way (ROW), and/or the adjacent street when:

- Fill materials are disturbed during soil excavation activities or underground demolition (including the removal of old foundations, caissons, piles, or other obstructions);
- Surface pavement is removed;
- Old buried utilities are excavated/removed;
- Potholing activities are performed;
- Sheet piling is installed;
- Frost walls are excavated/installed;
- Fill materials are disturbed during caisson drilling, grade beam construction, elevator pit excavation, excavation for a storm water retention tank/pond (if any), and basement excavation;
- Shallow excavation is conducted to install new buried utility lines; and
- Any other activities which are ground-breaking work.

In general, screening will be conducted prior to construction during potholing for all proposed caisson and sheet piling locations. Other areas requiring screening will be completed during construction activities. The location of the proposed caissons, sheet piling and other foundation elements are included as Figure 2.

All fill materials will be screened and excavated in 18-inch lifts until the base of the fill materials is encountered or the desired excavation depths are reached (as required by the construction plans). If the excavation areas are such that prohibit safe access as defined under OSHA regulations, screening of fill materials will be conducted in the excavation by attaching the instrument to a rope or long cord probe and moving the probe across the excavation base until the instrument has surveyed the entire area.

Work at the location will be temporarily halted if field meter readings meet or exceed 3 times background or the USEPA Action Level (7.1 pCi/g) are noted. USEPA will be contacted and appropriate soil sampling and other procedures can be arranged, if the Action Level is exceeded. Any area(s) with contaminated fill materials will be designed as a Hot Zone/Exclusion Zone until the radiologically-contaminated fill materials are remediated, confirmation samples are collected and the USEPA approves release of the area(s) as being documented in verification form (Appendix B). Other activities will continue as long as conducted outside the Exclusion Zone. Any contaminated urban fill materials generated will be properly characterized for disposed at a licensed landfill in Texas, Idaho, or Utah. The description of soil screening techniques, equipment, permitting, health and safety, sampling and any contaminated soil management is discussed in details in the following sections.

SCREEING PROCEDURES FOR POTENTIAL THORIUM CONTAMINATION

The screening procedures and sampling methods have been developed to evaluate fill materials on the Site (located within the Streeterville Moratorium Area of Chicago) for potential thorium contamination.

Instruments Used In Surveying and Decontamination Activities

The following equipment will be selected based on site conditions and screening requirements:

- Ludlum Model 193 Meter
- Ludlum Model – 44-10 2 x 2 sodium iodide (NAI) Probe
- Lead Shield for the Ludlum 44-10 2 x 2 Probe
- Long and Short Cords Connecting the Ludlum Model 193 Meter and Probes
- Ludlum Model 3 with Pancake Probe

Procedures for Radiological Survey

Pre-Survey Activities

Permits

Necessary permits and sign-offs will be secured prior to the commencement of trenching excavation activities in work zones. Permits and sign-offs for work may include the following:

- City of Chicago Department of Public Health Form No. DOE_ROW.01 or DOE_.02
- Board of Underground Review and Approval
- Street closure/sidewalk closure permits;
- Chicago Department of Transportation Letter for Settlement Point Monitoring
- Consultation with Departments of Transportation and Permit(s);
- Meetings with utilities; and
- Consultation with the Chicago Department of Public Health

Instrument Calibration

All survey instruments with the respective probes will be calibrated with and without the lead probe shield. Calibration of the Ludlum instrument(s) will also be conducted for the probe that utilizes both a long and short cord as cord length can influence the response of the instrument and the corresponding threshold limit on the instrument. Threshold limits will be provided for comparison for each cord length. Each gamma meter/probe will be calibrated using calibration blocks from the former Tronox facility in West Chicago, Illinois.

Calibration of the instrument will be conducted with USEPA personnel present or with their consent. A form will be completed with the survey results and will contain location, type of instrument, serial number, person doing the measurement, date and time of measurement. Each instrument will have a serial number and calibration results from the former Tronox facility.

Establishing a Site Wide Survey Grid

Prior to any surveying at the Site, two perpendicular baselines will be established across the Site and a survey area (utilizing a 5 meter grid interval) will be instituted. The grid will be established to identify measurement reading locations during the collection and recording of surface and excavation survey readings. The reading locations will be able to be identified based on a set location within the grid. The grid will be measured by site personnel using measuring tapes and boundary and nodal points will be marked with paint, cones or stakes with flagging.

Surveying the Location of Site Foundation Elements

Proposed intrusive activity locations such as the caisson, sheet piling, or basement areas will be marked and staked by a surveyor to enable proper locating of pre-excavation locations in relation to the established grid area.

Establishing Daily Site Specific Background Reading

All instruments will be required to have a daily background reading collected outside the Site in an area with no known radiological contamination. The instrument probe will be placed on the ground surface and a one minute count shall be obtained from at least one location prior to surveying in work zones. The dial reading will be documented in a field notebook for use in comparison to daily survey readings. If more than one reading is collected around the Site to establish a background reading for the instrument, the readings will be averaged to establish the specific instrument background reading for the day.

Screening Survey Procedures

In general three types of surveying will be completed as follows:

- ***Surface Survey*** - to establish if any near surface contamination can be located (the surface survey of the Site was completed in December 2014 and no elevated readings were detected);
- ***Excavation Survey*** – to be conducted in 18-inch lifts to fully penetrate the fill materials on the Site or to the depths of the fill material being disturbed prior to or during various construction activities, trenching, and excavation in the adjacent ROW and street areas to support utility work or tree planters; and
- ***Caisson Drilling Survey*** – to be conducted on auger spoils from boreholes (fill materials at least the depth of the top of the native soil formations only). The diameter of the auger will range from 48 inches to 66 inches cross.

Some of the surveying will be conducted prior to contractor site mobilization (during potholing for caissons and sheet piling) with the remainder conducted during construction activities, such ROW/street work and soil excavation required for the installation of subgrade building components. All screening surveys will be conducted by personnel trained and experienced in performing gamma surveys utilizing properly calibrated instruments. The surveys will be performed when:

- Fill materials are disturbed during soil excavation activities and underground demolition, including the removal of old foundations, caissons, piles, or other obstructions;
- Surface pavement is removed;
- Old buried utilities are excavated/removed;
- Potholing activities are performed;
- Sheet piling is installed;
- Frost walls are excavated/installed;
- Fill materials are disturbed during caisson drilling, grade beam construction, excavation for an elevator pit, a storm water retention tank (if any), and basement;
- Shallow excavation is conducted to install new buried utility lines; and
- Any other activities which will include any disturbance of the ground.

Surface Survey
Prior to any excavation on the Site or in a specific area, a site walk over survey will be conducted over the previously established grid area. A qualified survey technician will walk over each survey grid and note the highest count rate for each survey grid. The highest reading in each survey grid reading will be recorded in a field notebook. Any readings equal to or above 3 times the background rate or above the 7.1 pCi/g Action Level will be noted.

If pavement is present in any grid area, the pavement will be removed and RPS GaiaTech and the radiological technician will conduct a survey of the surficial fill under the pavement. The survey will also be conducted referencing the same grid (with 5 meter interval lines) across the Site. Readings will be collected across the entire grid area. All meter readings will then be recorded in a field notebook for compilation in a report.

If a reading is at or above the screening threshold limit established for the survey meter (and corresponding to the action threshold of 7.1 pCi/g), the nodal or area of screened surface soils/fill will be designated as a "Hot Zone" and staked/marked for future investigation/remediation. The surficial soils will remain in place until the surface screening is complete.

Upon discovery of elevated field measurements, the USEPA will be notified. On the direction of the USEPA, a soil sample will be collected for quantification of the isotopes. The soil sample will be analyzed at a qualified laboratory. The "hot spot" areas of the surface soil/fill contaminated with thorium will be covered by plastic sheeting and isolated with barricades and safety tape until properly remediated.

If no confirmed or suspected radiological contamination is detected during the surface screening survey, no further radiological testing/sampling or screening will be conducted on the surface soils/fill of the Site.

Excavations Survey/Screening
Excavations will be conducted for the purpose of the installation of foundation elements or other construction activities that disturb fill materials on the Site, and installation of offsite utilities or landscaping in the ROW or street areas.

Fill materials within each area will be screened for radiological contamination using a hand-held gamma-ray detector. Readings will be measured by lowering the probe down the sidewalls and across the surface of the excavation base to check for suspect soils as the excavation proceeds. The screening will be conducted in excavation lifts that will not exceed 18-inches. Soils/fill exhibiting field screening measurements that correlate to radiological levels that meet or exceed 3 times the background or 7.1 pCi/g total radium (Action Level) will be considered radiologically contaminated at first. Radiological contamination in these potentially contaminated fill materials will be confirmed by laboratory testing of a representative soil sample. Upon discovery of fill materials at or above the field screening measurement that corresponds to the Action Level of 7.1 pCi/g, excavation will stop and a representative soil sample will be collected in accordance with the work plan protocol. The suspect soil will remain in place until being remediated. Radiologically contaminated soils requiring excavation shall be managed and disposed in accordance with the sections below. Once suspect materials are removed and the USEPA has released the area, the screening will continue until the limits of the proposed excavation or at least to the top of the native materials are reached.

Where urban fill materials extend below the water table, the urban fill materials will be surveyed in the excavator bucket after they have been brought up to the surface by the excavator. Excavated soils will be both surveyed in the bucket and on the ground surface after the soils have been dumped out of the bucket. Surveying below the water table may continue until at least the top of native soils is encountered or the proposed depth of excavation is reached.

If the initial survey indicates readings correlating to a soil radiological level ***below*** the action level threshold 7.1 pCi/g of total radium, the soils will be classified as non-radiologically-contaminated soils. The material can be managed/reused within the Site boundaries by the General Contractor without further radiological considerations. Excavated soils not utilized onsite may be disposed offsite in an approved landfill as required by the Illinois EPA.

If the radiation survey indicates that screening levels are ***equal to or exceed*** the correlated action level threshold of 7.1 pCi/g, the area will be segregated as a "Hot Zone" and left in place. A representative soil sample(s) will be collected (with sampling approved or overseen by the USEPA) to quantify the concentration of radiological contamination.

Screening during Caisson Drilling

Prior to starting caisson drilling, the surface will be surveyed, if not previously completed. Following surface surveying, the 66-inch auger will commence drilling. The auger will bring up the soils on the auger flights. When possible (as soils are present on the auger flights), the radiation survey technician will walk around the auger and screen fill materials/auger spoils on the auger. If the soils are not determine to be either equal to or above 3 times the background level for the meter or 7.1 pCi/g, the soils will be cleaned from the augers for reuse on the site. However, if elevated readings above the Action Level are detected, the auger spoils will be placed on plastic sheeting and covered when completed. A soil sample will be collected accordingly from the highest recorded meter reading location and sent to the laboratory for analysis.

DECONTAMINATION

Excavation or sampling equipment that was in contact with radiologically-contaminated materials will be surveyed with a Ludlum Model 3 Pancake probe for potential elevated activity. If elevated activity is found, the equipment will be cleaned by scraping all adhered soils into a disposal bag ("super sack") and wiping the surface areas with clean towels. The equipment surface will be rechecked with the pancake probe for continued elevated activity and if no elevated readings are reported, the equipment is determined to have been decontaminated by the health physics technician and would be released for unrestricted use. If continued elevated activity is found on the equipment, further decontamination will occur until such a point as no elevated readings are detected. All scraped soils and materials used for decontamination will be discarded into a super sack for proper disposal.

SOIL SAMPLING

Confirmation of Contamination

In general, all soil samples collected for confirmation of radiological contamination will be collected at the location containing the highest reading (as determined from screening the suspect area with a Ludlum Model 193 meter and shielded probe). Once the highest level is found, the soil will be carefully excavated with a hand trowel, sifted to remove coarse aggregate, and placed in laboratory-supplied ("Marinelli") containers. The collected soil sample will be sealed and sent under chain of custody procedures for analysis by gamma spectroscopy at an appropriate laboratory.

Verification Sampling after Soil Removal

Confirmation/verification sampling will be conducted to verify that the fill materials in excess of the Action Level have been removed from the identified area of contamination. Prior to sampling an identified contaminated area, each area will be secured (e.g., roped off) as a "Hot Zone" to prevent non-authorized personnel from entering the area during sampling activities. Personnel will be required to complete the sampling activities in the designated contamination area utilizing modified Level D personal protective equipment (PPE). This will include disposable PPE including booties, rubber gloves and Tyvek suits. During the potential exposure time in the contamination area, personnel in addition to a radiation badge will have personal air monitoring on their lapel. In most cases, the verification sampling will be completed by USEPA personnel. Air monitoring will be conducted and monitored by a trained and qualified contractor.

Sampling Procedures

After fill has been identified as containing thorium equal to or above the Action Level of 7.1 pCi/g, the USEPA will be notified by telephone and an email that an area with apparent soil contamination has been encountered. Generally, the USEPA will then be present during the sampling to document that the fill/soils exhibiting the highest level of contamination are collected for analysis. Soil sampling will be accomplished by screening the contamination area for the highest levels and then excavating the contaminated soils with a stainless steel trowel. The soils will then be placed in a large stainless steel bowl, mixed, and sifted to remove the larger aggregate and fill materials. Prior to placing the sifted soils in a laboratory jar, the contaminated soils will be checked again with the Ludlum meter to document that the highest levels were collected for analysis. The soils will then be placed in a Marinelli container, transported under chain of custody procedures and analyzed at RSSI Laboratories in Morton Grove, Illinois. The sample containers will have a USEPA seal placed on the jar.

When sampling has been completed, sampling tools will be wiped clean with towels and checked for residual radiological contamination with a Ludlum Model 3 with a pancake probe. Personnel will also be checked with the pancake meter to document that they have been decontaminated. The PPE and cleaning towels will be disposed with the contaminated soil in a Super Sack container for offsite disposal.

The final verification samples will be collected by the USEPA and will follow the USEPA long-standing procedure of USEPA surveying prior to sample collection. After the USEPA collects the sample, the sample will be sent immediately to RPS GaiaTech's contracted laboratory. Once results are obtained, the USEPA will review the results. The USEPA will sign a verification completion form if the results indicate the Streeterville cleanup criterion has been achieved. Subsequently, RPS GaiaTech's contracted laboratory will send the sample to the USEPA National Air and Radiation laboratory in Montgomery Alabama.

Initial confirmation of contaminated soil samples and post remedial confirmatory/verification soil samples will be collected utilizing the same techniques. If collected, confirmatory soil samples will provide documentation that the contamination area has been adequately remediated. A confirmatory sample release form will be sent to the USEPA for that specific area so the Agency can designate the remaining soils as below the Action Level and release the area.

It is understood that the USEPA reserves its authority to perform the radiological survey work and sample collection. The samples will undergo initial analysis by RPS GaiaTech's radiological contractor's laboratory. After this initial analysis, the samples will be sent to the USEPA for potential subsequent analysis and confirmation by USEPA's radiological laboratory.

HANDLING OF CONFIRMED RADIOLOGICALLY CONTAMINATED SOILS

An area confirmed by laboratory analysis to contain radiologically contaminated soils/fill will be excavated and removed for disposal offsite at a qualified and approved landfill. During soil removal activities, the soils will be surveyed by a qualified field technician using a Ludlum gamma meter and probe to determine the extent of the contaminated area. After the soils/fill contaminated with thorium is removed from the excavation, confirmatory/verification soil sampling will be performed as described in the sampling section above.

Soils identified as radiologically contaminated in an area at which the proposed redevelopment plan will disturb the subsurface soil shall be removed from the contamination area and placed in a Super Sack container (1 cubic yard or larger) for direct shipment. Shipping will occur, after a sufficient number of Super Sack containers are accumulated for a truck load. The Super Sack containers can be temporarily stored on site in a fenced or taped off staging area with appropriate warning signs placed on the staging area. If required by certain conditions, the Super Sack container(s) may be placed directly into a plastic-lined, covered steel shipping container suitable for rail shipment and/or trucking to an approved landfill. Before off-site shipment of the container, the containerized thorium-contaminated soils will be placed in a fenced area (located on the subject Site) and the container will be secured with appropriate warning signs placed on the container and the surrounding enclosure. Materials will be stored for as short a period as possible until shipping can be arranged reasonably. It is anticipated that, in most cases, a truckload of Super Sack containers can be shipped out within a days after receipt of landfill approval.

Contractors conducting work on the site during these activities will be required to adhere to Health and Safety stipulations in the attached HASP as well as their company-specific HASPs, as well as applicable federal, state and local regulations concerning activities conducted at the Site. Appropriate air monitoring will also be conducted (as stipulated below) during most excavation activities. Confirmation and verification sampling will be conducted in accordance with the sampling section above.

The Site Owner will be responsible for supplying Super Sack containers or other approved shipping containers and the transportation and disposal of radiologically contaminated materials removed from the Site. That responsibility includes health physics personnel to survey transport containers, subcontractor transportation and logistics personnel, and documentation of shipping and disposal in accordance with Federal and State regulations. It is anticipated that the Super Sack containers, shipping papers, logistics, monitoring and transportation will be provided by the approved disposal facility. When sufficient material has been accumulated for disposal or surveying has been completed, the Super Sack containers (or other approved containers) will be properly transported off-site for disposal by a qualified contractor to the designated and approved disposal facility

ASBESTOS CONATINING MATERIAL (ACM)

Recent activities in the Streeterville area have found instances where asbestos mantle strings or the mantles have been encountered and intermixed with thorium contaminated fill materials. If this asbestos containing material (ACM) is located in a contamination area or in any other area at the site the USEPA will be notified along with the Chicago Department of Public Health, appropriate forms will be completed.

If the mantle or string material requiring removal, the material will be kept wet and personnel will utilize proper PPE with ½ face HEPA equipped respirators, Tyvek suits and booties. Air monitoring will also be conducted as described below.

AIR MONITORING

Air monitoring will be conducted and if ACM is detected, air monitoring will be upgraded. At a minimum, air monitoring will consist of a single high volume perimeter air sampler. The air sampler will be setup to collect a sample downwind of the excavation in addition to the personal exposure monitoring of the excavator operator, laborer and/or health physicist in the excavation and/or near fillings or the Super Sacks. Furthermore, water will be used for dust controls as necessary so there is no visible dust migrating out of the property.

Air monitoring activities will be conducted onsite to monitor the exposure of workers and to alert Site personnel to a potential release of airborne contaminants that may affect persons or property on the Site. Onsite monitors will be placed on workers, around the excavation areas, and/or placed along the perimeter of the Site. Air monitoring activities will be setup, maintained and reported by the soil screening contractor with oversight by a certified health physicist. USEPA guidelines will be used whenever feasible in establishing sampling locations, quality control, height of the sampling above the ground and sampling orientation. High volume samplers will be used for excavation perimeter monitoring and low volume monitors for personal monitoring.

After collection of the air samples, the samples will be transported under proper chain of custody procedures for analysis by the RSSI Laboratory in Morton Grove, Illinois or another approved laboratory. More details are included in the attached HASP.

REPORTING

After field activities are completed, a written report will be prepared to document the completed screening activities and findings and shall include descriptions and results of initial screening activities performed during foundation demolition and removal, completion of geotechnical borings and installation of foundation elements. The report will also include information regarding instruments used and the calibration data, radiological screening data, and drawings/maps showing areas surveyed.

If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

RPS GaiaTech

John H. Yang, PG
Vice President, Site Investigation & Remediation

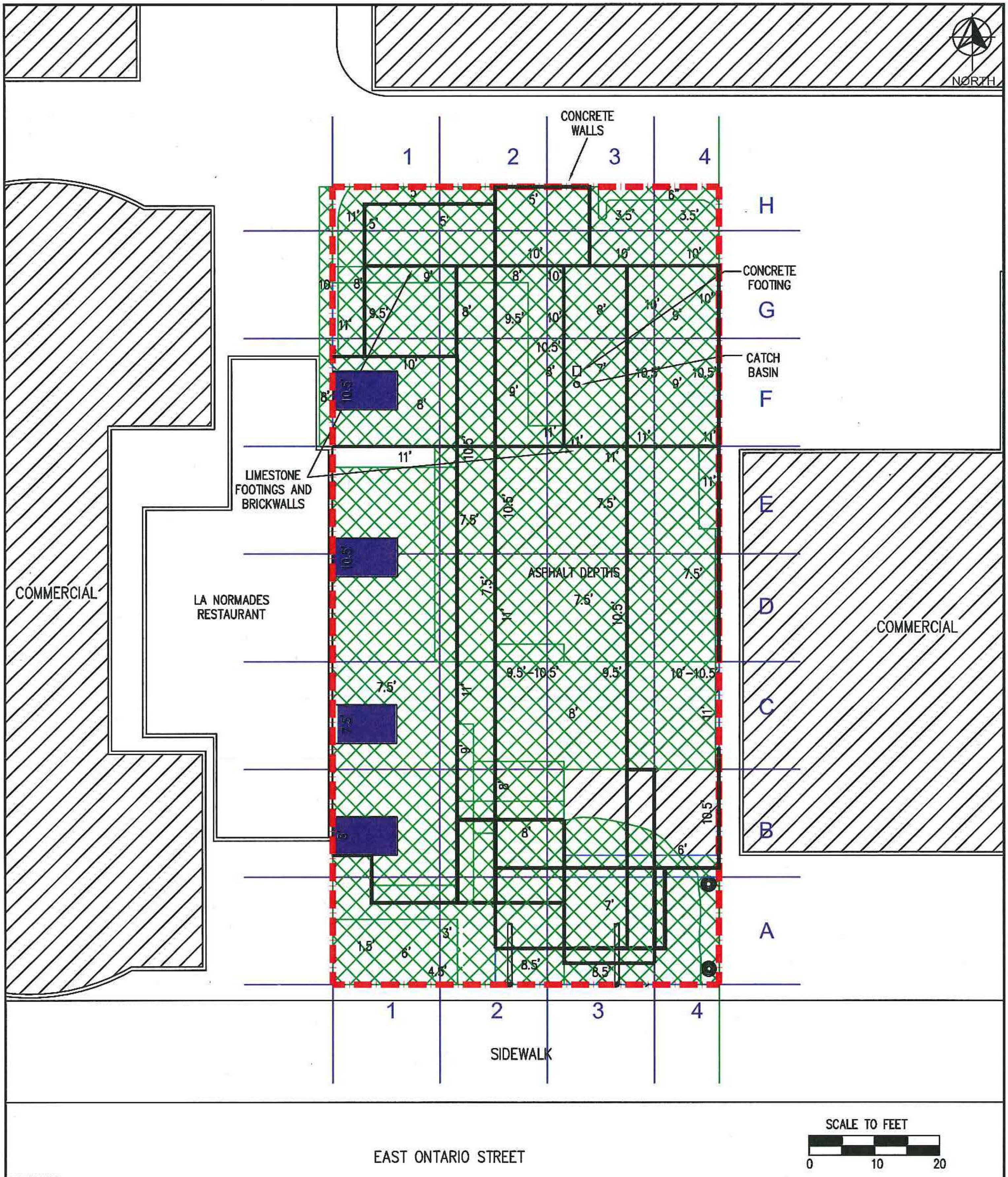
cc: Scott Greenburg & Jeff Solomon – SMASHotels Chicago LLP
Eugene Jablonowski – USEPA

Attachments

Figure 1 - Site Plan with previous screening areas
Figure 2 - Foundation Plans
Appendix A - 2015 Geotechnical Investigation Report
Appendix B – Notice of Successful Release Survey

ATTACHMENTS

Figure 1
Site Plan with Previous Screening Areas



LEGEND

- 🟥 SITE BOUNDARY
- ▨ TEST PIT
- 🟩 SURVEYED AREA 12/08 -12/17/2014
- ● TREE STUMP

DESCRIPTION:

CONSTRUSTION SITE
224 TO 228 E ONTARIO STREET
CHICAGO, IL

DRAWN: JB

SCALE: GRAPHIC

DATE: 12/17/14

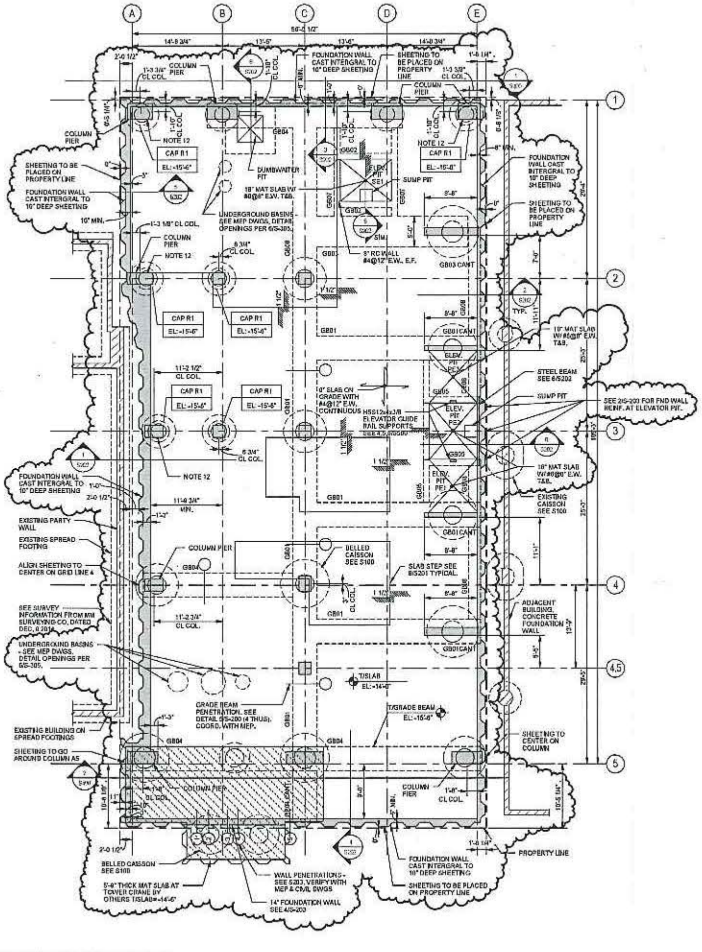
FILE: 156348.400.00

FIGURE: GENERAL SITE PLAN

RPS GaiaTech

Figure 2
Proposed Foundation Plans

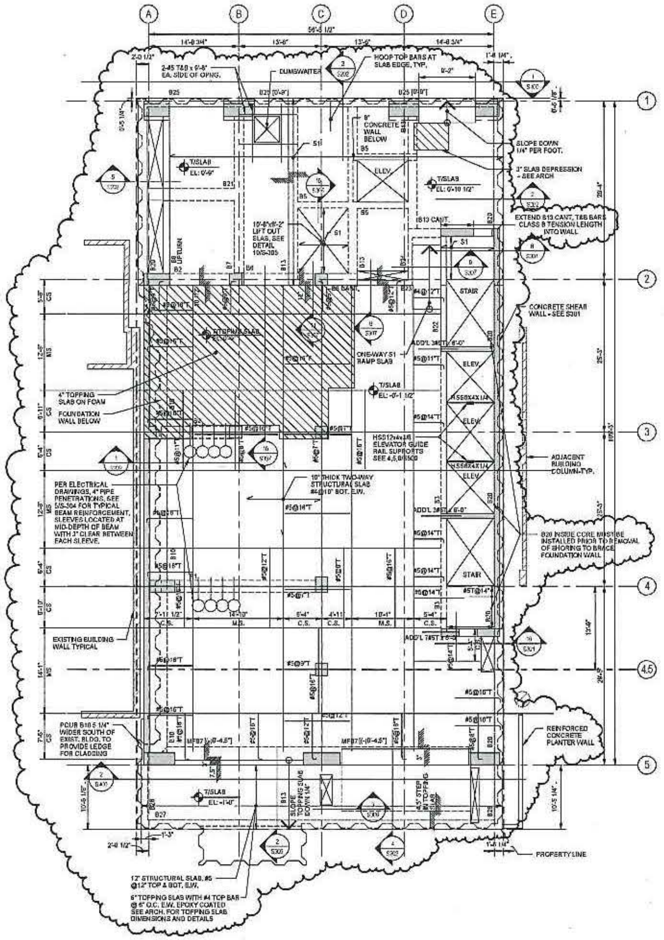
7/31/15 - 100% Design Development



1 FOUNDATION FRAMING PLAN

SCALE: 1/8" = 1'-0"

NOTES
1. T/SLAB-ON-GRADE EL. (-)14'-0" UNLESS NOTED OTHERWISE.
2. T/GRADE BEAMS EL. (-)15'-6" UNLESS NOTED OTHERWISE.
3. VERIFY ELEVATOR PIT DEPTH AND SUMP PIT LOCATIONS WITH ELEVATOR MANUFACTURER.
4. SEE S100 FOR CAISSON AND CAISSON CAP DETAILS.
5. GBXX DENOTES REINFORCED CONCRETE GRADE BEAM. SEE S200 FOR SCHEDULE AND DETAILS.
6. COORDINATE GRADE BEAM AND FOUNDATION WALL PENETRATIONS WITH ARCHITECTURAL, MEP, AND CIVIL DRAWINGS.
7. SEE S201 FOR SLAB ON GRADE DETAILS.
8. SEE S202 AND S203 FOR FOUNDATION WALL DETAILS.
9. SEE S301 FOR CONCRETE SHEAR WALL REINFORCEMENT.
10. SEE S302 FOR CONCRETE COLUMN SCHEDULE AND REINFORCEMENT.
11. EARTH RETENTION SYSTEM DESIGN IS BY OTHERS. SHEETING SHOWN IS FOR REFERENCE ONLY, BUT MAY NOT ENCROACH INTO THE STRUCTURE FURTHER THAN THAT SHOWN.
12. SEE DETAIL 17/S201 AND COLUMN SCHEDULE FOR COLUMN DOWELS.
13. SLAB-ON-GRADE LATERALLY BRACES BOTTOM OF FOUNDATION WALL IN PERMANENT CONDITION. SLAB TO BE FULLY INSTALLED WITH A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI PRIOR TO REMOVAL OF TEMPORARY SHORING.



2 ENTRY LEVEL FRAMING PLAN

SCALE: 1/8" = 1'-0"

NOTES
1. T/SLAB ELEVATION VARIES - SEE PLAN AND VERIFY ALL ELEVATIONS, STEPS, SLOPES AND DEPRESSIONS, WITH ARCHITECTURAL AND CIVIL DRAWINGS.
2. SEE TYPICAL REINFORCED SLAB DETAILS ON SHEET S305.
3. BXX DENOTES REINFORCED CONCRETE BEAM. SEE TYPICAL DETAILS ON SHEET S303 AND S304.
4. SSRX DENOTES SHEAR STUD SCHEDULE. SEE SCHEDULE ON SHEET S307.
5. ALL COLUMN REINFORCEMENT TO BE CENTERED AT COLUMN.
6. SEE S301 FOR CONCRETE SHEAR WALL REINFORCEMENT.
7. SEE S302 FOR CONCRETE COLUMN SCHEDULE AND REINFORCEMENT.

EL: 0'-0" PROJECT DATUM (P.D.) = EL.: 13.33' CITY OF CHICAGO DATUM (CCD)

SMASHOTELS
LIFE AND TRAVEL
SMASHotels Chicago LLC
250 Parkway Drive Suite # 120
Lincolnshire, IL 60069

KOO LLC
55 W JACKSON BLVD STE 215
CHICAGO IL 60604
312-235-0020 PH

Halvorson and Partners
STRUCTURAL ENGINEER

TERRA Engineering, Ltd.
CIVIL ENGINEER

MA Engineering
MEP ENGINEER

Daniel Weinbach & Partners, Ltd.
LANDSCAPE ARCHITECT

HALVORSON AND PARTNERS
STRUCTURAL ENGINEERS
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AUTOGRAPH STREETERVILLE

228 E. ONTARIO,
CHICAGO, IL

GREGORY J. LAKOTA
081-062579
02/23/15
EXP: 11/30/16

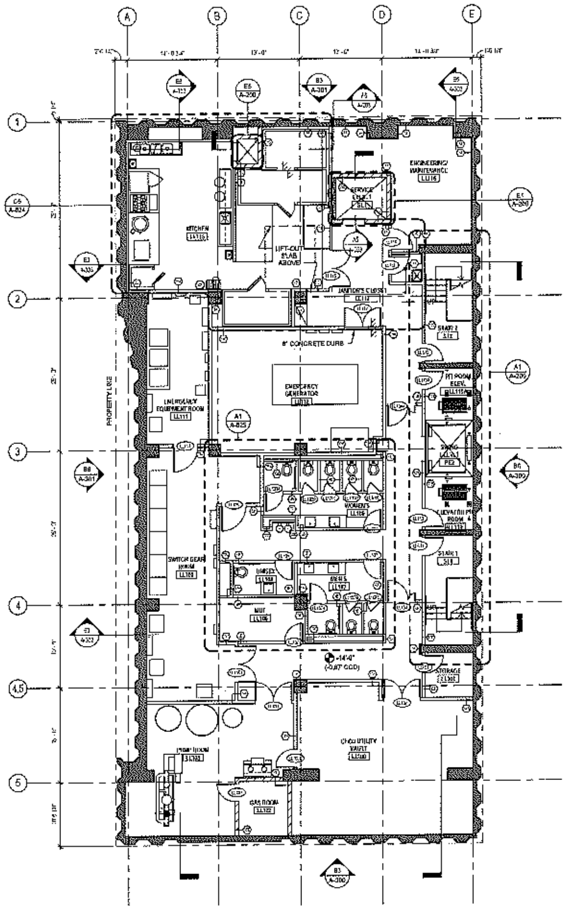
NORTH

0 4'-0" 8'-0" 16'-0"

FOUNDATION & ENTRY LEVEL FRAMING PLANS

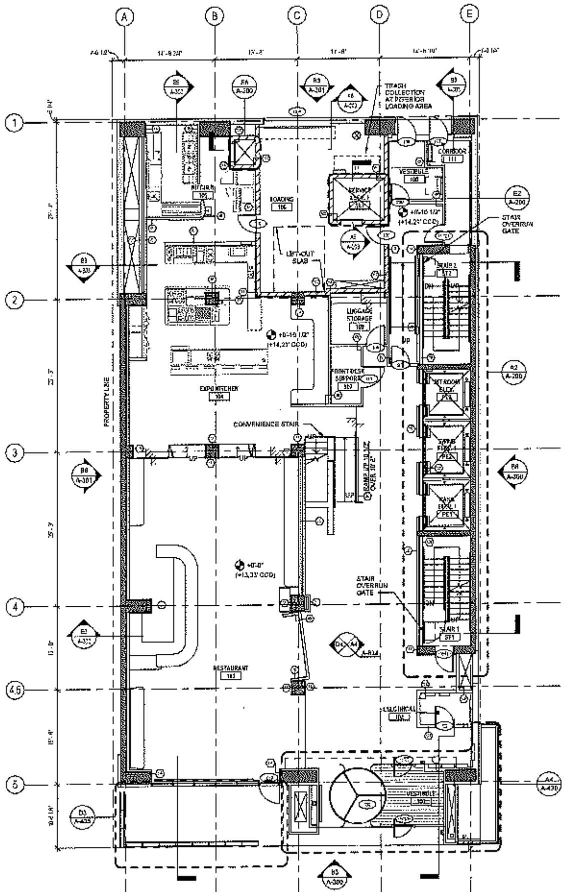
S101

7/31/15 - 100% Design Development



B6 LOWER LEVEL PLAN

SCALE: 1/8" = 1'-0"



B3 ENTRY LEVEL PLAN

SCALE: 1/8" = 1'-0"

EL: 0'-0" PROJECT DATUM = EL: 13.33' CITY OF CHICAGO DATUM (CCD)

SMASHOTELS
LIFE AND TRAVEL

SMASHotels Chicago LLC
250 Parkway Drive Suite #120
Lincolnshire, IL 60069

KOO LLC
55 W JACKSON BLVD STE 215
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Halvorson and Partners
STRUCTURAL ENGINEER

TERRA Engineering, Ltd.
CIVIL ENGINEER

MA Engineering
MEP ENGINEER

Daniel Weinbach & Partners, Ltd.
LANDSCAPE ARCHITECT

AUTOGRAPH STREETERVILLE

228 E. ONTARIO, CHICAGO, IL

ISSUE/REVISION

NO.	DATE	DESCRIPTION
	12/05/14	SCHEMATIC DESIGN
	02/05/15	STRUCTURAL AND FOUNDATION GMP.
	04/01/15	FOUNDATION PERMIT
	07/07/15	MEP GTB REFERENCE
3	07/25/15	BULLETIN #003
4	07/31/15	100% DESIGN DEVELOPMENT

DRAWN BY: Author

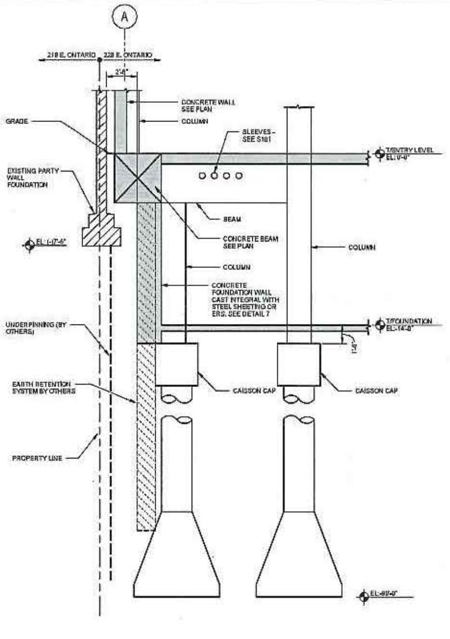
NORTH

0 4'-0" 8'-0" 16'-0"

LOWER LEVEL & ENTRY LEVEL PLANS

DRAWING NO.

A-100



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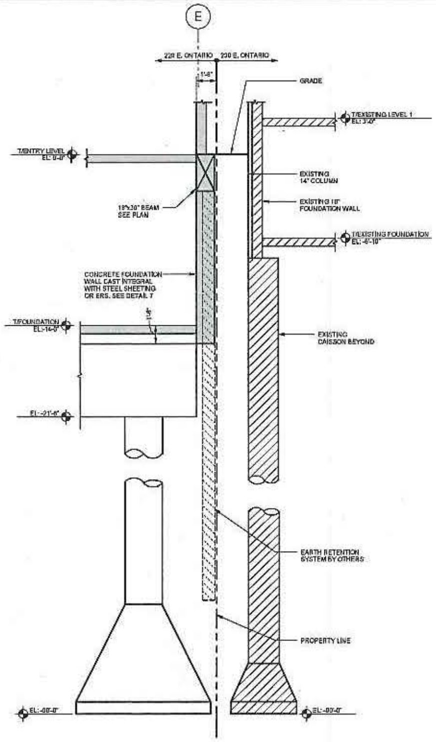

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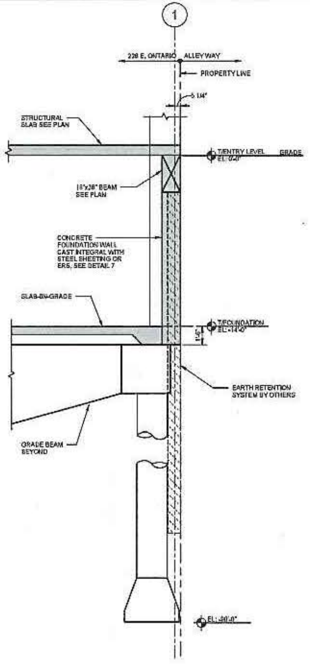

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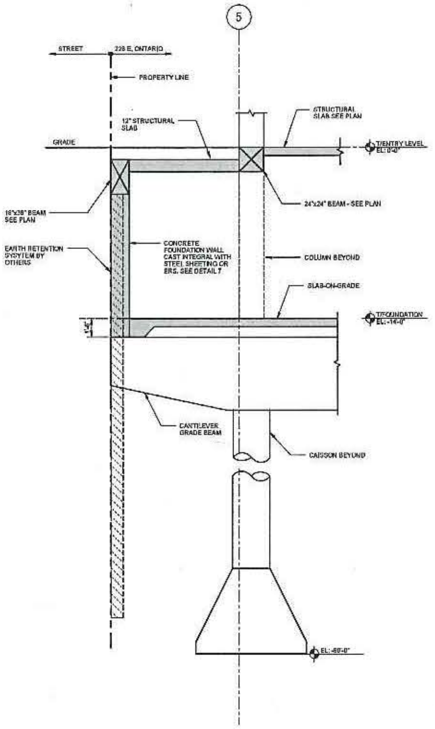

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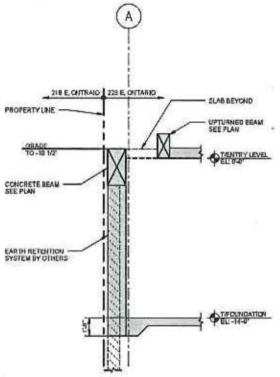

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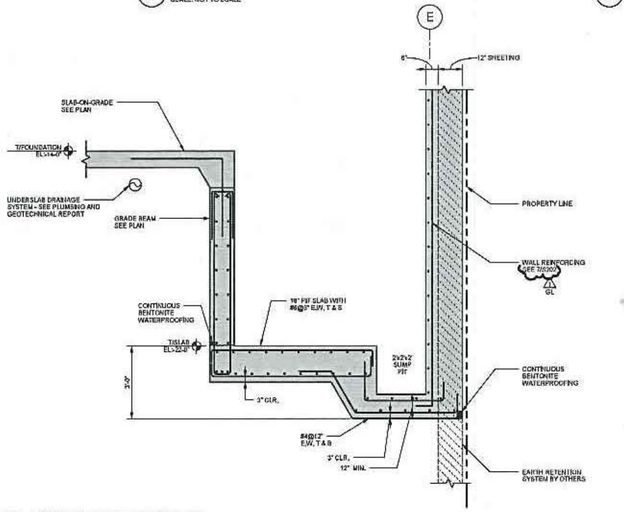

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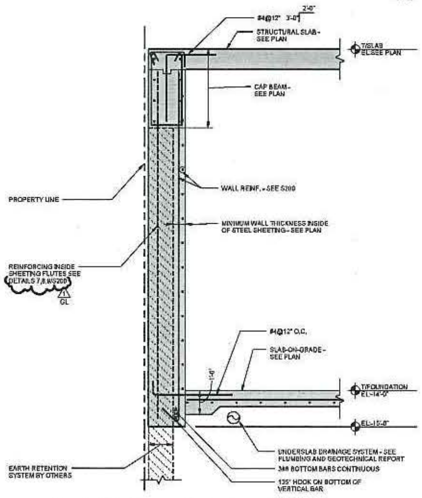

7 TYPICAL FOUNDATION WALL REINFORCING

SCALE: NOT TO SCALE

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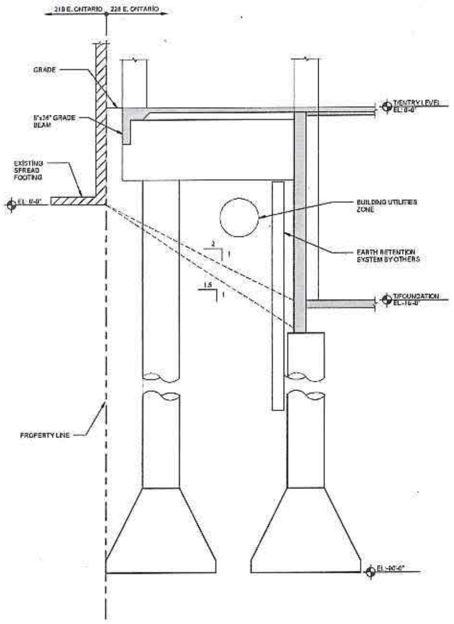
AUTOGRAPH STREETERVILLE

228 E. ONTARIO,
CHICAGO, IL

GREGORY J. LAKOTA
081-005579
02/23/15
EXP: 11/30/16

FOUNDATION DETAILS

S202



① SECTION AT HOUSE (WEST P.L.)

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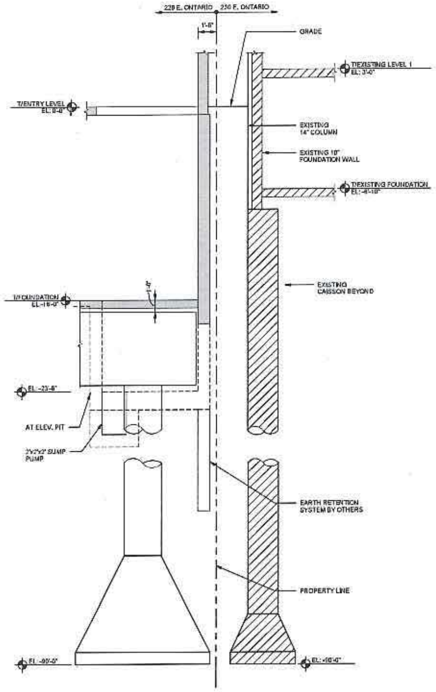

② SECTION AT CONDO (EAST P.L.)

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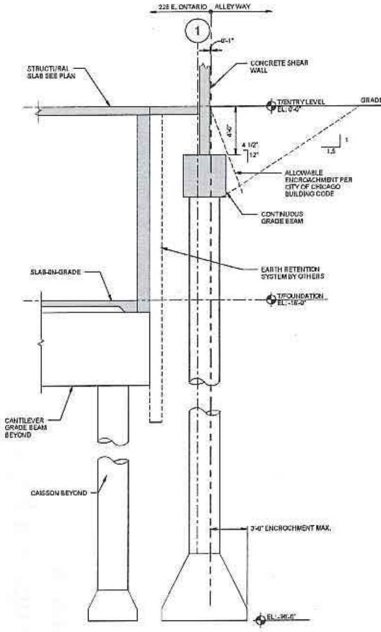

③ SECTION AT NORTH PROPERTY LINE

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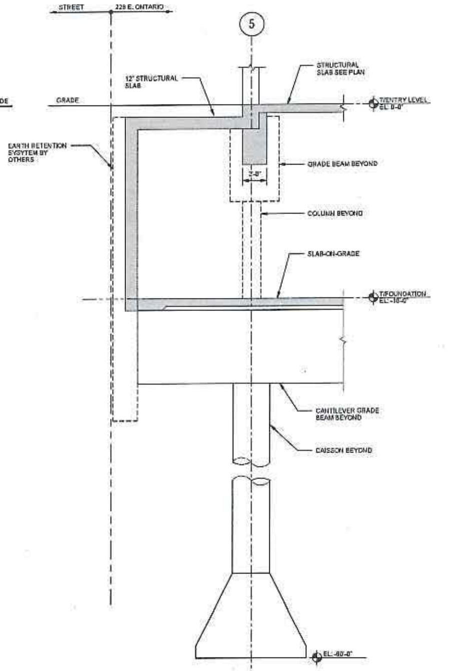

④ SECTION AT SOUTH PROPERTY LINE

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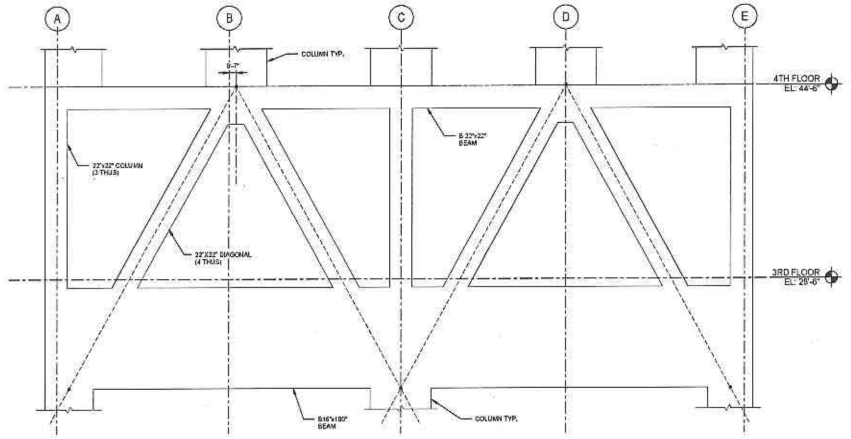

⑤ ELEVATION - GRID 5

SCALE: 1/4" = 1'-0"

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228 E. Ontario

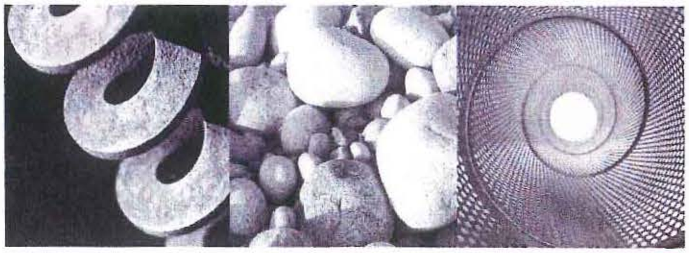
228 E. ONTARIO,
CHICAGO, IL

NORTH

FOUNDATION DETAILS

S300

Appendix A
Geotechnical Investigation Report



GEI Consultants

Geotechnical
Environmental and
Water Resources
Engineering

Subsurface Exploration and Geotechnical Engineering Services

Proposed Residential Tower, 224-228 East Ontario Street

Chicago, Illinois

Submitted to:
Mr. Jeff Solomon
SMASHotels Chicago, LLC
250 Parkway Drive, Suite 120
Lincolnshire, IL 60069

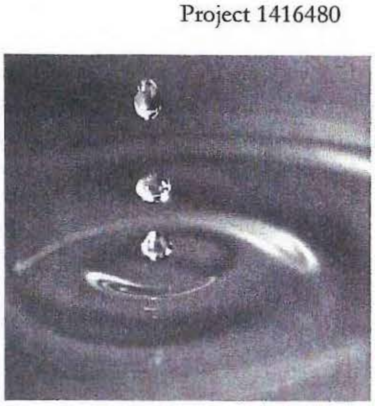
Submitted by:
GEI Consultants, Inc.
400 N. Lakeview Parkway, Suite 140
Vernon Hills, IL 60061
847-984-3401

January 23, 2015

Project 1416480

RYAN C. RUSK
062-059211
LICENSED PROFESSIONAL ENGINEER OF ILLINOIS

Ryan C. Rusk, P.E.
Senior Professional



GEI Consultants

Geotechnical
Environmental
Water Resources
Ecological

January 23, 2015
Project No. 1414680

Sent via email: jeff@ecdco.com

Mr. Jeff Solomon
SMASHotels Chicago, LLC
250 Parkway Drive, Suite 120
Lincolnshire, IL 60069

Dear Mr. Solomon:

RE: Geotechnical Engineering Services for New Residential Tower to be Located at 224-228 East Ontario Street in Chicago, Illinois

GEI Consultants, Inc. (GEI) is pleased to submit our geotechnical engineering study and recommendations for the above referenced project.

We appreciate the opportunity to provide our services for this project. Please do not hesitate to call with any questions with regard to this report.

Sincerely,

GEI CONSULTANTS, INC.

Paul L. Zinnecker
Staff Professional

William H. Walton

William H. Walton, S.E., P.E.
Senior Vice President/Senior Consultant

Ryan C. Rusk, P.E.
Senior Professional

RCR:nls

cc: Jackie Koo – Koo and Associates. Via email: jkoo@kooandassociates.com
Jonathan Sladek – Halvorson & Partners Structural. Via email: jsladek@hpse.com

www.geiconsultants.com

GEI Consultants, Inc.
400 N. Lakeview Parkway, Suite 140, Vernon Hills, IL 60061
847.984.3401 fax: 847.984.3532

Table of Contents

Appendix

1. Introduction

1.1 Purpose

GEI Consultants, Inc. (GEI) has prepared this geotechnical engineering report for SMASHotels Chicago, LLC to present the results of our subsurface exploration and geotechnical evaluation. This report provides recommendations for foundation systems, site retention systems, and other pertinent information.

1.2 Scope of Work

Our scope of work for this project included the following:

- Obtained a City of Chicago, Office of Underground Coordination (OUC) permit prior to commencing field activities. We submitted our application on November 18, 2014 and received the permit on December 22, 2014.
- Engaged a subcontractor to drill a total of five (5) soil borings to obtain pertinent subsoil and groundwater information for geotechnical evaluation and analysis. The borings were extended to depths of approximately 108 to 111 feet below the ground surface.
- Performed a total of nine (9) in-situ pressuremeter tests in three (3) selected borings.
- Performed a total of six (6) in-situ vane shear tests in two (2) borings.
- Worked with owner's representative to screen near-surface fill for potential thorium contamination.
- Prepared this geotechnical engineering report to present our findings, foundation recommendations, and construction.

1.3 Site and Project Description

The proposed development, located at 224 to 228 East Ontario Street in Chicago, Illinois, is planned to consist of a twenty-one story residential building with a one level basement in a portion of the site. The site is currently vacant with the previous three story masonry structures with basements having been recently demolished. The proposed building will be directly west of and adjacent to an existing twenty-eight story residential building, also with a basement. To the west, there is a three story brick structure. Anticipated column loads include dead loads of 500 to 2,000 kips, live loads of 150 to 450 kips, and wind loads of about 800 kips. It is our understanding that the proposed development will be constructed with reinforced concrete walls, columns, and slabs, and will be supported on belled caissons.

1.4 Authorization

SMASHotels Chicago, LLC authorized our work for this project in accordance with our Proposal No. 610040, dated November 3, 2014.

2. Subsurface Exploration

2.1 Geotechnical Exploratory Borings

A total of five (5) deep soil borings were performed at the subject site. GEI submitted for and received utility clearance for the recommended soil boring locations from the OUC utilizing a CADD format of a recent survey plan. The subsurface exploration and testing program was performed after clearance and approval of our utility clearance request was received.

Strata Earth Services, LLC (SES) of Palatine, Illinois was retained by GEI to advance the borings at the site. Borings were drilled between December 23, 2014 and January 14, 2015 using solid-stem auger and mud rotary methods. Samples were obtained in general accordance with ASTM D 1586 *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*. Additional in-situ testing, including Vane Shear and Pressuremeter testing was performed in general accordance with ASTM D 2573 and ASTM D 4719, respectively. General information regarding GEI soil description and sampling information is included in Appendix A.

2.1.1 Soil Strata

The generalized soil and groundwater conditions encountered in our borings are presented below. The soil boring locations are shown on the attached figure in Appendix B.

- *Urban Fill* – Urban fill extended to depths of between about 8 and 8.5 feet below existing ground surface. The fill primarily consisted of construction debris and sandy gravel with varying amounts of clay, brick, and wood. The relative density of the fill varied between loose and medium dense.

- *Fine to Medium Sand* – Underlying the urban fill, a layer of brown medium to very dense silty sand and gravel was encountered, extending to between approximately elevations -11 to -14 feet CCD. Approximately 2 feet of loose fine to medium sand was encountered between the urban fill and sandy silt in Boring B-4. This layer was generally saturated below 0 to -3 feet CCD. Moisture contents in this layer varied from 1 to 24 percent.

- *Soft to Medium Clay* – Underlying the sand, a layer of soft to medium clay was encountered. Minor amounts of sand, gravel, and shale were observed within this layer. This layer extended to between approximately elevations -39 and -56 feet CCD. Moisture contents in this layer ranged from 23 to 31 percent. Peak undrained strength indicated from vane shear testing ranged from 0.3 to 0.6 tons per square foot (tsf) in this layer, with residual strengths ranging from 0.12 to 0.29 tsf. Unconfined compressive strength estimated by hand penetrometer ranged from less than 0.25 to 0.75 tsf.

- *Stiff to Very Stiff Silty Clay* – Underlying the soft clay, a layer of gray stiff to very stiff silty clay was encountered. Minor amounts of sand, gravel and shale fragments were observed in the silty clay. This layer extended to between approximately elevations -71 to -76 feet CCD. Unconfined compressive strengths estimated from the hand penetrometer ranged between 1 and 3.25 tsf. Moisture contents were between approximately 13 and 25 percent.

- *Hard Silty Clay* – This hard silty clay layer (locally referred to as hardpan) was encountered below the stiff to very stiff silty clay described above. The layer is gray and contains varying amounts of sand, gravel and shale. This layer extended to elevations between approximately -86 and -91 feet CCD and was approximately 9 to 19 feet thick. The unconfined compressive strengths from hand penetrometer testing were greater than 4.5 tsf. A moist to wet, fine sand layer was encountered in Boring B-3 at an elevation of approximately -73 feet CCD. Moisture contents ranged between 9 and 16 percent but were typically between 9 and 13 percent. Standard penetration test (SPT) results had blowcounts ranging from 27 blows for 12 inches to 50 blows for 3 inches. Pressuremeter tests performed in this material had creep pressures (P_f) values ranging from 15.8 to 37.9 tsf.

- *Very Dense Silt* – The borings encountered a very dense layer of saturated silt below the hard clay. This layer extends to between approximately -91 and -96 feet CCD. SPT blowcounts in this layer ranged from 31 blows per foot to 50 blows in six inches. Moisture contents ranged from 5 to 20 percent, but were generally 18 to 20 percent. The pressuremeter test performed in this layer had a creep pressure (P_f) of 23.5 tsf. This creep pressure is comparable to those obtained in the overlying hardpan.

- *Hard Clay* – A second hard gray clay layer was encountered beneath the very dense saturated silts. This layer extended to the boring termination depths of 108.5 to 110 feet below ground surface. Moisture contents in this layer ranged from 7 to 13 percent, and were generally between 9 and 13 percent. SPT blowcounts in this layer ranged from 37 blows per foot to 75 blows in 3 inches. Pressuremeter creep pressures (P_f)in this layer ranged from 26 to 30 tsf, comparable with those in the overlying strata.

The profile described above generally represents the conditions encountered in the soil borings performed. Some variations should be expected and the boring logs should be reviewed for specific conditions encountered at a given boring location. The stratification lines shown on the boring logs which designate the probable interfaces between soil layers and profiles are approximate; in-situ, the transition may be gradual. The soil boring logs, soil profile, vane shear test results and pressuremeter test results are included in Appendix C, *Soil Boring Logs*, Appendix D, *Soil Profile*, Appendix E, *Vane Shear Test Results*, and Appendix F, *Pressuremeter Test Results,* respectively.

2.1.2 Groundwater

Shallow groundwater level measurements obtained in the borings during drilling and sampling operations were on the order of 15 feet below ground surface, with one reading being 12.5 feet below ground surface. After casing removal, water levels in the borings within this range. However, it should be recognized that due to the use of drilling fluids the readings at the completion of drilling may not be indicative of actual groundwater conditions. In our opinion, the readings at depths of about 12.5 feet are probably representative of the shallow static groundwater level. For design purposes, we recommend assuming the shallow water table at elevation +4 feet CCD.

A separate piezometric level is commonly found immediately overlying the limestone bedrock aquifer. Measurements of the deep piezometric levels were not performed since the borings did not extend to those depths.

Fluctuations in the level of the groundwater should be expected to occur throughout the seasons and years depending upon the level of Lake Michigan, amounts of precipitation, evaporation and surface run-off.

3. Geotechnical Recommendations

3.1 Foundation Options

Based on the available soil information at the project site and anticipated structural loads, the proposed structure can be supported on new belled caissons.

3.1.1 Belled Caissons

Based on the soil conditions and pressuremeter testing performed at the project site, we recommend belled caissons supported at an approximate elevation of -78 feet CCD (an approximate depth of 90 feet below the existing ground surface) with a maximum allowable bearing pressure of 50 kips per square foot (ksf). The maximum net allowable soil bearing pressure is that pressure which may be transmitted to the foundation soil in excess of the final minimum surrounding overburden pressure. Caisson side friction should be ignored when computing the capacity of belled caissons to resist compression loads. A 33 percent increase may be applied to the allowable bearing pressure for wind and seismic loading.

We anticipate that maximum settlement for caissons designed for a net allowable bearing pressure of 50 ksf will be approximately ¼ to ¾ inch, not including elastic shortening. Differential settlement is dependent upon adjacent loads, but is not expected to exceed 50% of the estimated total settlement.

Caisson shafts should have a minimum diameter of 30 inches. The caisson bells should have a base angle no flatter than 60 degrees from the horizontal, and the bell diameter should not exceed three times the shaft diameter. As part of the foundation permit, the geotechnical engineer of record or their agent should be retained to inspect and approve each caisson bearing level. If the bearing surface of the belled caisson cannot be inspected by visual means, e.g. through use of a down-hole camera, bells should be oversized by 1 foot.

Caisson bearing capacity and settlement calculations are included in Appendix G.

3.1.2 Foundation Proximity to Existing Caissons

The east side of the building is directly adjacent to an existing tower. We recommend that an attempt be made to determine the foundation details of the existing building to the east. We do not recommend extending the proposed foundations to a level below these foundations within a zone of approximately 1.5 horizontal to 1 vertical from the bottom of the existing foundation. This may result in undermining and settlement of the existing foundations.

If necessary, the proposed foundations could be raised to an elevation of approximately -73 feet CCD (85 feet below the existing ground surface) and be designed for a net allowable soil bearing pressure of 30 ksf. If this option is pursued, differential settlement between adjacent caissons may be somewhat larger than discussed in section 3.1.1 but could be reviewed on a case by case basis.

3.1.3 Lateral Resistance

Lateral loads induced by wind loadings on the structure could be resisted by lateral resistance of the drilled caisson shafts, passive resistance on the grade beams and pile caps, and side friction along the buried face of grade beams and caps.

For passive resistance against foundation walls, grade beams and pile caps, a net pressure should be used corresponding to the passive pressure in front of the structure minus the active pressure behind the structure. We recommend an equivalent net allowable fluid pressure above and below the groundwater level of 180 and 80 pounds per square foot per foot of depth (psf/ft), respectively. This includes a factor of safety of 2.0 on the passive resistance to provide strain compatibility with other structural components, such as the lateral resistance on the caissons and frictional sliding resistance on the slabs. Backfill against structural components that will provide lateral resistance should be granular material compacted to 95 percent of the maximum dry density as determined by a modified Proctor test per ASTM D1557. In addition, we recommend that an allowable shear resistance of 18 psf/ft be used for the side friction along the exterior faces of the grade beams. The 18 psf/ft value would increase linearly for each foot of depth. Below the design water table, at elevation +4 feet CCD, we recommend a reduced allowable shear resistance increasingly linearly at 8.6 psf/ft for each foot of depth.

For estimating the lateral resistance of caisson shafts (cut-off level may be below the basement mat level), we recommend that the following horizontal subgrade reaction values (k) be used:

Table 1 – Lateral Modulus of Subgrade Reaction

		Lateral Modulus of Subgrade Reaction, (kcf), for Given Diameter of Caisson Shaft			
Elevation (ft CCD)	**Soil Type**	**3 feet**	**4 feet**	**5 feet**	**6 feet**
+12.5 to +4	Urban Fill	8z*	7z*	6z*	5.5z*
+4 to -11.5	Medium Dense to Dense Sand (Submerged)	40z*	35z*	31z*	28z*
-11.5 to -41.5	Soft to Medium Clay	17	15	13	12
-41.5 to -71	Stiff to Very Stiff Clay	79	69	61	56
-71 to -98	Hard Silty Clay or Clayey Silt (Hardpan)	213	184	165	150

*Note: For granular soil, the lateral modulus of subgrade reaction increases per foot depth, z.

We recommend a minimum overall safety factor of 1.5 for caisson shaft resistance, passive resistance and side friction on grade beams to resist lateral forces on the structure. If base shear resistance is to be optimized, GEI can provide LPILE analysis to estimate individual and group action of the caisson lateral resistance at given scenarios as a separate deliverable.

3.1.4 Uplift Resistance

Deep foundation elements extended to the hardpan layer should be provided with full length tied reinforcing steel, if utilized for uplift resistance. The uplift resistance of belled caissons bearing in hardpan clay can be estimated as the lesser value computed using the following methods:

Option 1 - The summation of the dead weight of the caisson and the cylindrical projection of soil above the bell, using the buoyant unit weight of concrete and soil, plus the allowable side friction along the conical bell section, or

Option 2 - The summation of the dead weight of the caisson using the buoyant unit weight of concrete plus the allowable side friction along the shaft and bell. The ultimate side friction along the caisson shaft can be estimated to be equal to the values provided in Table 4. These values are applicable where the caisson concrete is directly in contact with the appropriate soil layer described below.

Table 2 – Ultimate Side Friction

Elevation (ft CCD)	Soil Type	Recommended Ultimate Side Friction (psf)
-11.5 to -41.5	Medium to Soft Clay	500
-41.5 to -71	Stiff to Very Stiff Clay	800
-71 to -80	Hardpan Layer	2,500

The values in Table 2 do not include any factors of safety. We recommend that a minimum factor of safety of 1.5 and 2.5 be used on factored load and un-factored load combinations, respectively. The considered factored load combination can be estimated as: DL - 0.6*W, and the unfactored load combination can be estimated as: DL - W; where, DL is the dead load and W is the wind loading. Live loads should be conservatively ignored.

3.2 Basement Earth Retention and Drainage Systems

3.2.1 Wall Systems

We understand that the proposed development will include a basement to one level beneath existing grade. The excavation will extend through the upper saturated granular fill into the natural sand strata. This material could flow into the excavation if it is not properly retained and dewatered. To effectively dewater the excavation, the earth retention system will need to consist of a fully-enclosed, "water-tight" system that surrounds the basement that is keyed at least 2 feet into the underlying clay to provide a groundwater cutoff. Then, water removal would be limited to water falling onto the site and seepage through the retention system through leaks in the interlocks or concrete cold joints. All formed walls should have external waterproofing. However, water leakage should be expected and prepared for in the new excavation.

The type of retention system will depend upon the anticipated depth of excavation, geometry, and access. Due to the saturated soil, depth of excavation and sensitivity of the adjacent restaurant and infrastructure to movement, the use of soldier pile and lagging is not recommended.

The earth retention system will require temporary or permanent internal bracing. We do not recommend external tiebacks be used under the restaurant property. Interferences with existing off-site utilities will likely interfere with grouted tiebacks. City permission and permits to extend temporary tiebacks off-site and below City streets would need to be obtained. Earth retention systems protecting the public right-of-way will also need to be approved and permitted by the City. Any element that extends outside the property line into the public way will require annual payments to the City. Site-specific monitoring will also be required to the degree, and in accordance with the frequency, set by the City.

3.2.2 Underpinning of Neighboring Structures

Prior to installing the sheeting, slurry walls or secant pile walls, we recommend the adjacent restaurant be surveyed for existing distress, underpinned with drilled micropiles or pushed steel segmental pipe piles. The restaurant foundation should be underpinned with drilled or pushed micropiles in the zone of influence extending upward from the base of the excavation at a slope of 1 horizontal to 1 vertical. We understand that the existing restaurant is supported on shallow limestone block foundations that bear at a depth of about 7.5 feet. These foundations will not be suitable for underpinning without some form of remedial support. Furthermore, during earth retention installation and while the excavation is on-going, we recommend the restaurant be monitored for settlement using settlement points and inclinometers for lateral movement.

A licensed Structural Engineer, registered in the State of Illinois, should be retained to design temporary and permanent lateral excavation support systems to protect City streets, utilities, alleys, and adjacent buildings.

3.2.3 Lateral Earth Pressures

The temporary and permanent earth retention systems can be designed using equivalent fluid pressures. These permanent lateral pressures against the basement walls correspond to long-term "at-rest" conditions, which is appropriate for permanent walls that are restrained at the top and bottom against movement. The permanent lateral pressures govern the design of both temporary and permanent retention systems. Above the water table of +4 feet CCD, within the predominantly granular fill material expected, an equivalent fluid soil pressure of 55 psf per foot of excavation depth should be used for the design. Below the water table, at Elev +4 CCD, a combined earth and water pressure of 90 psf/ft should be used.

Adjustments to the recommended general pressure distributions may be necessary depending on construction staging, surcharge loading, bracing locations and prestressing requirements. Earth retention systems along streets and alleyways should be designed to limit vertical and horizontal movements to less than 2 inches. Vertical and horizontal movements along the Restaurant (west) and existing tower (east) sides of the excavation should be limited to less than ½ inch.

Any surcharge loads (due to adjacent roadways, foundations, or floor slabs) within the area that projects upward from the base of the cut on a 45 degree angle (using a lateral earth pressure coefficient of 0.5), should be included as additional lateral pressures on the retention system. A uniform surcharge of 250 psf (or an equivalent 2 feet of soil) should be applied to the ground surface to represent construction equipment loading and/or truck traffic. Similar loading may be applied to permanent basement walls to represent traffic loading.

GEI's recommended permanent lateral earth pressures are shown on the figure in Appendix H.

3.2.4 Slab on Grade Underdrain

Assuming that the perimeter retention system extends into the underlying clays encountered between 23 and 28 feet below grade, the basement level will provide a continuous and permanent water cut-off. For this condition, we recommend that the basement slab be designed for the drained condition (no hydrostatic uplift if properly designed and constructed) and be underlain with a minimum of 8 inches of free-draining granular drainage blanket material (e.g., IDOT CA-7 washed crushed gravel, with less than 2% fines) placed over a non-woven geotextile (minimum 7 oz./yd^2) that is placed over the sandy subgrade to avoid contamination and clogging of the mat or slab gravel drain. The underdrain stone blanket should have perforated or slotted drain tile laterals placed around the interior perimeter of the basement and at maximum 50-foot spacing, placed in deepened trenches and surrounded by the same granular drainage material. There should be 3 inches of stone cover over the pipes/drain tiles. No slope of the drains pipes is required. The underslab drain tiles should outlet into a sump pump pit to remove the collected water.

4. Construction Considerations

4.1 Belled Caisson Construction

To prevent the surficial granular fill and saturated silt from sloughing into the caisson shaft and water inflow from the shallow water table, we recommend that a temporary steel casing be used at the surface during construction of belled caissons. The lower tip of all temporary casing should be extended to a minimum of 2 feet into the underlying clay to create a seal against groundwater inflow. The clay layer was encountered at each boring, as described below in Table 3.

Table 3 – Top of Clay Layer

Boring ID	Elevation of Top of Clay Layer (feet CCD)
B-1	-10.3
B-2	-14.5
B-3	-10.6
B-4	-10.7
B-5	-11

The two (2) individual vane shear tests indicate that clay squeeze is possible for four (4) foot diameter shafts and larger down to elevation of -35 feet CCD. However, the average of the vane shear test results indicate that the potential for clay squeeze is marginal. Squeeze potential is dependent upon the total overburden at the time of caisson construction, generally there is lower potential for squeeze if a large portion of a site has been excavated. We have assumed a ground surface elevation of +13 feet CCD at the time of caisson construction. The contractor should have temporary casing available to prevent squeezing should it occur. Additional procedures may be needed to prevent squeezing of the clay, if it occurs, while the concrete hardens. The contractor may need to extend the temporary casing deeper into the clay. We recommend temporary casing through potentially squeezing clays when the total overburden pressure divided by the undrained shear strength exceeds the values listed in Table 4. A figure indicating the squeeze potential for various diameter shafts is included in Appendix I.

Table 4 – Squeeze Potential

Depth/Shaft Radius	Total Overburden Pressure / Undrained Shear Strength
4	5.0
8	6.0
12	6.5
16	7.0
20	7.5
24	8.0
28	8.5
32	9.0

We recommend that the caisson excavation be observed by a representative of GEI to determine if squeeze is occurring. The amount of squeeze is dependent not only upon the strength of soils encountered but also on the diameter and length of time the excavation is left open. No caisson should remain open overnight unless it has been flooded with polymer slurry. In the event that squeeze occurs, longer length temporary casing extending below the squeezing clay will be required. Caisson squeeze could result in settlements of adjacent foundations, city utilities, and streets.

We recommend that the locations of the existing adjacent caissons or other foundation be properly identified, and the new caisson foundations be designed to avoid interference with the existing foundation or to avoid undermining the existing foundations.

During caisson construction, care should be taken to avoid concrete hitting the sides of the excavation or the reinforcing cage if the concrete is placed by the free-fall method. Caisson shafts and bell excavations should be cleaned of loose soil and as dry as possible prior to concrete placement. No more than four inches of standing water should be present at the bottom of the bell when concrete is placed. Concrete slump should be in the range of 5 to 7 inches for free-fall placement, and between 7 to 9 inches when tremie methods are used. The minimum tremie pipe sizes for free-fall and pumped concrete are 10 and 5 inches, respectively.

It is anticipated that the top of caisson concrete will likely be within the temporary liner and at or below the water table in saturated sand. Therefore, we recommend that permanent corrugated steel liners be installed. The permanent liner should extend to at least two (2) feet below the bottom of the temporary casing. The caisson concrete should be allowed to set at least overnight. After the caisson concrete has set, annular space between the permanent liner and temporary casing should be filled with cement grout. Once the void has been filled the temporary casing can be removed.

We strongly recommend that a representative of GEI, the geotechnical engineer of record, be present during all phases of caisson construction to observe that the excavations have reached suitable bearing strata as recommended in the design. GEI will not be responsible for the misinterpretation of this report by other inspection firms which could result in caissons being placed too high or too low in soil profile.

4.2 Construction Dewatering

A dewatering contractor should be consulted regarding the design of the construction dewatering system. We recommend that groundwater be lowered at least two feet below the excavation subgrade, well in advance of final excavation to subgrade. Perimeter control of surface water runoff should be provided to prevent flooding of the excavation from surface runoff. Dewatering should be controlled within the property lines. We do not recommend lowering the ground water level outside the new tower excavation earth retention system and tower core cofferdam or under adjacent streets or neighboring structures which may result in unwanted settlement.

4.3 Excavations

Preconstruction surveys, shoring, bracing and instrumentation performance monitoring of the existing adjacent tower and restaurant structures should be required during the project.

Foundation excavations and excavations that are to receive compacted fill should be kept free of standing water. In addition, all soils which become softened or loosened at the base of foundation excavation areas or subgrade areas should be carefully re-compacted or removed prior to placement of foundation concrete or fill material. No foundation concrete or structural fill should be placed in areas of ponded water or frozen soil. All excavations should be constructed such that they provide a safe and stable excavation. OSHA regulations regarding excavation side slopes should be followed.

We recommend that all foundation subgrade soils be observed by a representative of GEI prior to placement of concrete or fill, to confirm that the subgrade conditions are consistent with the design assumptions and recommendations contained in this report. Periodic density testing should be performed on any fill in order to document that density requirements have been met.

5. Limitations

5.1 General Limitations

This subsurface exploration and geotechnical report was prepared for the exclusive use of SMASHotels Chicago, LLC for the proposed new residential tower to be located at 224 East Ontario Street in Chicago, Illinois. Modifications to our recommendations may be required if there are any changes in the nature, design, or location of the proposed structures. We cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to evaluate whether any changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

The recommendations in this report are based in part on our review of subsurface data from adjacent or nearby geotechnical explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. Therefore, we recommend that GEI be engaged to make site visits during construction to: a) check that the subsurface conditions exposed during construction are in general conformance with our design assumptions; and b) ascertain that, in general, the geotechnical aspects of the work are being performed in compliance with the contract documents.

It was not part of our scope to explore for or research the locations of buried utilities or other buried structures at the site. Before construction of foundations for the proposed structure, a diligent effort should be made to determine the presence and location of any buried structures including utilities. This effort should include a thorough review of available drawings and other records of the site use and facilities. If the presence of such structures is determined to be likely, GEI should be notified so that we may review and revise our recommendations, if appropriate.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, expressed or implied, is made.

Appendix A

General Geotechnical Attachments

GEI Consultants

COARSE-GRAINED SOILS

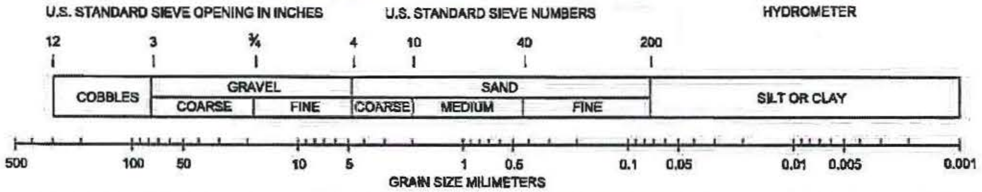
VISUAL-MANUAL DESCRIPTIONS

TYPICAL SOIL COLORS

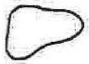
- 🟨 YELLOW
- 🟩 OLIVE
- 🟫 LIGHT BROWN
- 🟫 BROWN
- 🟥 REDDISH BROWN
- 🟥 RED
- ◼ GRAY
- ⬛ BLACK

SOILS WITH <50% FINES

				GROUP SYMBOL		GROUP NAME
GRAVEL % Gravel > % Sand	≤5% Fines	WIDELY GRADED		GW	<15% Sand	WIDELY GRADED GRAVEL
					≥15% Sand	WIDELY GRADED GRAVEL WITH SAND
		NARROWLY GRADED		GP	<15% Sand	NARROWLY GRADED GRAVEL
					≥15% Sand	NARROWLY GRADED GRAVEL WITH SAND
	~10% Fines	WIDELY GRADED	Fines = ML or MH	GW-GM	<15% Sand	WIDELY GRADED GRAVEL WITH SILT
					≥15% Sand	WIDELY GRADED GRAVEL WITH SILT AND SAND
			Fines = CL or CH	GW-GC	<15% Sand	WIDELY GRADED GRAVEL WITH CLAY
					≥15% Sand	WIDELY GRADED GRAVEL WITH CLAY AND SAND
		NARROWLY GRADED	Fines = ML or MH	GP-GM	<15% Sand	NARROWLY GRADED GRAVEL WITH SILT
					≥15% Sand	NARROWLY GRADED GRAVEL WITH SILT AND SAND
			Fines = CL or CH	GP-GC	<15% Sand	NARROWLY GRADED GRAVEL WITH CLAY
					≥15% Sand	NARROWLY GRADED GRAVEL WITH CLAY AND SAND
	≥15% Fines		Fines = ML or MH	GM	<15% Sand	SILTY GRAVEL
					≥15% Sand	SILTY GRAVEL WITH SAND
			Fines = CL or CH	GC	<15% Sand	CLAYEY GRAVEL
					≥15% Sand	CLAYEY GRAVEL WITH SAND
SAND % Sand ≥ % Gravel	≤5% Fines	WIDELY GRADED		SW	<15% Gravel	WIDELY GRADED SAND
					≥15% Gravel	WIDELY GRADED SAND WITH GRAVEL
		NARROWLY GRADED		SP	<15% Gravel	NARROWLY GRADED SAND
					≥15% Gravel	NARROWLY GRADED SAND WITH GRAVEL
	~10% Fines	WIDELY GRADED	Fines = ML or MH	SW-SM	<15% Gravel	WIDELY GRADED SAND WITH SILT
					≥15% Gravel	WIDELY GRADED SAND WITH SILT AND GRAVEL
			Fines = CL or CH	SW-SC	<15% Gravel	WIDELY GRADED SAND WITH CLAY
					≥15% Gravel	WIDELY GRADED SAND WITH CLAY AND GRAVEL
		NARROWLY GRADED	Fines = ML or MH	SP-SM	<15% Gravel	NARROWLY GRADED SAND WITH SILT
					≥15% Gravel	NARROWLY GRADED SAND WITH SILT AND GRAVEL
			Fines = CL or CH	SP-SC	<15% Gravel	NARROWLY GRADED SAND WITH CLAY
					≥15% Gravel	NARROWLY GRADED SAND WITH CLAY AND GRAVEL
	≥15% Fines		Fines = ML or MH	SM	<15% Gravel	SILTY SAND
					≥15% Gravel	SILTY SAND WITH GRAVEL
			Fines = CL or CH	SC	<15% Gravel	CLAYEY SAND
					≥15% Gravel	CLAYEY SAND WITH GRAVEL




ROUNDED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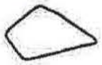
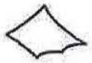

SUBANGULAR

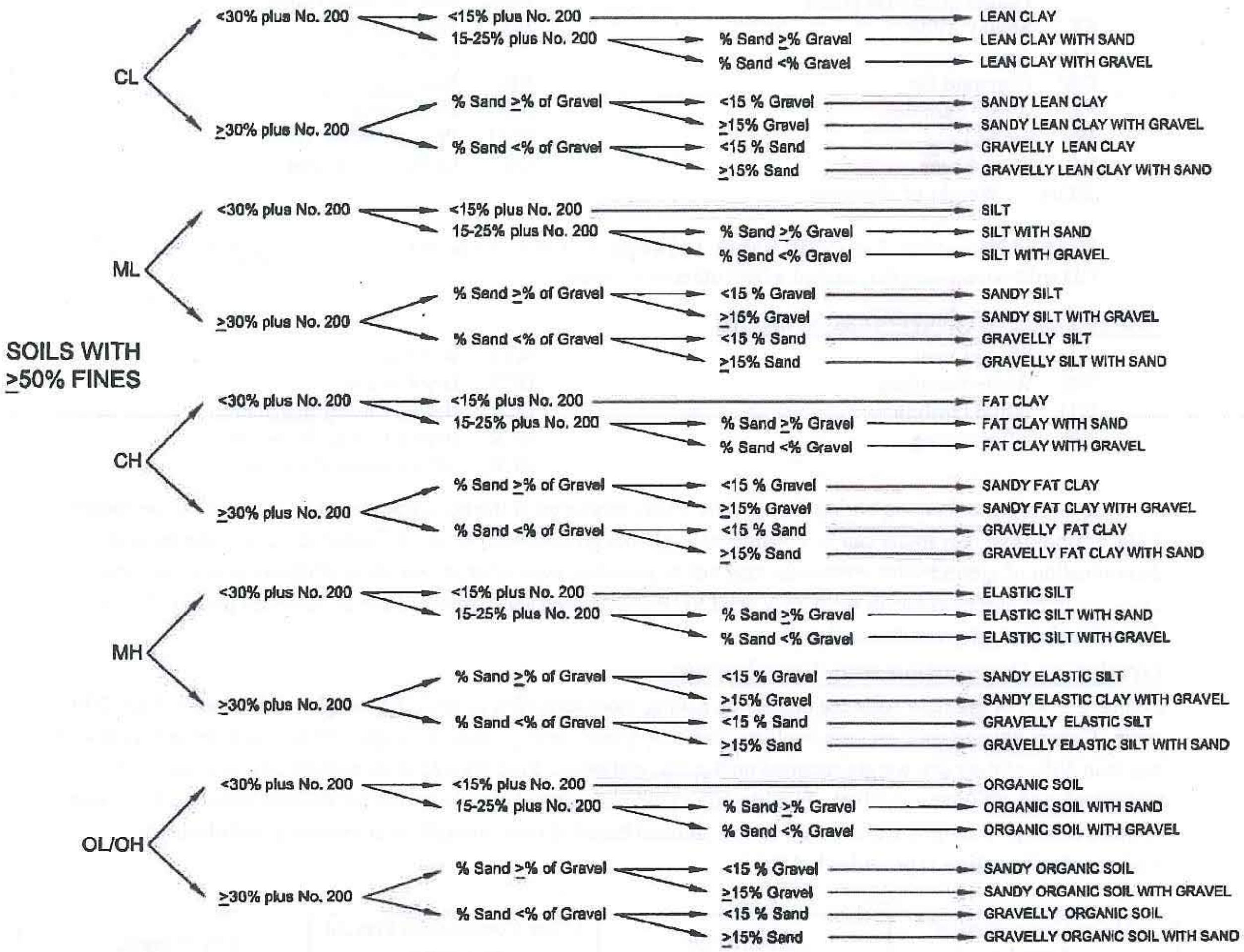

ANGULAR

1. GROUP NAME and (SYMBOL)
2. Structure , if any. (stratified layer thicknesses, lenses, varves, gradational changes)
3. Describe sand, gravel and fines components, with percentages, in order of predominance. Include max gravel size. For test pits give percent cobbles and boulders, by volume, and include max size.
4. Color
5. Sheen, odor, roots, ash, brick, cementation, reaction with HCL, etc.
6. "Fill," local name or geologic name, if known

GEI Consultants

FINE-GRAINED SOILS

VISUAL-MANUAL DESCRIPTIONS



ID OF INORGANIC FINE SOILS FROM MANUAL TESTS

Symbol	Name	Dry Strength	Dilatancy	Toughness*
ML	Silt	None to low	Slow to rapid	Low or thread cannot be formed
CL	Lean Clay	Medium to high	None to slow	Medium
MH	Elastic Silt	Low to medium	None to slow	Low to medium
CH	Fat Clay	High to very high	None	High

1. GROUP NAME and (SYMBOL)
2. Describe fines, sand, and gravel components, in order of predominance. Include plasticity of fines. Include percentages of sand and gravel.
3. Color
4. Sheen, odor, roots, ash, brick, cementation, torvane and penetrometer results, etc.
5. "Fill," local name or geologic name, if known

PEAT

Peat refers to a sample composed primarily of vegetable matter in varying stages of decomposition. The description should begin: PEAT (PT) and need not include percentages of sand, gravel or fines.

CRITERIA FOR DESCRIBING PLASTICITY

Description	Criteria
Nonplastic ML	A 1/8-in. (3 -mm) thread cannot be rolled at any water content
Low Plasticity ML, MH	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit *
Medium Plasticity MH, CL	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit
High Plasticity CH	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit

* Toughness refers to the strength of the thread near plastic limit. The lump refers to a lump of soil drier than the plastic, similar to dry strength.

GENERAL NOTES

Drilling and Sampling Symbols:

SS: Split-Spoon, 1 3/8-inch ID, 2-inch OD Unless otherwise noted
ST: Shelby Tube
PA: Power Auger
DB: Diamond Bit
AS: Auger Sample
JS: Jar Sample
VS: Vane Shear
WOH: Weight of Hammer

OS: Osterburg Sampler
HSA: Hollow Stem Auger
WS: Wash Sample
FT: Fish Tail
RB: Rock Bit
BS: Bulk Sample
PMT: Pressuremeter Test
GS: Giddings Sampler

Standard Penetration Test (STP) Value: Blows per foot of a 140-pound hammer falling 30 inches on a 2-inch OD split-spoon sampler, except where otherwise noted.

Water Level Measurement Symbols:

WL: Water Level
WS: While Sampling
WD: While Drilling
AB: After Boring

WCI: Wet Cave-in
DCI: Dry Cave-in
BCI: Before Casing Installation
BCR: Before Casing Removal
ACR: After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the time indicated. In permeable soils, the indicated elevations can be considered a reliable groundwater level. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations. In these cases, groundwater monitoring wells may need to be constructed and monitored for an extended period of time to determine the actual groundwater level.

Gradation Description and Terminology:

Coarse-grained or granular soils are defined as having more than 50% of their dry weight retained on the No. 200 sieve. Coarse grained soils include boulders, cobbles, gravel, and/or sand. Fine-grained soils are defined as having less than 50% of their dry weight retained on the No. 200 sieve. Fine grained soils include clay or clayey silt (cohesive), and silt (non-cohesive). In addition to gradation, granular soils are further defined based on their relative in-place density. Fine-grained soils are further defined based of their strength or consistency and plasticity. Additional information is provided below.

Major Component of Sample	Size Range	Other Components Present in Sample	Dry Weight, %
Boulders	Over 8 inches (200 mm)	Trace	1 to 5
Cobbles	8 inches to 3 inches (200 mm to 75 mm)	Trace to Some	5 to 12
Gravel	3 inches to No. 4 sieve	Some	12 to 34
Sand	Nos. 4 to 200 sieves (4.76 mm to 0.074 mm)	And	34 to 50
Silt	Passing No. 200 sieve (0.074 mm to 0.005 mm)		
Clay	Smaller than 0.005 mm		

Consistency of Cohesive Soils		Relative Density of Granular Soils	
Unconfined Compressive Strength, Qu, tsf	Consistency	N, blows per foot	Relative Density
<0.25	Very Soft	0 to 3	Very Loose
0.25 to 0.49	Soft	4 to 9	Loose
0.50 to 0.99	Medium (firm)	10 to 29	Medium Dense
1.0 to 1.99	Stiff	30 to 49	Dense
2.00 to 3.99	Very Stiff	50 – 80	Very Dense
4.00 to 8.00	Hard	>80	Extremely Dense
>8.00	Very Hard		

FIELD AND LABORATORY PROCEDURES

Field Sampling Procedures

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) – (ASTM Standard D-1586-99)

In the split-barrel sampling procedures, a 2-inch O.D. split-barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. The value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is only qualitative, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, frilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is place in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) - (ASTM D-1587-94)

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 identified, sealed, and carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-foot sections of thin-wall tubing, which are capable of retrieving continuous columns of soil in 5-foot maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-foot interval.

FIELD AND LABORATORY PROCEDURES

Subsurface Exploration Field Procedures

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer or a drop hammer. When the sampler is driven to the desired depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the borehole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedures, continuous flight augers are used to advance the boreholes. They are turned and hydraulically advanced by a truck, trainer, or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open boreholes.

Hollow-Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers (with open stems) are used to advance the boreholes. The open stem allows the sampling tool to be used without removing the augers from the borehole. Hollow-stem augers thus provide support to the sides of the borehole during the sampling operations.

Rotary Drilling (RD)

In employing rotary drilling methods, various cutting bits are used to advance the boreholes. In this process, surface casing and/or drilling fluids are used to maintain open boreholes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (or triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in study containers in sequential order.

FIELD AND LABORATORY PROCEDURES

Laboratory Procedures

Water Content (Wc)

The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)

In the hand penetrometer gtest, the unconfined compressive strength of a soil is determined to a maximum value of 4.5 tons per square foot (tsf) or 7.0 tsf, depending on the testing device utilized, by measuring the resistance of the soil sample to penetration by a small spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests and thereby provides a useful and a relative simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)

In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever comes first.

Dry Density (γd)

The dry density is a measure of the amount of solids in a unit volume of soil. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples

In conjunction with the sample testing program, all soil samples are examined in our laboratory and visually classified on the basis of their texture and plasticity in general accordance with the Unified Soil Classification System. The soil descriptions on the boring logs are derived from this system, as well as the component gradation terminology, consistency of cohesive soils, and relative density of granular soils, as described on a separate sheet entitled General Notes. The estimated groups symbols, included in parentheses following the soil descriptions on the boring logs, are in general conformance with the Unified Soil Classification System (USCS).

FIELD AND LABORATORY PROCEDURES

Standard Boring Log Procedures

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets, and samples.

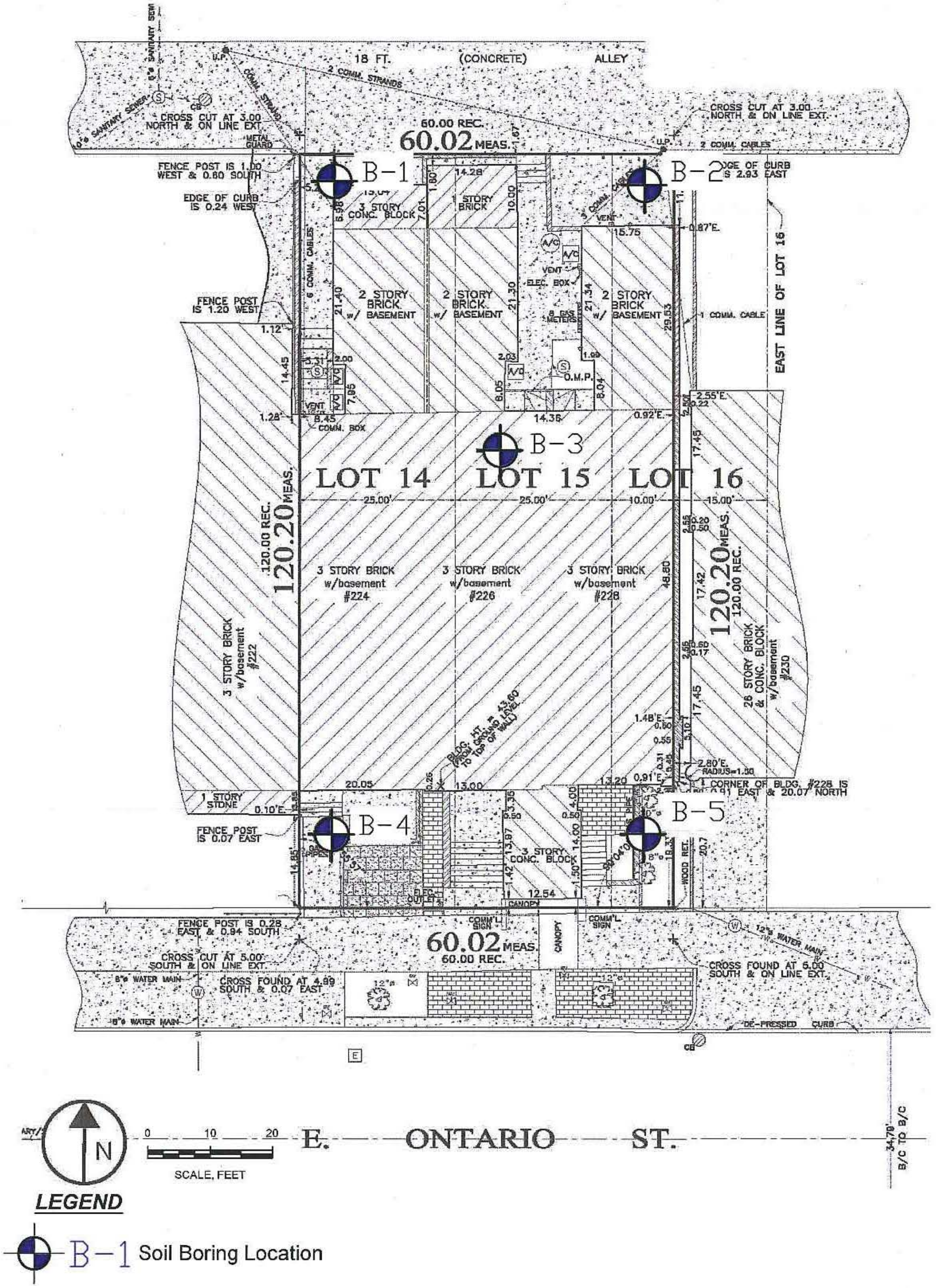
Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations, and procedures.

Samples obtained in the field are frequently subjected to additional testing an re-classification in the laboratory by experienced Geotechnical Engineers; and therefore, differences between the field logs and the final logs may exist. The engineer preparing the report reviews the field logs, laboratory test data, and classifications and then, using judgement and experience in interpreting this data, may make further changes. It is common practice in the geotechnical engineering profession not to include field logs and laboratory data sheets in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for 60 days and then discarded, unless special disposition is requested by our client. Samples retained over a long period of time, even though in sealed jars, are subject to moisture loss, which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples need to recognize this factor.

Appendix B

Soil Boring Location Diagram



224-228 East Ontario
Chicago, IL

GEI Consultants

Soil Boring Location Diagram

Project 1414680

January 20, 2015

Fig. 1

K:\SMASHotels\1414680 224 East Ontario\Engineering\SBLD

Appendix C

Soil Boring Logs

GEI Consultants

CLIENT:
SMASHotels Chicago, LLC

PROJECT NAME:
224 East Ontario

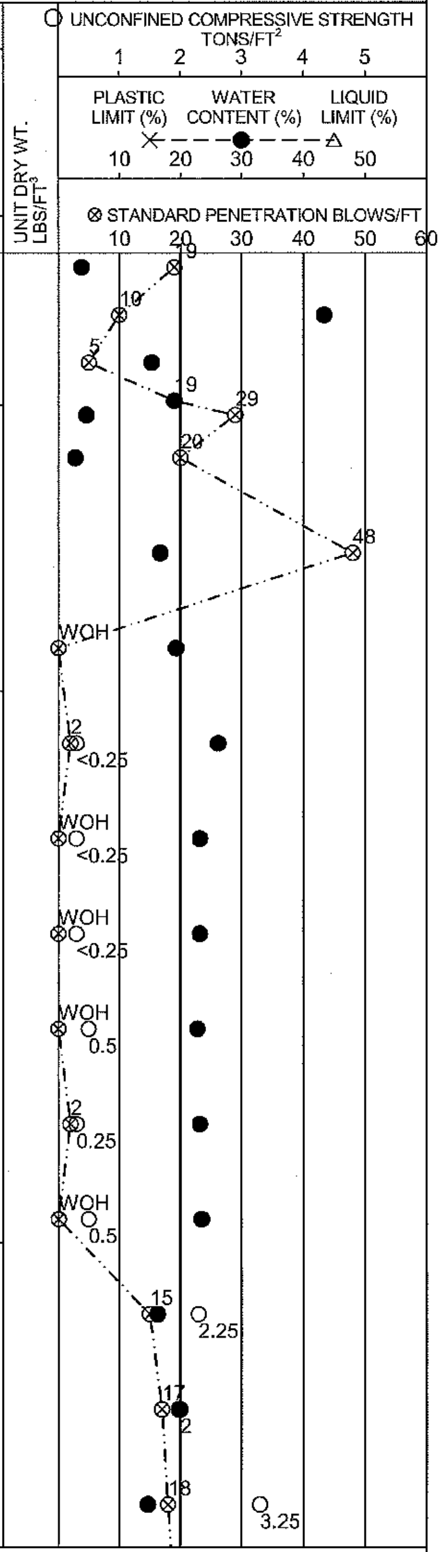
LOG OF BORING NUMBER **B-1**

ARCHITECT-ENGINEER
Koo and Associates / HP

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

SURFACE ELEVATION (ft.) 12.7

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		1	SS	Fill: Sandy gravel - little clay seams - trace wood and brick - brown, black and gray - dry - loose to medium dense
	10	2	SS	
5		3	SS	
		4	SS	8.0 Fine to medium sand - little silt - trace gravel - brown - moist to saturated below 16.0' - medium dense (SM)
		4A	SS	
10		5	SS	
	0			
15		6	SS	
20		7	SS	
	-10			23.0 Silty clay - trace sand and gravel - gray - soft (CL)
25		8	SS	
30		9	SS	
	-20			
35		10	SS	
40		11	SS	
	-30			
45		12	SS	
50		13	SS	
	-40			52.0 Silty clay - trace sand, gravel and shale - gray - very stiff to hard (CL)
55		14	SS	
60		15	SS	
	-50			
65		16	SS	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 16 ft WS	BORING STARTED 12/24/2014	GEI OFFICE Vernon Hills, IL	
	BORING COMPLETED 12/30/2014	ENTERED BY LJE	APPROVED BY PLZ
NORTHING 115.8000 EASTING 5.5000	RIG/FOREMAN CME-75 / Malouf (Strata)	GEI PROJECT NO. 1414680	PAGE NO. 1 OF 2

GEI Consultants

CLIENT:
SMASHotels Chicago, LLC

LOG OF BORING NUMBER **B-1**

PROJECT NAME:
224 East Ontario

ARCHITECT-ENGINEER
Koo and Associates / HP

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

DESCRIPTION OF MATERIAL

SURFACE ELEVATION (ft.) 12.7

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE
70	-60	17	SS
75		18	SS
80	-70	19	SS
85		20	SS
90	-80	21	SS
95		22	SS
100	-90	23	SS
		24	SS
105		25	SS
110	-100		
115			
120	-110		
125			
130	-120		
135			

Note: Moist hairline fine sand lens encountered in Sample No. 17

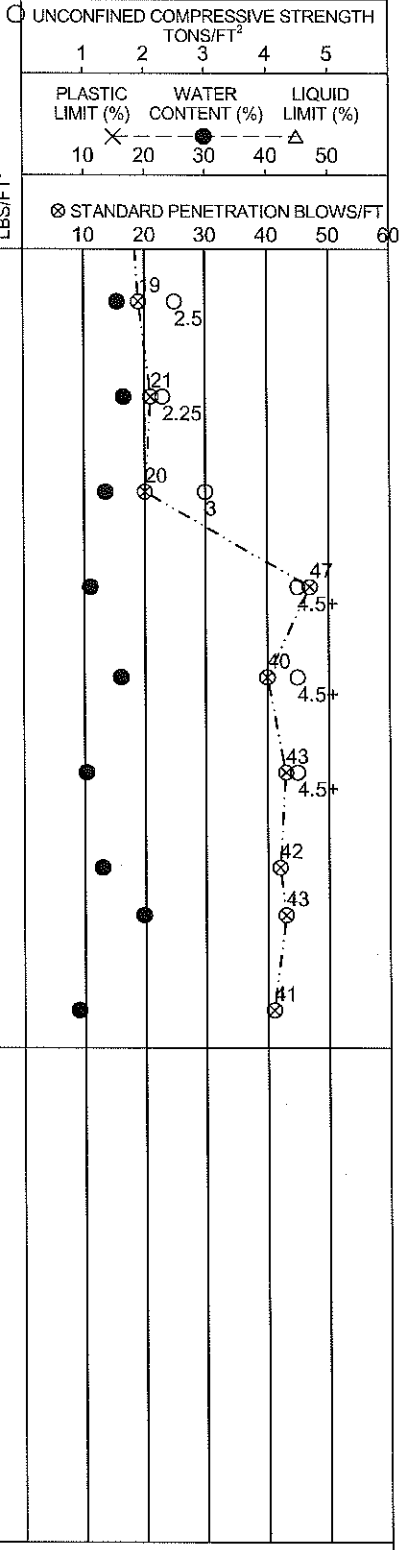
89.0
Clayey silt and silty clay - trace sand and gravel - gray - hard (CL-ML)
Note: Moist silt lenses encountered in Sample No. 21
Pressuremeter Test from 90.0 to 92.5 feet
P_o = 5.5 tsf, P_f > 37.9 tsf, E_d = 1025 tsf

98.0
Silt - little clay - gray - saturated - very dense (ML)
Pressuremeter Test from 100.0 to 102.5 feet
P_o = 7.0 tsf, P_f = 23.5 tsf, E_d = 257 tsf

105.0
Silty clay and clayey silt - trace sand and gravel - gray - hard (CL-ML)
Pressuremeter Test from 107.5 to 110.0 feet
P_o = 8.0 tsf, P_f = 26.0 tsf, E_d = 335 tsf

110.0
End of Boring
Boring advanced to 20.0 feet with solid stem auger
Boring advanced from 20.0 feet to 110.0 feet with rock bit and drilling fluid
30 feet of 4 inch casing used
Boring grouted upon completion

UNIT DRY WT. LBS/FT³



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 16 ft WS	BORING STARTED 12/24/2014	GEI OFFICE Vernon Hills, IL	
	BORING COMPLETED 12/30/2014	ENTERED BY LJE	APPROVED BY PLZ
NORTHING 115.8000 EASTING 5.5000	RIG/FOREMAN CME-75 / Malouf (Strata)	GEI PROJECT NO. 1414680	PAGE NO. 2 OF 2

GEI Consultants

CLIENT: **SMASHotels Chicago, LLC**

LOG OF BORING NUMBER **B-2**

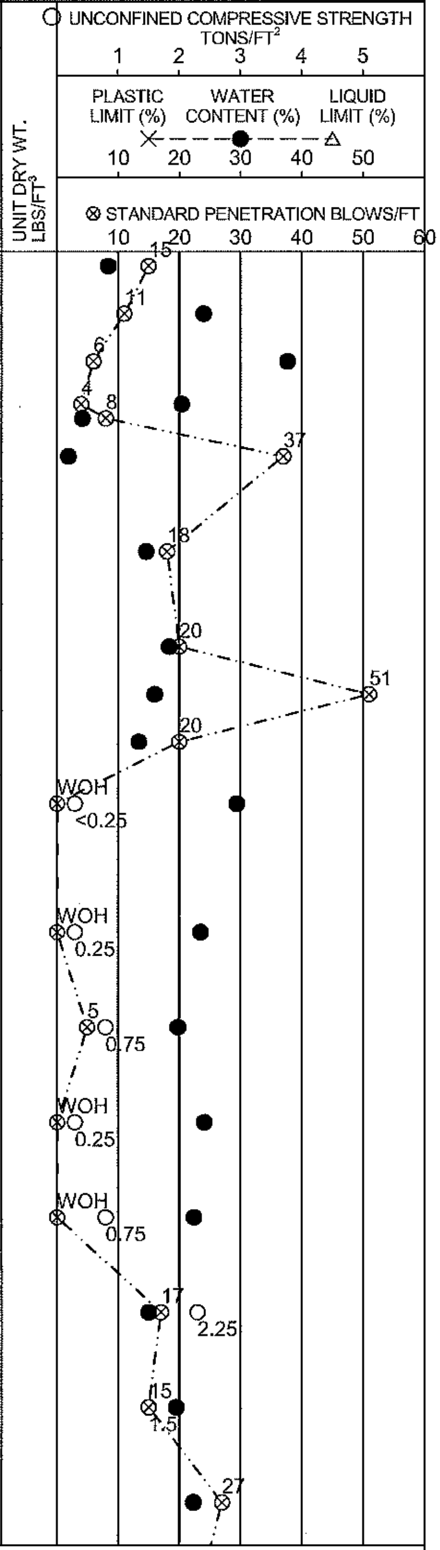
PROJECT NAME: **224 East Ontario**

ARCHITECT-ENGINEER **Koo and Associates / HP**

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

SURFACE ELEVATION (ft.) 13.0

SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
1	SS	Fill: Sandy gravel - little clay - trace wood and brick - brown, black and gray - moist - loose to medium dense ***Note: Sample No. 2 clayey***
2	SS	
3	SS	
4	SS	
4A	SS	8.5 Fine to medium sand - little silt - little to trace gravel - brown - moist to saturated below 15.0' - medium dense to dense (SM)
5	SS	
6	SS	
7	SS	
8	SS	22.0 Sandy gravel - little silt - brown - saturated - very dense to medium dense (GW)
9	SS	
10	SS	27.5 Silty clay - trace sand and gravel - gray - soft to medium (CL) **Vane Shear Test with vane tip at 31.5 feet** **Peak S_u = 625 psf -- Remolded S_u = 250 psf**
11	SS	
12	SS	**Vane Shear Test with vane tip at 39.5 feet** **Peak S_u = 650 psf -- Remolded S_u = 400 psf**
13	SS	
14	SS	**Vane Shear Test with vane tip at 50.0 feet** **Peak S_u = 950 psf -- Remolded S_u = 575 psf**
15	SS	52.5 Silty clay - trace sand and gravel - gray - very stiff to stiff (CL)
16	SS	
17	SS	***Note: Sample No. 17 disturbed by gravel and sand, no Qp obtained***



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 15 ft WS, 16 ft BCR, 14 ft ACR	BORING STARTED 12/24/2014	GEI OFFICE Vernon Hills, IL	
	BORING COMPLETED 12/24/2014	ENTERED BY LJE	APPROVED BY PLZ
NORTHING 115.2500 EASTING 55.4000	RIG/FOREMAN CME-75 / Malouf (Strata)	GEI PROJECT NO. 1414680	PAGE NO. 1 OF 2

GEI Consultants

CLIENT:
SMASHotels Chicago, LLC

LOG OF BORING NUMBER **B-2**

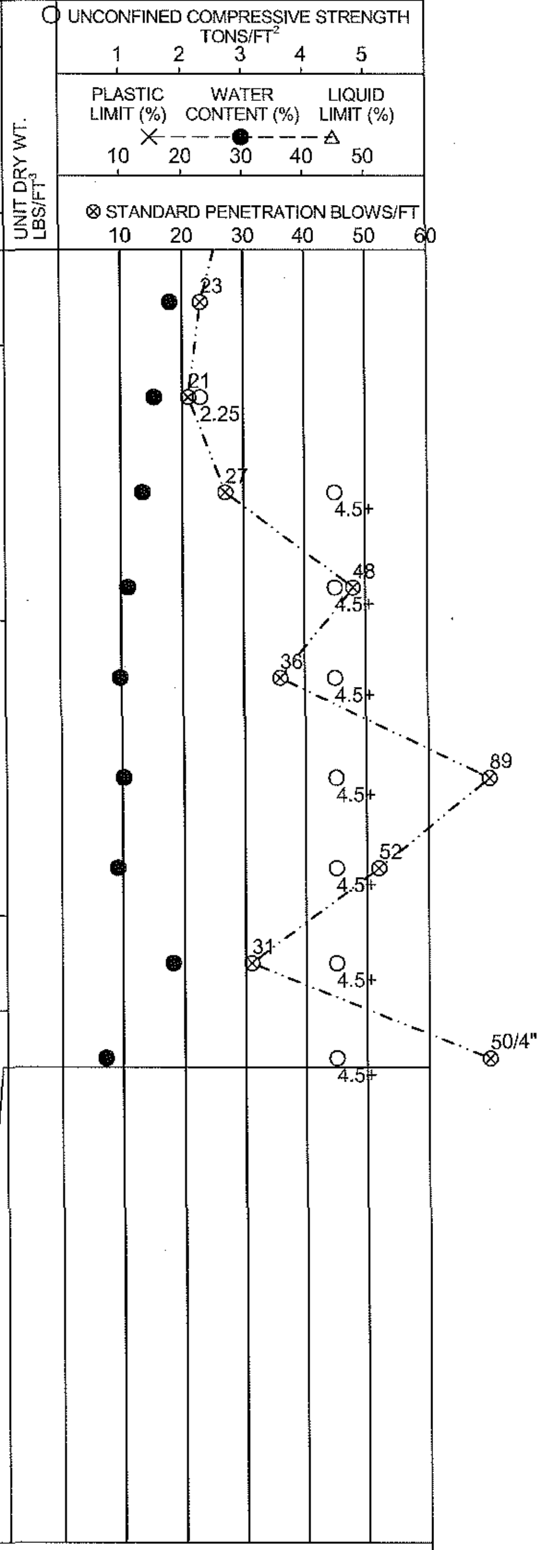
PROJECT NAME:
224 East Ontario

ARCHITECT-ENGINEER
Koo and Associates / HP

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

SURFACE ELEVATION (ft.) 13.0

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT³
70		18	SS			*Note: Sample No. 18 disturbed by gravel and sand, no Qp obtained*	
	-60					73.0 Silty clay - trace sand and gravel - gray - very stiff to hard (CL)	
75		19	SS				
80		20	SS				
	-70						
85		21	SS				
						87.5 Silty clay and clayey silt - gray - hard (CL-ML)	
90		22	SS				
	-80						
95		23	SS				
100		24	SS				
	-90					103.0 Silt - little clay - gray - saturated - very dense (ML)	
105		25	SS				
						108.0 Silty clay and clayey silt - trace sand and gravel - gray (CL-ML)	
110		26	SS			*Note: Sample No. 26 possibly dried in transit*	
	-100					111.0 End of Boring Boring advanced to 20.0 feet with solid stem auger Boring advanced from 20.0 feet to 110.0 feet with rock bit and drilling fluid 30 feet of 4 inch casing used Boring grouted upon completion	
115							
120							
	-110						
125							
130							
	-120						
135							



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 15 ft WS, 16 ft BCR, 14 ft ACR

BORING STARTED
12/24/2014

BORING COMPLETED
12/24/2014

GEI OFFICE
Vernon Hills, IL

ENTERED BY
LJE

APPROVED BY
PLZ

NORTHING
115.2500

EASTING
55.4000

RIG/FOREMAN
CME-75 / Malouf (Strata)

GEI PROJECT NO.
1414680

GEI Consultants

CLIENT:
SMASHotels Chicago, LLC

LOG OF BORING NUMBER **B-3**

PROJECT NAME:
224 East Ontario

ARCHITECT-ENGINEER
Koo and Associates / HP

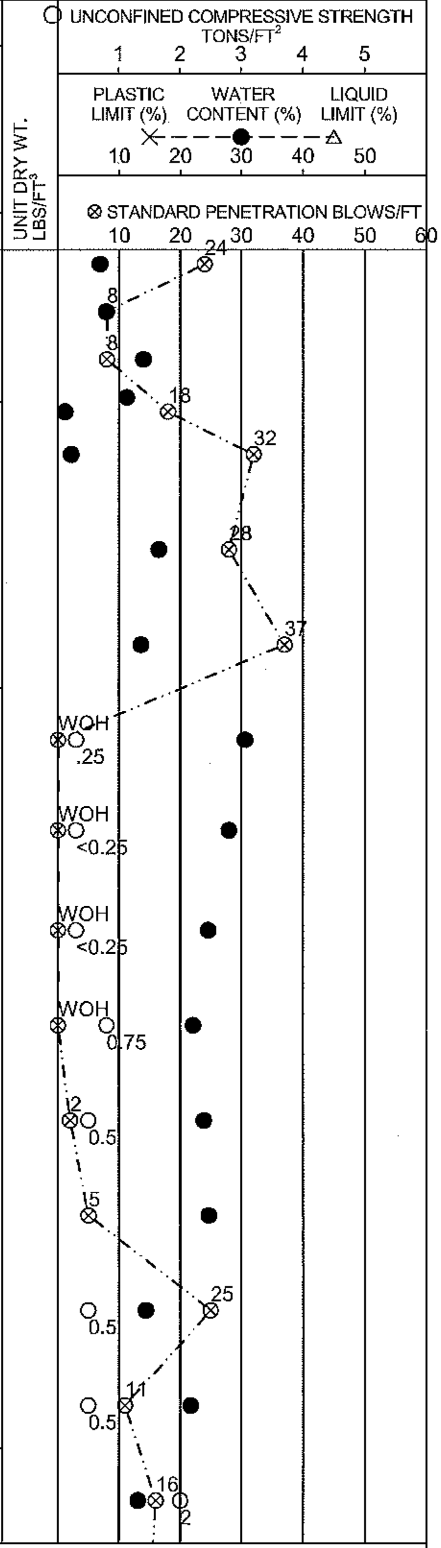
LOCATION: 224 - 228 East Ontario Street, Chicago, IL

DESCRIPTION OF MATERIAL

SURFACE ELEVATION (ft.) 12.4

UNIT DRY WT. LBS/FT³

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
	10	1 2	SS SS	Fill: Sandy gravel - little silt - trace wood, slag and brick - brown, black and gray - dry - medium dense to loose
5		3 4	SS SS	
10		4A 5	SS SS	8.0 Fine to medium sand - little silt - little to trace gravel - brown - dry to moist to saturated below 12.5' - medium dense to dense (SM)
15	0	6	SS	
20		7	SS	***Note: Coarse, gravelly near 20.0'***
25	-10	8	SS	23.0 Silty clay - trace sand and gravel - gray - soft (CL) ***Note: Sample No. 10 disturbed, small sandy lens***
30		9	SS	
35	-20	10	SS	
40		11	SS	
45	-30	12	SS	
50		13	SS	***Sample No. 13 disturbed, no Qp obtained***
55	-40	14	SS	
60		15	SS	
65	-50	16	SS	63.0 Silty clay - trace sand, gravel and shale - gray - very stiff (CL)



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 12.5 ft WD, 15 ft BCR, 12 ft ACR

BORING STARTED **12/23/2014**

BORING COMPLETED **12/23/2014**

GEI OFFICE **Vernon Hills, IL**

ENTERED BY **LJE**

APPROVED BY **PLZ**

NORTHING **73.0000**

EASTING **32.2500**

RIG/FOREMAN **CME-75 / Malouf (Strata)**

GEI PROJECT NO. **1414680**

PAGE NO. **1** OF **2**

MIDWEST BORING LOG 1414680-224 E ONTARIO - PLZ.GPJ GEI DATA TEMPLATE.GDT 1/21/15

GEI Consultants

CLIENT:
SMASHotels Chicago, LLC

PROJECT NAME:
224 East Ontario

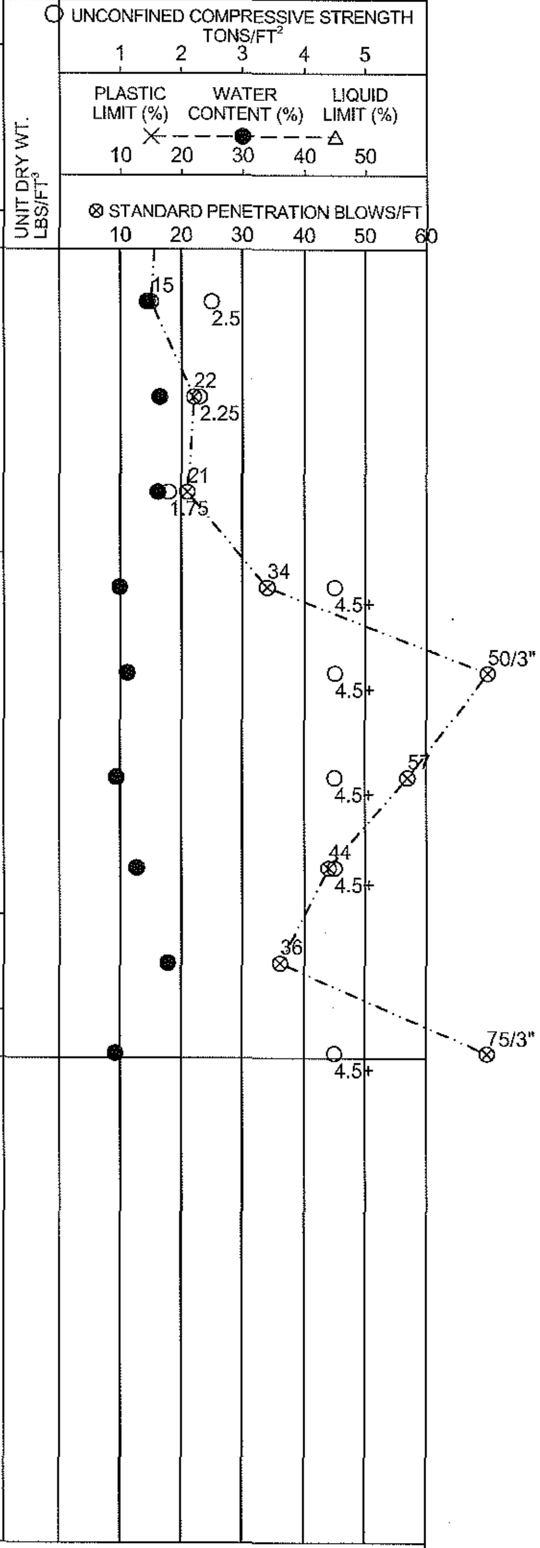
LOG OF BORING NUMBER **B-3**

ARCHITECT-ENGINEER
Koo and Associates / HP

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

SURFACE ELEVATION (ft.) 12.4

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
70		17	SS	
	-60			
75		18	SS	
80		19	SS	
	-70			
85		20	SS	84.0 Silty clay and clayey silt - trace sand and gravel - gray - hard (CL-ML) ***Note: Sample No. 20 < 1" sand lens/seam, moist to wet*** **Pressuremeter Test from 85.0 to 87.5 feet** **P_o = 4.5 tsf, P_f = 15.8 tsf, E_d = 390 tsf** **Pressuremeter Test from 90.0 to 92.5 feet** **P_o = 6.0 tsf, P_f > 32.6 tsf, E_d = 646 tsf** **Pressuremeter Test from 95.0 to 97.5 feet** **P_o = 6.5 tsf, P_f = 25.6 tsf, E_d = 444 tsf**
90		21	SS	
	-80			
95		22	SS	
100		23	SS	
	-90			
105		24	SS	103.0 Silt - gray - saturated - very dense (ML)
110		25	SS	108.0 Silty clay - little gravel - gray - hard (CL-ML)
	-100			110.5 End of Boring Boring advanced to 15.0 feet with solid stem auger Boring advanced from 15.0 feet to 110.0 feet with rock bit and drilling fluid 25 feet of 4 inch casing used Boring grouted upon completion
115				
120				
	-110			
125				
130				
	-120			
135				



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 12.5 ft WD, 15 ft BCR, 12 ft ACR

BORING STARTED
12/23/2014

BORING COMPLETED
12/23/2014

GEI OFFICE
Vernon Hills, IL

ENTERED BY
LJE

APPROVED BY
PLZ

NORTHING
73.0000

EASTING
32.2500

RIG/FOREMAN
CME-75 / Malouf (Strata)

GEI PROJECT NO.
1414680

GEI Consultants

CLIENT:
SMASHotels Chicago, LLC

PROJECT NAME:
224 East Ontario

LOG OF BORING NUMBER **B-4**

ARCHITECT-ENGINEER
Koo and Associates / HP

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

DESCRIPTION OF MATERIAL

SURFACE ELEVATION (ft.) 12.3

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE
	10	1	SS
		2	SS
5		3	SS
		4	SS
		4A	SS
10		5	SS
	0		
15		6	SS
20		7	SS
	-10		
25		8	SS
30			
	-20	9	SS
35			
		10	SS
40			
	-30		
45		11	SS
50		12	SS
	-40		
55		13	SS
60		14	SS
	-50		
65		15	SS

Fill: Sandy gravel - little silt and brick - black and red - loose to medium dense

8.0
Fine to medium sand - little silt and gravel - brown - moist to saturated below 15.0' - loose (SM)

23.0
Silty clay - trace sand - gray - soft (CL)

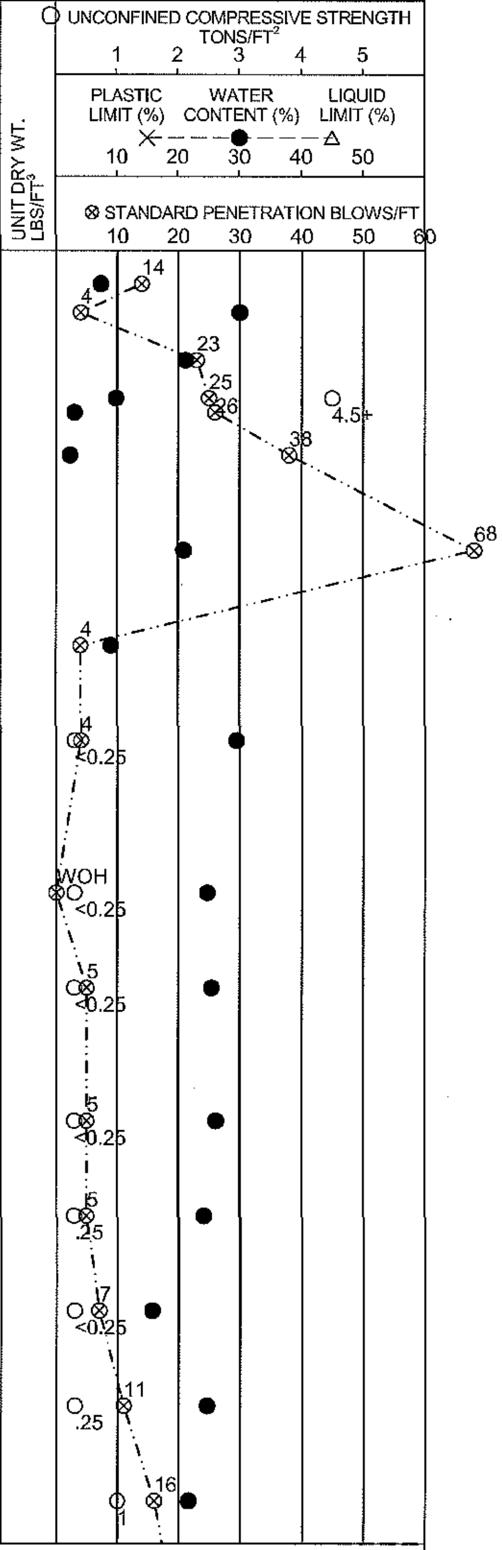
Vane Shear Test with vane tip at 33.0 feet
Peak S_u = 600 psf -- Remolded S_u = 425 psf

Vane Shear Test with vane tip at 38.0 feet
Peak S_u > 1050 psf

Vane Shear Test with vane tip at 43.0 feet
Peak S_u = 1225 psf -- Remolded S_u = 775 psf

63.0
Silty clay - trace sand and gravel - gray - stiff (CL)

UNIT DRY WT. LBS/FT³



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 18 ft BCR, 18 ft ACR	BORING STARTED 12/24/2014	GEI OFFICE Vernon Hills, IL	
	BORING COMPLETED 12/30/2014	ENTERED BY LJE	APPROVED BY PLZ
NORTHING 11.6000 EASTING 5.2000	RIG/FOREMAN CME-75 / Malouf/Baker (Strata)	GEI PROJECT NO. 1414680	PAGE NO. 1 OF 2

GEI Consultants

CLIENT: **SMASHotels Chicago, LLC**

PROJECT NAME: **224 East Ontario**

LOG OF BORING NUMBER **B-4**

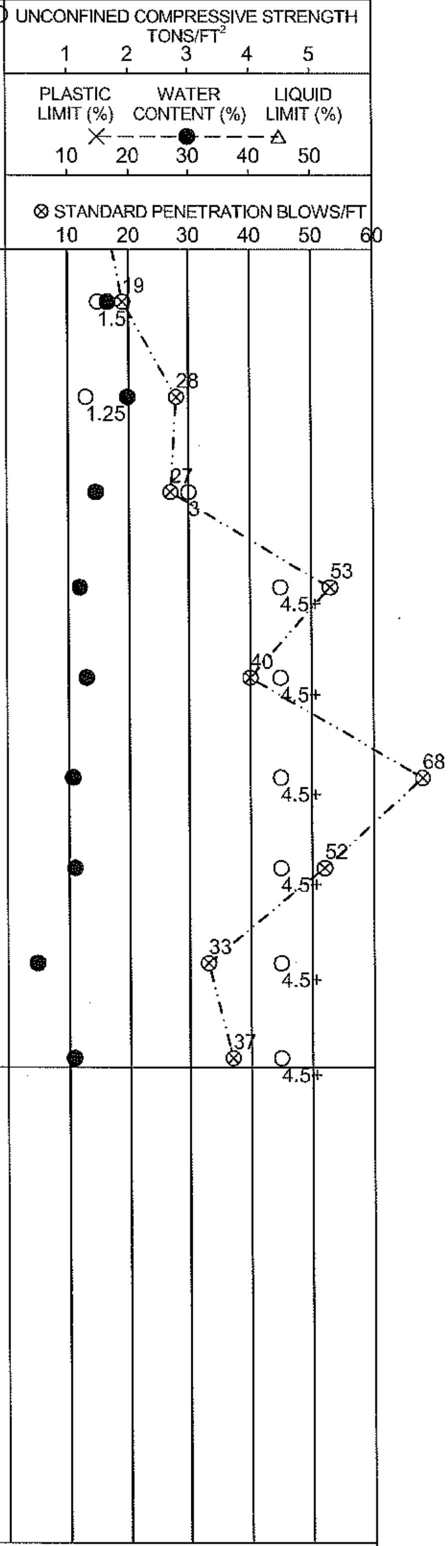
ARCHITECT-ENGINEER **Koo and Associates / HP**

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

SURFACE ELEVATION (ft.) 12.3

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
70	-60	16	SS	
75		17	SS	
80	-70	18	SS	
85		19	SS	84.0 Silty clay and clayey silt - trace sand and gravel - gray - hard (CL-ML)
90	-80	20	SS	*Note: Sample No. 20 gravelly*
95		21	SS	
100	-90	22	SS	*Note: Thin dry silt lenses encountered in Sample No. 24*
105		23	SS	103.0 Clayey silt - gray - saturated - very dense (ML)
110	-100	24	SS	108.0 Silty clay - trace sand - gray - hard (CL)
115				111.0 End of Boring Boring advanced to 10.0 feet with solid stem auger Boring advanced from 10.0 feet to 110.0 feet with rock bit and drilling fluid 30 feet of 4 inch casing used Boring grouted upon completion
120	-110			
125				
130	-120			
135				

UNIT DRY WT. LBS/FT³



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 18 ft BCR, 18 ft ACR	BORING STARTED 12/24/2014	GEI OFFICE Vernon Hills, IL	
	BORING COMPLETED 12/30/2014	ENTERED BY LJE	APPROVED BY PLZ
NORTHING 11.6000 EASTING 5.2000	RIG/FOREMAN CME-75 / Malouf/Baker (Strata)	GEI PROJECT NO. 1414680	PAGE NO. 2 OF 2

GEI Consultants

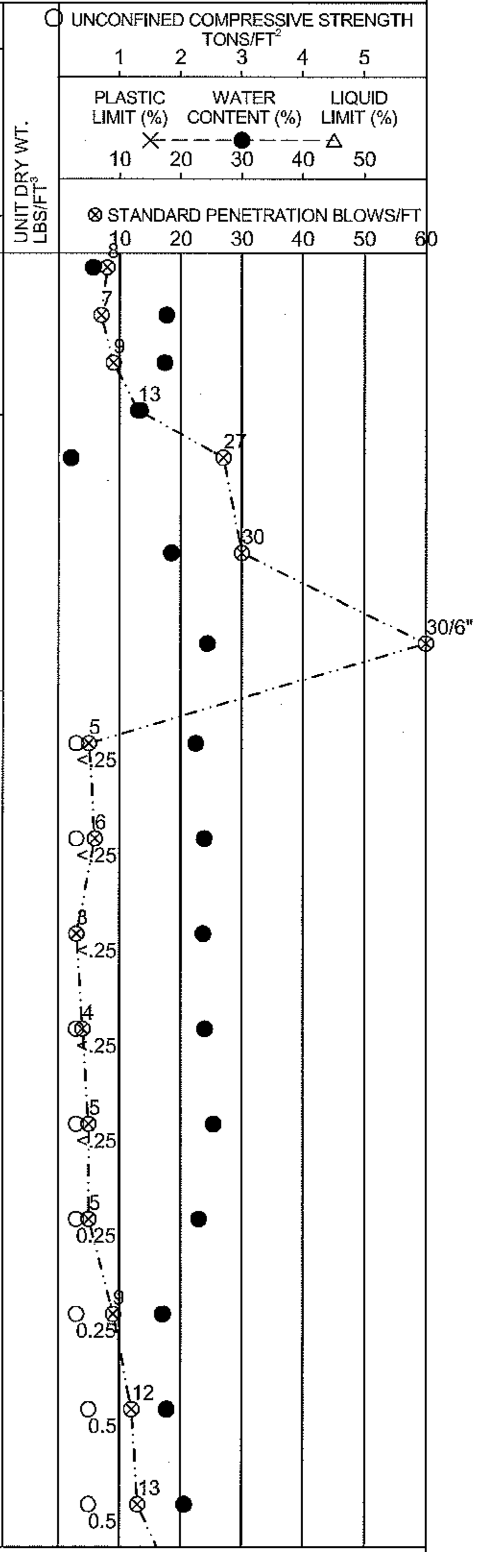
CLIENT: **SMASHotels Chicago, LLC**	LOG OF BORING NUMBER **B-5**
PROJECT NAME: **224 East Ontario**	ARCHITECT-ENGINEER **Koo and Associates / HP**

LOCATION: 224 - 228 East Ontario Street, Chicago, IL

DESCRIPTION OF MATERIAL

SURFACE ELEVATION (ft.) 12.0

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
	10	1	SS	Fill: Sandy gravel to sandy clay - with clayey layers and seams - little brick and cinders - trace wood - black and gray - loose - dry
		2	SS	
5		3	SS	
		4	SS	
		4A		8.5 Fine to medium sand - little silt - trace gravel - brown - medium dense to very dense - moist to saturated (SP-SM)
10		5	SS	
	0			
15		6	SS	Note: Saturated below 15 feet
20		7	SS	
	-10			23.0 Silty clay - trace gravel and sand - gray - soft to medium (CL)
25		8	SS	
30		9	SS	
	-20			
35		10	SS	
40		11	SS	
	-30			
45		12	SS	
50		13	SS	
	-40			
55		14	SS	
60		15	SS	
	-50			
65		16	SS	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 12.5 ft WD, 15 ft ACR	BORING STARTED 12/24/2014	GEI OFFICE Vernon Hills, IL	
	BORING COMPLETED 1/14/2015	ENTERED BY PLZ	APPROVED BY RCR
NORTHING 11.6000 EASTING 55.2000	RIG/FOREMAN CME-75 / Malouf/Baker (Strata)	GEI PROJECT NO. 1414680	PAGE NO. 1 OF 2

GEI Consultants

CLIENT: **SMASHotels Chicago, LLC**	LOG OF BORING NUMBER **B-5**
PROJECT NAME: **224 East Ontario**	ARCHITECT-ENGINEER **Koo and Associates / HP**

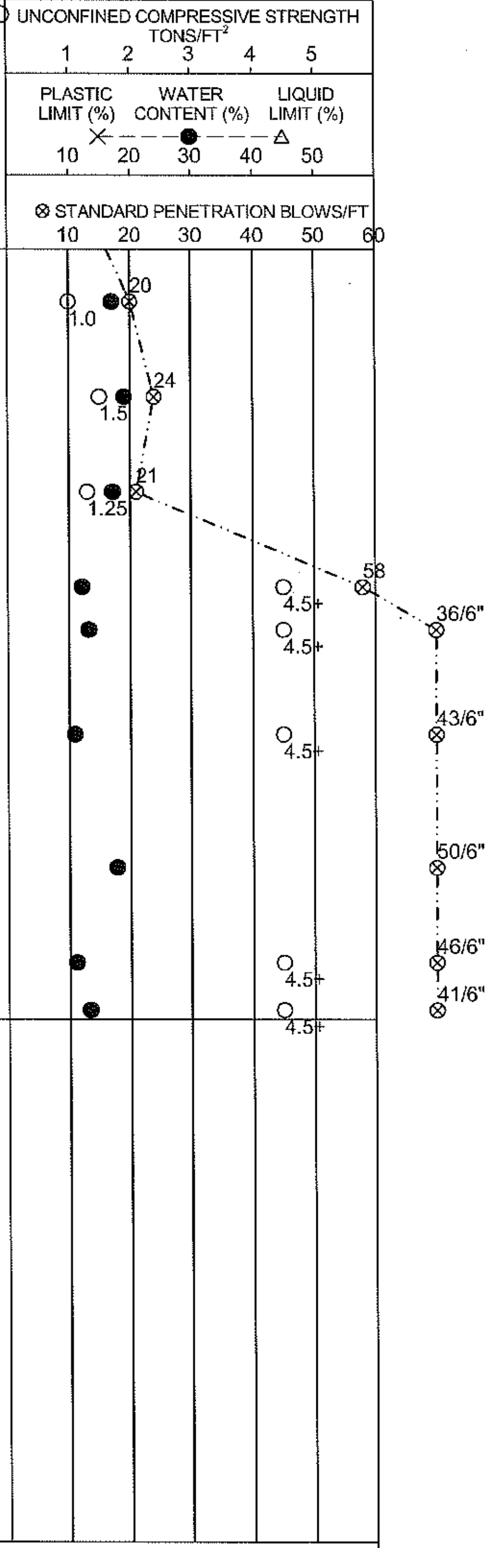
LOCATION: 224 - 228 East Ontario Street, Chicago, IL

DESCRIPTION OF MATERIAL

SURFACE ELEVATION (ft.) 12.0

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL
70	-60	17	SS			68.0 Silty clay - trace gravel and sand - gray - stiff (CL)
75		18	SS			
80	-70	19	SS			
85		20	SS			83.0 Silty clay and clayey silt - trace sand and gravel - gray - hard (CL-ML)
		21	SS			**Pressuremeter Test from 87.5 to 90.0 feet** **P_o = 5.0 tsf, P_f = 20.0 tsf, E_d = 413 tsf**
90	-80	22	SS			**Pressuremeter Test from 93.0 to 95.5 feet** **P_o = 5.0 tsf, P_f = 28.7 tsf, E_d = 561 tsf**
95						
100	-90	23	SS			98.0 Silt - gray - very dense - saturated (ML)
105		24	SS			103.0 Silty clay and clayey silt - trace sand and gravel - hard (CL-ML0
		25	SS			**Pressuremeter Test from 105.0 to 107.5 feet** **P_o = 6.0 tsf, P_f = 30.0 tsf, E_d = 434 tsf**
110	-100					108.5 End of Boring Boring advanced to 15.0 feet with solid stem auger Boring advanced from 15.0 feet to 108.5 feet with rock bit and drilling fluid 30 feet of 4 inch casing used Boring grouted upon completion
115						
120	-110					
125						
130	-120					
135						

UNIT DRY WT. LBS/FT³

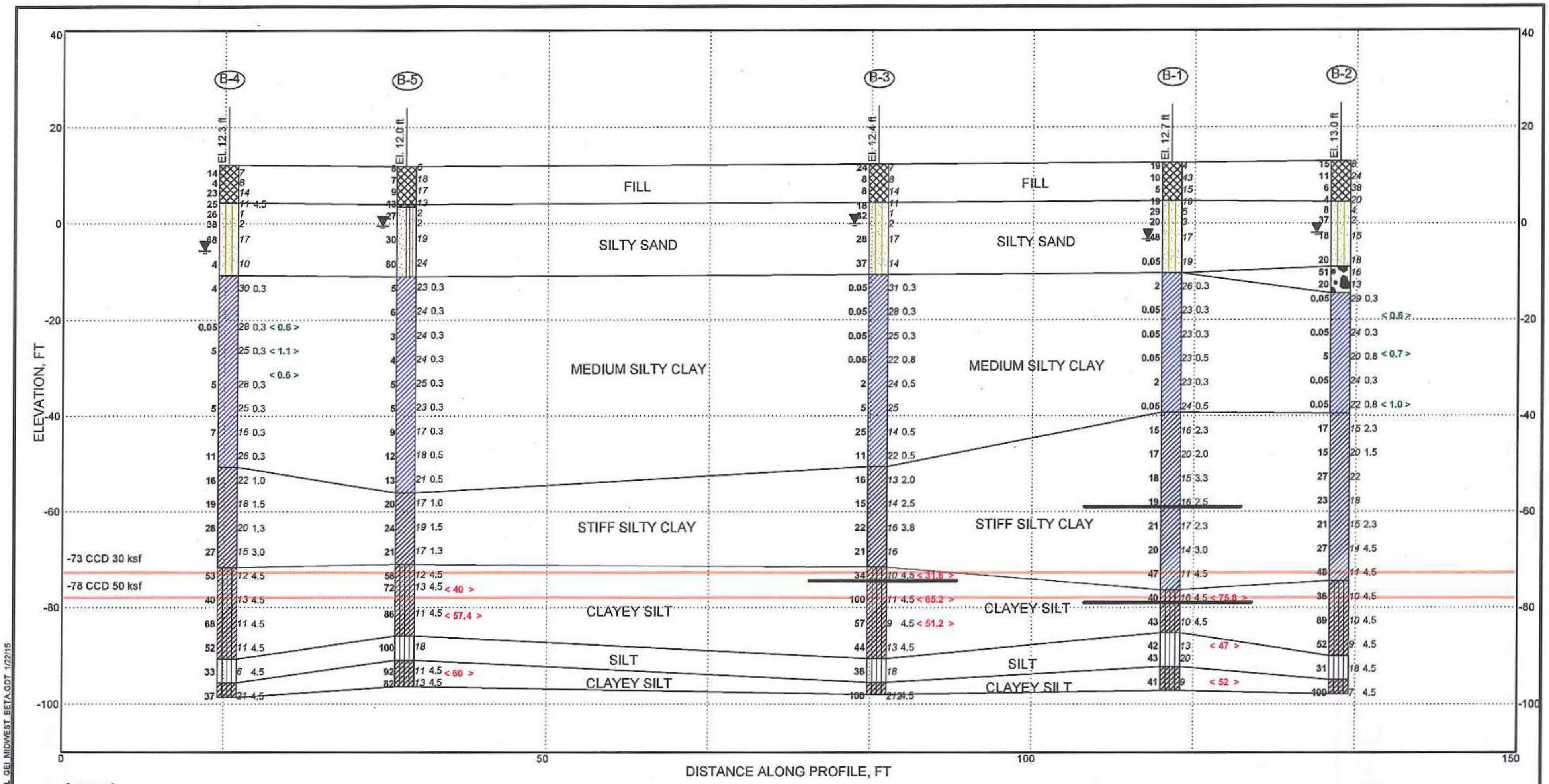


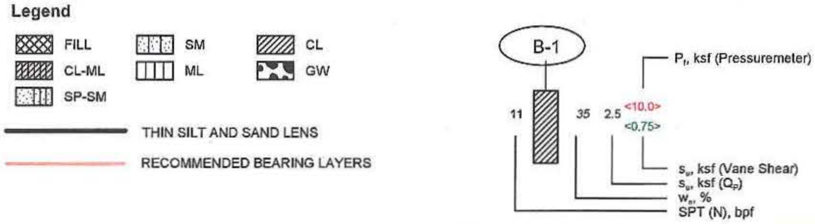
The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WATER LEVEL: 12.5 ft WD, 15 ft ACR	BORING STARTED 12/24/2014	GEI OFFICE Vernon Hills, IL	
	BORING COMPLETED 1/14/2015	ENTERED BY PLZ	APPROVED BY RCR
NORTHING 11.6000 EASTING 55.2000	RIG/FOREMAN CME-75 / Malouf/Baker (Strata)	GEI PROJECT NO. 1414680	PAGE NO. 2 OF 2

Appendix D

Soil Profile





DRAWING IS SHOWN WITH A 6x VERTICAL EXAGERATION

0 20 40

APPROXIMATE VERTICAL SCALE: 1 inch = 20 ft

0 10 20

APPROXIMATE HORIZONTAL SCALE: 1 inch = 120 ft

224 East Ontario
Chicago, IL

SMASHotels
Chicago, IL

GEI Consultants

Project: 1414680

SOIL PROFILE

January 2015

Fig. 1

Proj. No.-## djm 01/22/2015

GEI 11X17 FENCE GEO 224EONTARIO.GPJ TPL GEI MIDWEST BETA.GDT 1/22/15

Appendix E

Vane Shear Test Results

Project: 224 E Ontario
GEI Number:1414680

Vane Shear Tests Results

OPERATOR: STRATA (Dan/Mark)

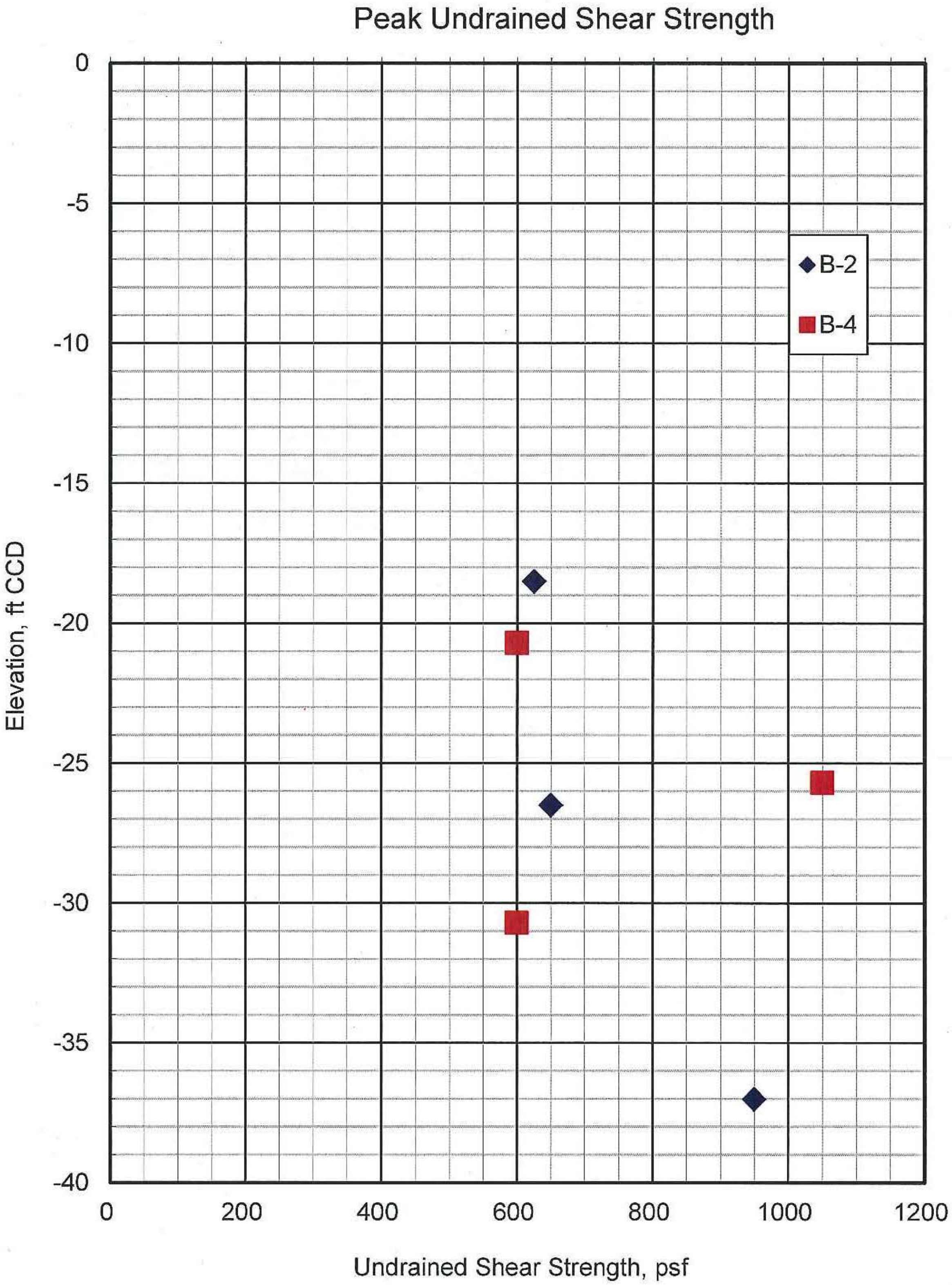
SURFACE ELEVATION:
B-2 13.0 Feet
B-4 12.3 Feet

*VANE SIZE
2.0 = SMALL (11CM X 5CM) VANE
1.0 = MEDIUM (13CM X 6.5 CM) VANE
0.5 = LARGE (17.2CM X 8CM) VANE

Vane Constant,K: 1.0624

DATA REDUCTION: PLZ CHECKED BY: RCR

BORING NO.	VANE TIP DEPTH (ft)	VANE	a (in)	PEAK S_u (tsf)	PEAK S_u (psf)	a (in)	REMOLDED S_u (tsf)	REMOLDED S_u (psf)	SENSITIVITY PEAK/REM.	VANE TIP ELEVATION (ft)
B-2	31.5	0.5	2.25	0.31	625	0.91	0.12	250	2.5	-18.5
B-2	39.5	0.5	2.34	0.32	650	1.47	0.20	400	1.6	-26.5
B-2	50.0	0.5	3.47	0.48	950	2.09	0.29	575	1.7	-37.0
B-4	33.0	0.5	2.16	0.30	600	1.53	0.21	425	1.4	-20.7
B-4	38.0	0.5	>3.81	>0.52	>1050	Test reached maximum capacity				-25.7
B-4	43.0	0.5	2.20	0.30	600	1.41	0.19	375	1.6	-30.7


Peak Undrained Shear Strength
B-2
B-4
Elevation, ft CCD
0
-5
-10
-15
-20
-25
-30
-35
-40
0
200
400
600
800
1000
1200
Undrained Shear Strength, psf

Appendix F

Pressuremeter Test Results

Project Name: 228 E. Ontario, Chicago, IL
GEI Project Number: 1414680
Operator: RCR
Engineer: PZ
Date: January 15, 2015

PRESSUREMETER TEST RESULTS

BORING NUMBER	TEST DEPTH (ft)	P_o (tsf)	P_f (tsf)	P_l (tsf)	E_d (tsf)	E^+ (tsf)	E_d/E^+	E_d/P_l	P_l/P_f
B-1	90.0 to 92.5	5.5	>37.9	>75.0	1025	3636	0.28	-	-
	100.0 to 102.5	7.0	23.5	47.5	257	683	0.38	5.4	2.0
	107.5 to 110.0	8.0	26.0	65.8	335	1095	0.31	5.1	2.5
B-3	85.0 to 87.5	4.5	15.8	32.9	390	809	0.48	11.9	2.1
	90.0 to 92.5	6.0	>32.6	>65.0	646	1228	0.53	-	-
	95.0 to 97.5	6.5	25.6	57.0	444	1035	0.43	7.8	2.2
B-5	87.5 to 90.0	5.0	20.0	50.7	413	1097	0.38	8.1	2.5
	93.0 to 95.5	5.0	28.7	>57	561	1795	0.31	-	-
	105.0 to 107.5	6.0	30.0	>60	434	1067	0.41	-	-

	P_o	P_f	P_l	E_d	E^+	E_d/E^+	E_d/P_l	P_l/P_f
AVERAGE:	5.5	24.0	NE	481	1172	0.37	8.1	2.5

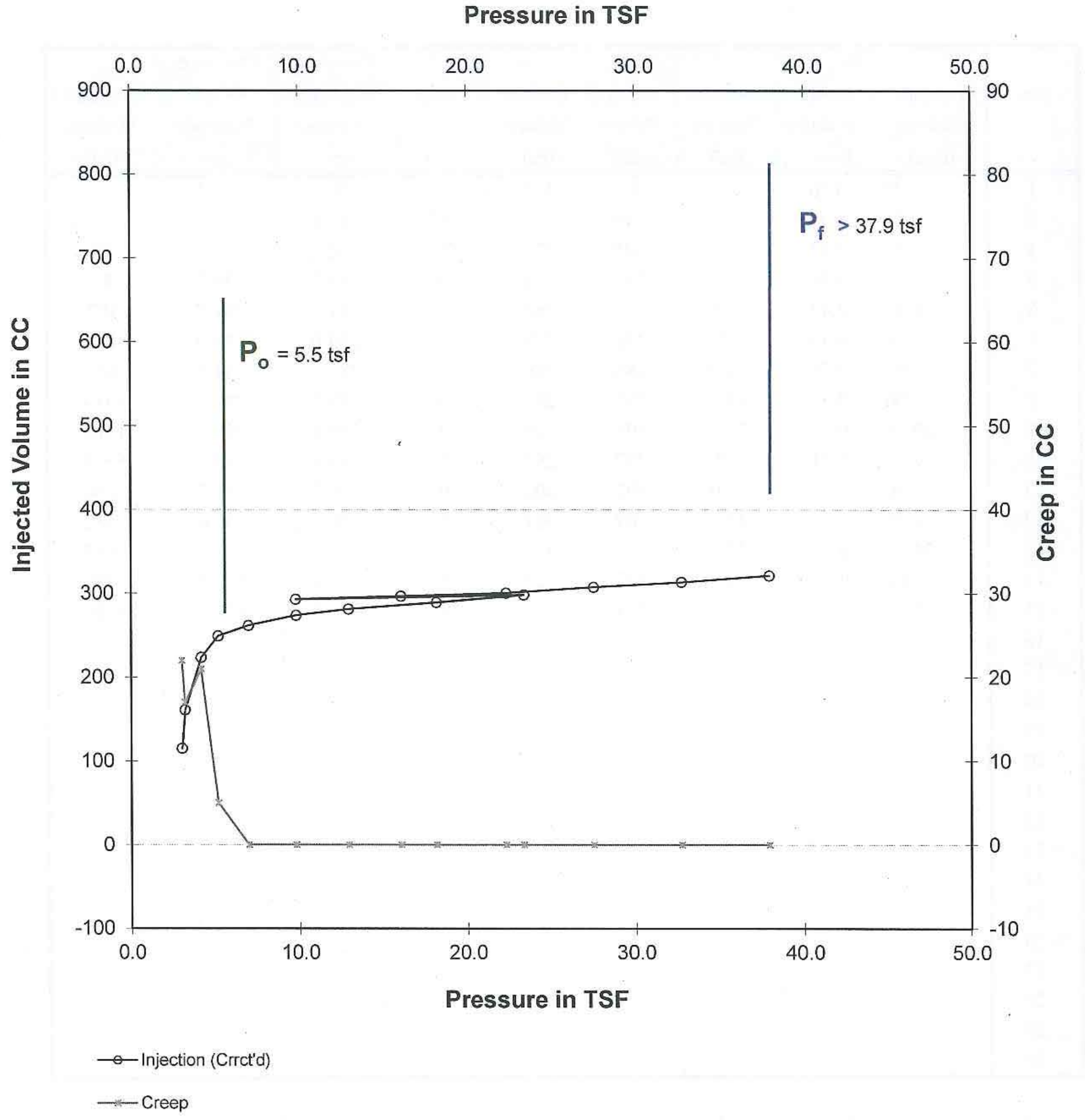
* -- Oversized Test Zone

** -- Unstable Test Zone

Pressuremeter Data Reduction (BX)

Project Name: 228 E. Ontario, Chicago, IL
GEI Job #: 1414680
Test Date: December 30, 2014
Operator: RCR
Engineer: PZ
Boring No.: B-1

Test Depth (ft): 90.0 to 92.5



E_d = 1025 TSF
E^+ = 3636 TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name: 228 E. Ontario, Chicago, IL
GEI Job Number: 1414680
Test Date: Tuesday, December 30, 2014
Boring No.: B-1
Test Depth (ft): 90.0 to 92.5

Operator: RCR
Engineer: PZ
Instr. Hght (ft): 3
Water Correction: 2.87

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.25	0.26	3.0	95	117	22	93.1	115.1	
2	0.50	0.34	3.2	146	163	17	144.0	161.0	7
3	1.50	0.43	4.1	205	226	21	202.7	223.7	29
4	2.50	0.46	5.1	247	252	5	244.3	249.3	81
5	4.25	0.47	6.9	265	265	0	261.7	261.7	307
6	7.00	0.49	9.8	278	278	0	274.0	274.0	498
7	10.00	0.50	12.9	286	286	0	281.3	281.3	921
8	15.00	0.51	18.1	295	295	0	289.3	289.3	1414
9	20.00	0.52	23.3	305	305	0	298.4	298.4	1268
10	7.00	0.51	9.8	297	297	0	293.0	293.0	5524
11	13.00	0.52	16.0	302	302	0	296.7	296.7	3690
12	19.00	0.52	22.3	307	307	0	300.6	300.6	3582
13	24.00	0.53	27.5	315	315	0	307.6	307.6	1662
14	29.00	0.54	32.7	322	322	0	313.5	313.5	1980
15	34.00	0.55	37.9	331	331	0	321.4	321.4	1500
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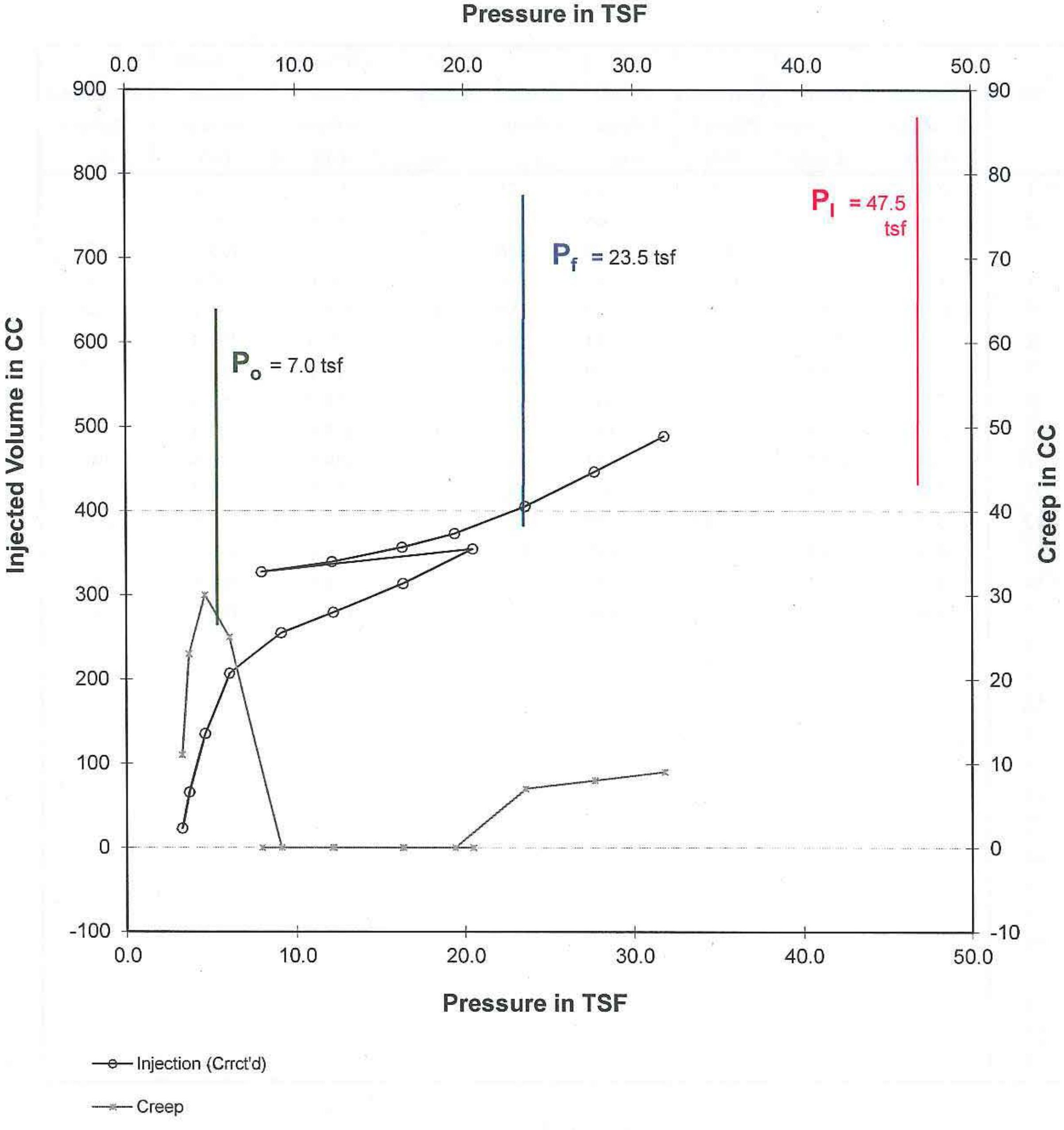
E_d= 1025 TSF E^+= 3636 TSF P_l= NE TSF

Pressuremeter Data Reduction (BX)

Project Name: 228 E. Ontario
GEI Job #: 1414680
Test Date: December 30, 2014
Operator: RCR
Engineer: PZ
Boring No.: B-1

Test Depth (ft): 100.0 to 102.5



E_d = 257 TSF
E^+ = 683 TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name: 228 E. Ontario
GEI Job Number: 1414680
Test Date: Tuesday, December 30, 2014
Boring No.: B-1
Test Depth (ft): 100.0 to 102.5

Operator: RCR
Engineer: PZ
Instr. Hght (ft): 3
Water Correction: 3.18

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.07	3.2	14	25	11	12.0	23.0	
2	0.50	0.17	3.7	45	68	23	42.8	65.8	15
3	1.50	0.30	4.6	108	138	30	105.5	135.5	22
4	3.00	0.41	6.0	185	210	25	182.0	207.0	38
5	6.00	0.47	9.1	259	259	0	255.1	255.1	130
6	9.00	0.50	12.2	284	284	0	279.4	279.4	272
7	13.00	0.54	16.3	319	319	0	313.7	313.7	267
8	17.00	0.59	20.5	361	361	0	354.9	354.9	231
9	5.00	0.55	8.0	331	331	0	327.4	327.4	1059
10	9.00	0.57	12.1	344	344	0	339.5	339.5	799
11	13.00	0.59	16.3	362	362	0	356.7	356.7	567
12	16.00	0.61	19.4	379	379	0	373.1	373.1	453
13	20.00	0.64	23.5	405	412	7	398.4	405.4	316
14	24.00	0.69	27.7	446	454	8	438.6	446.6	256
15	28.00	0.74	31.8	488	497	9	479.7	488.7	261
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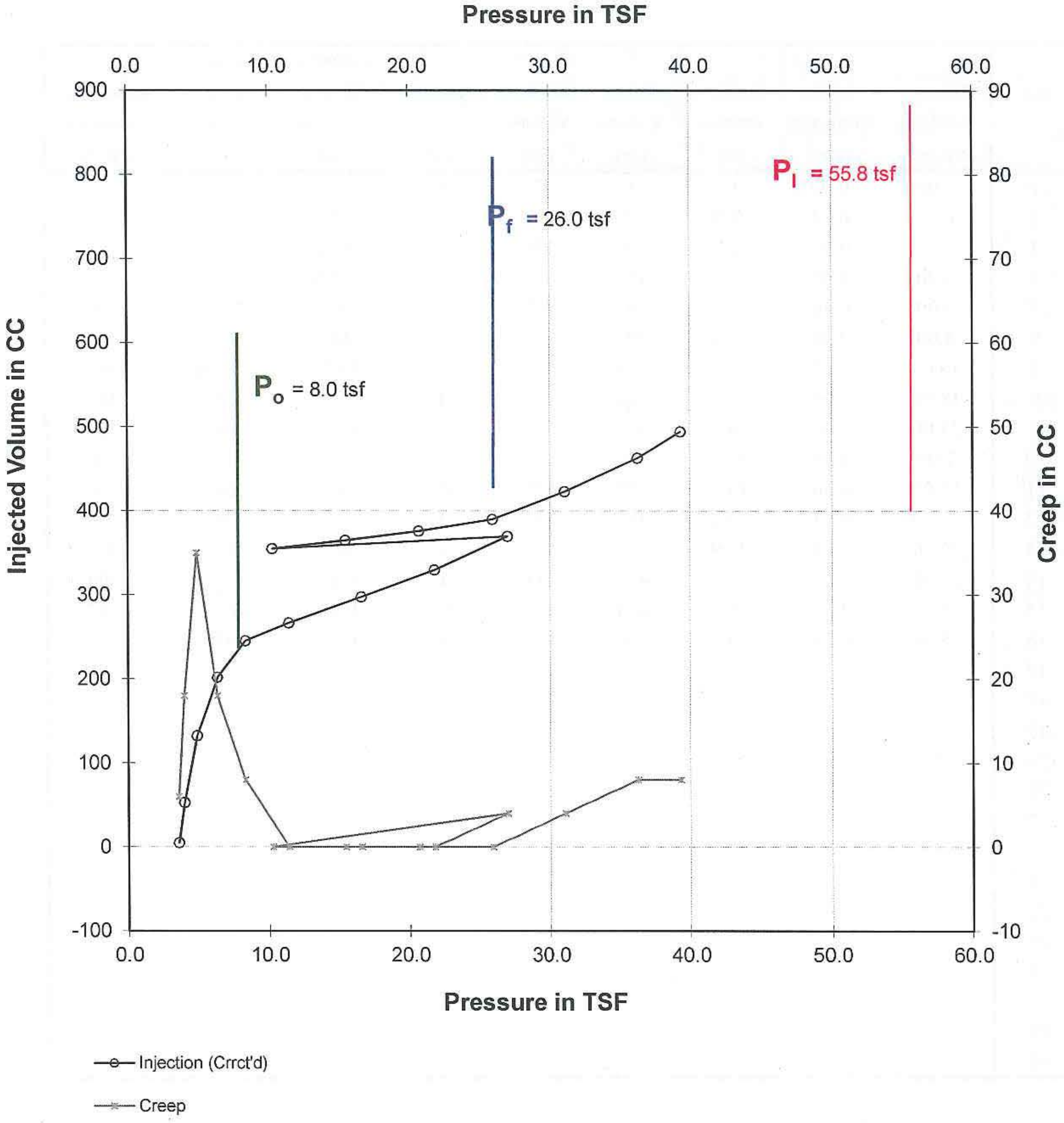
E_d= 257 TSF E^+= 683 TSF P_l= 47.5 TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name: 228 E. Ontario
GEI Job #: 1414680
Test Date: December 30, 2014
Operator: RCR
Engineer: PZ
Boring No.: B-1

Test Depth (ft): 107.5 to 110.0



E_d = 335 TSF
E^+ = 1095 TSF

Pressuremeter Data Reduction (BX)

Project Name: 228 E. Ontario
GEI Job Number: 1414680
Test Date: Tuesday, December 30, 2014
Boring No.: B-1
Test Depth (ft): 107.5 to 110.0

Operator: RCR
Engineer: PZ
Instr. Hght (ft): 3
Water Correction: 3.41

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.02	3.5	1	7	6	-1.1	4.9	
2	0.50	0.14	3.9	37	55	18	34.7	52.7	12
3	1.50	0.30	4.8	100	135	35	97.4	132.4	19
4	3.00	0.40	6.3	187	205	18	183.9	201.9	39
5	5.00	0.46	8.3	241	249	8	237.3	245.3	94
6	8.00	0.48	11.4	271	271	0	266.6	266.6	307
7	13.00	0.52	16.6	303	303	0	297.6	297.6	363
8	18.00	0.56	21.8	336	336	0	329.7	329.7	365
9	23.00	0.60	26.9	373	377	4	365.7	369.7	304
10	7.00	0.58	10.3	359	359	0	354.9	354.9	2683
11	12.00	0.60	15.5	370	370	0	364.8	364.8	1245
12	17.00	0.61	20.7	382	382	0	375.9	375.9	1133
13	22.00	0.63	25.9	397	397	0	389.9	389.9	906
14	27.00	0.67	31.1	427	431	4	418.9	422.9	394
15	32.00	0.71	36.2	464	472	8	454.8	462.8	337
16	35.00	0.74	39.3	496	504	8	486.1	494.1	267
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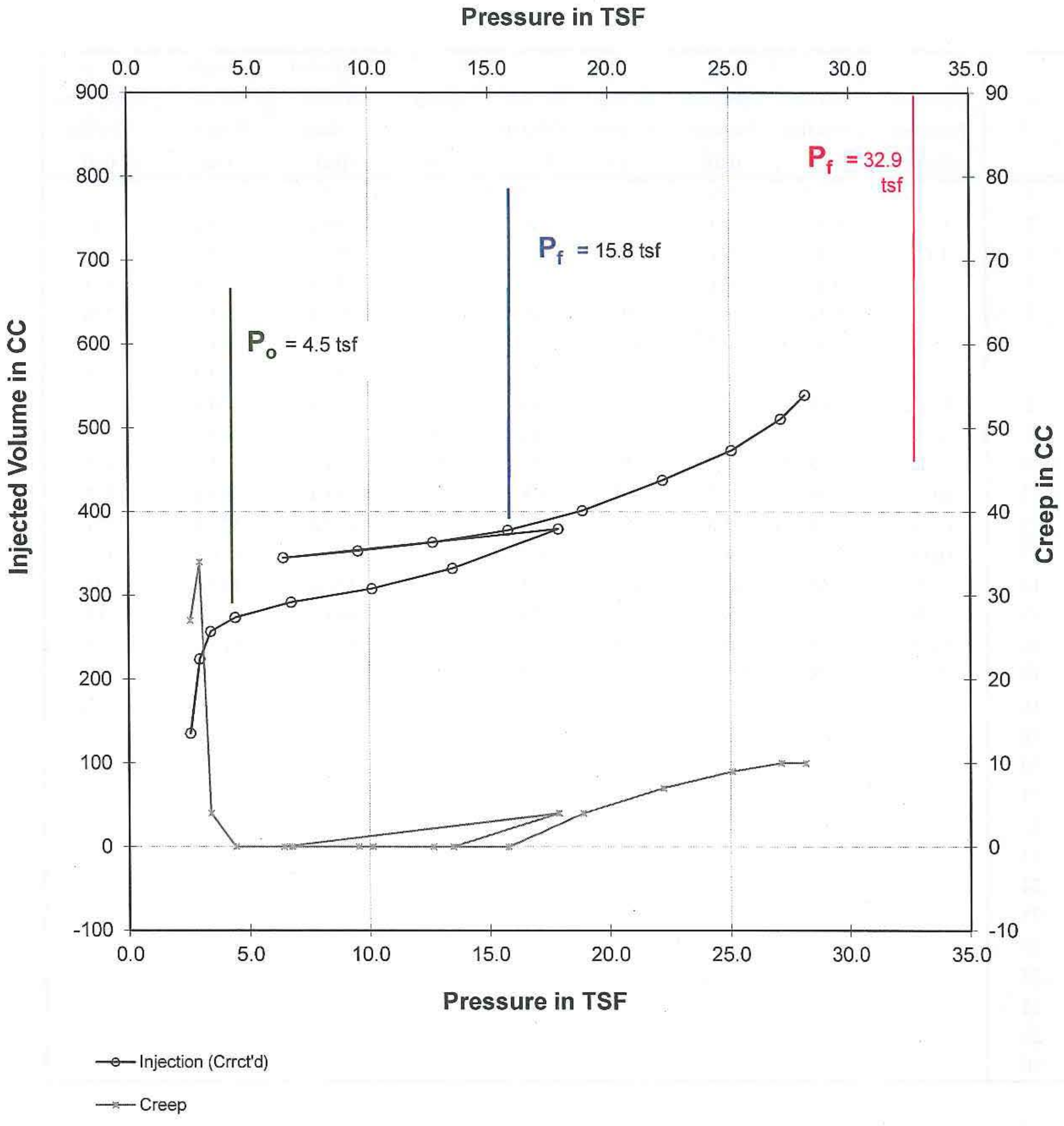
E_d= 335 TSF E^+= 1095 TSF P_l= 55.8 TSF

Pressuremeter Data Reduction (BX)

Project Name:	228 E. Ontario, Chicago, IL	Operator:	RCR
GEI Job #:	1414680	Engineer:	PZ
Test Date:	December 23, 2014	Boring No.:	B-3

Test Depth (ft): 85.0 to 87.5



E_d = 390 TSF

E^+ = 809 TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name: 228 E. Ontario, Chicago, IL
GEI Job Number: 1414680
Test Date: Tuesday, December 23, 2014
Boring No.: B-3
Test Depth (ft): 85.0 to 87.5

Operator: RCR
Engineer: PZ
Instr. Hght (ft): 3
Water Correction: 2.72

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.30	2.5	110	137	27	108.3	135.3	
2	0.50	0.43	2.9	192	226	34	190.2	224.2	8
3	1.00	0.47	3.4	255	259	4	253.0	257.0	30
4	2.00	0.49	4.4	276	276	0	273.5	273.5	131
5	4.25	0.51	6.7	295	295	0	291.8	291.8	278
6	7.50	0.53	10.1	312	312	0	307.9	307.9	465
7	10.75	0.56	13.5	337	337	0	332.2	332.2	315
8	15.00	0.61	17.9	381	385	4	375.4	379.4	220
9	4.00	0.57	6.4	348	348	0	344.9	344.9	791
10	7.00	0.58	9.5	357	357	0	353.0	353.0	900
11	10.00	0.59	12.7	368	368	0	363.4	363.4	718
12	13.00	0.61	15.8	383	383	0	377.8	377.8	521
13	16.00	0.64	18.9	403	407	4	397.2	401.2	326
14	19.25	0.68	22.2	437	444	7	430.6	437.6	234
15	22.00	0.72	25.1	471	480	9	464.1	473.1	210
16	24.00	0.76	27.1	508	518	10	500.7	510.7	149
17	25.00	0.79	28.1	537	547	10	529.5	539.5	99
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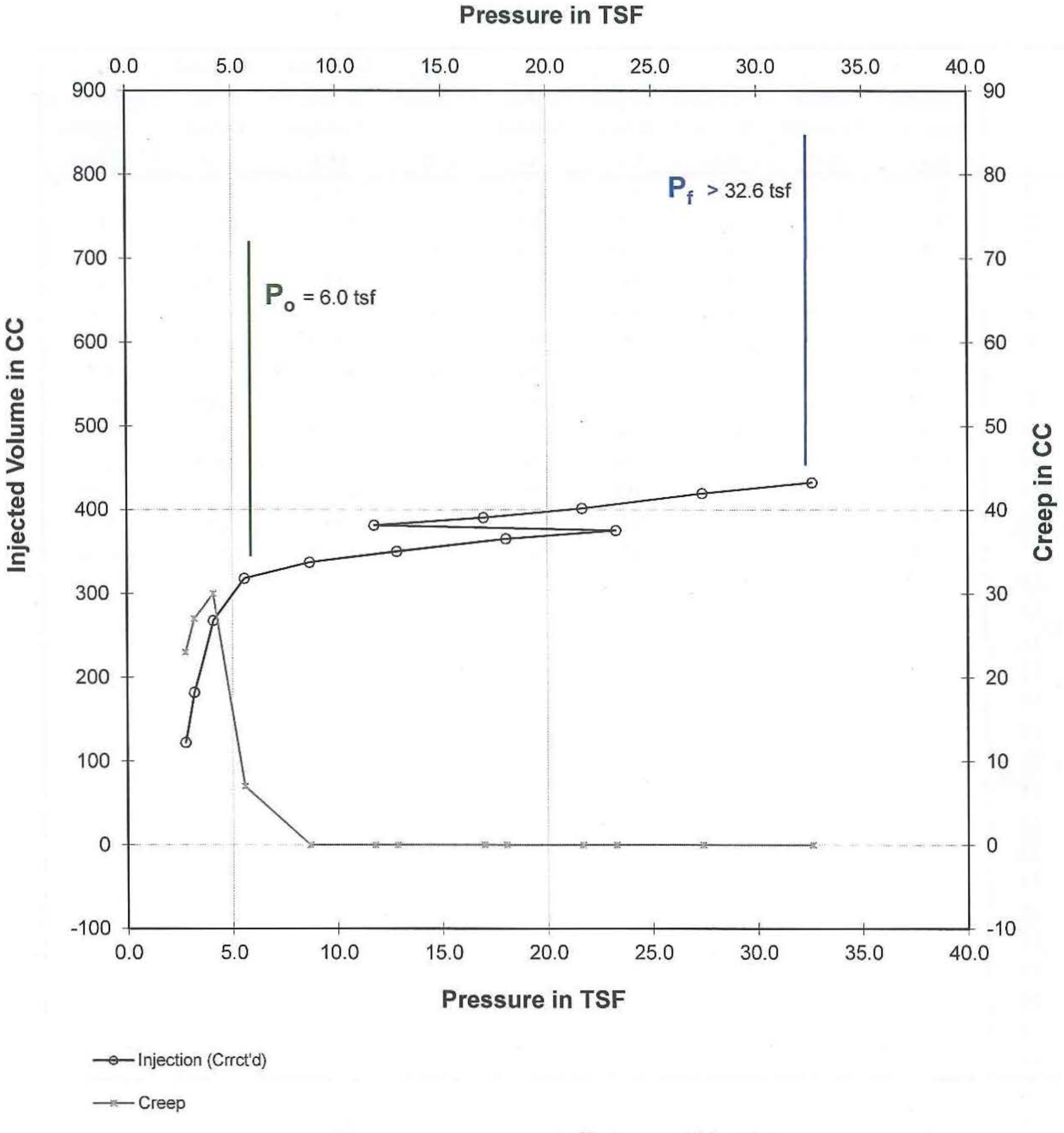
E_d= 390 TSF E^+= 809 TSF P_l= 32.9 TSF

Pressuremeter Data Reduction (BX)

Project Name:	228 E. Ontario, Chicago, IL	Operator:	RCR
GEI Job #:	1414680	Engineer:	PZ
Test Date:	December 23, 2014	Boring No.:	B-3

Test Depth (ft): 90.0 to 92.5



E_d = 646 TSF

E^+ = 1228 TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name:	228 E. Ontario, Chicago, IL		
GEI Job Number:	1414680	Operator:	RCR
Test Date:	Tuesday, December 23, 2014	Engineer:	PZ
Boring No.:	B-3	Instr. Hght (ft):	3
Test Depth (ft):	90.0 to 92.5	Water Correction:	2.87

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.28	2.7	101	124	23	99.2	122.2	
2	0.50	0.37	3.1	157	184	27	155.1	182.1	13
3	1.50	0.48	4.1	240	270	30	237.7	267.7	22
4	3.00	0.54	5.6	314	321	7	311.1	318.1	66
5	6.00	0.56	8.7	341	341	0	337.2	337.2	374
6	10.00	0.58	12.8	355	355	0	350.3	350.3	744
7	15.00	0.60	18.0	371	371	0	365.4	365.4	822
8	20.00	0.61	23.3	382	382	0	375.4	375.4	1247
9	9.00	0.61	11.8	386	386	0	381.5	381.5	-4564
10	14.00	0.63	17.0	396	396	0	390.5	390.5	1416
11	18.50	0.64	21.7	408	408	0	401.7	401.7	1040
12	24.00	0.66	27.4	427	427	0	419.6	419.6	804
13	29.00	0.68	32.6	441	441	0	432.5	432.5	1030
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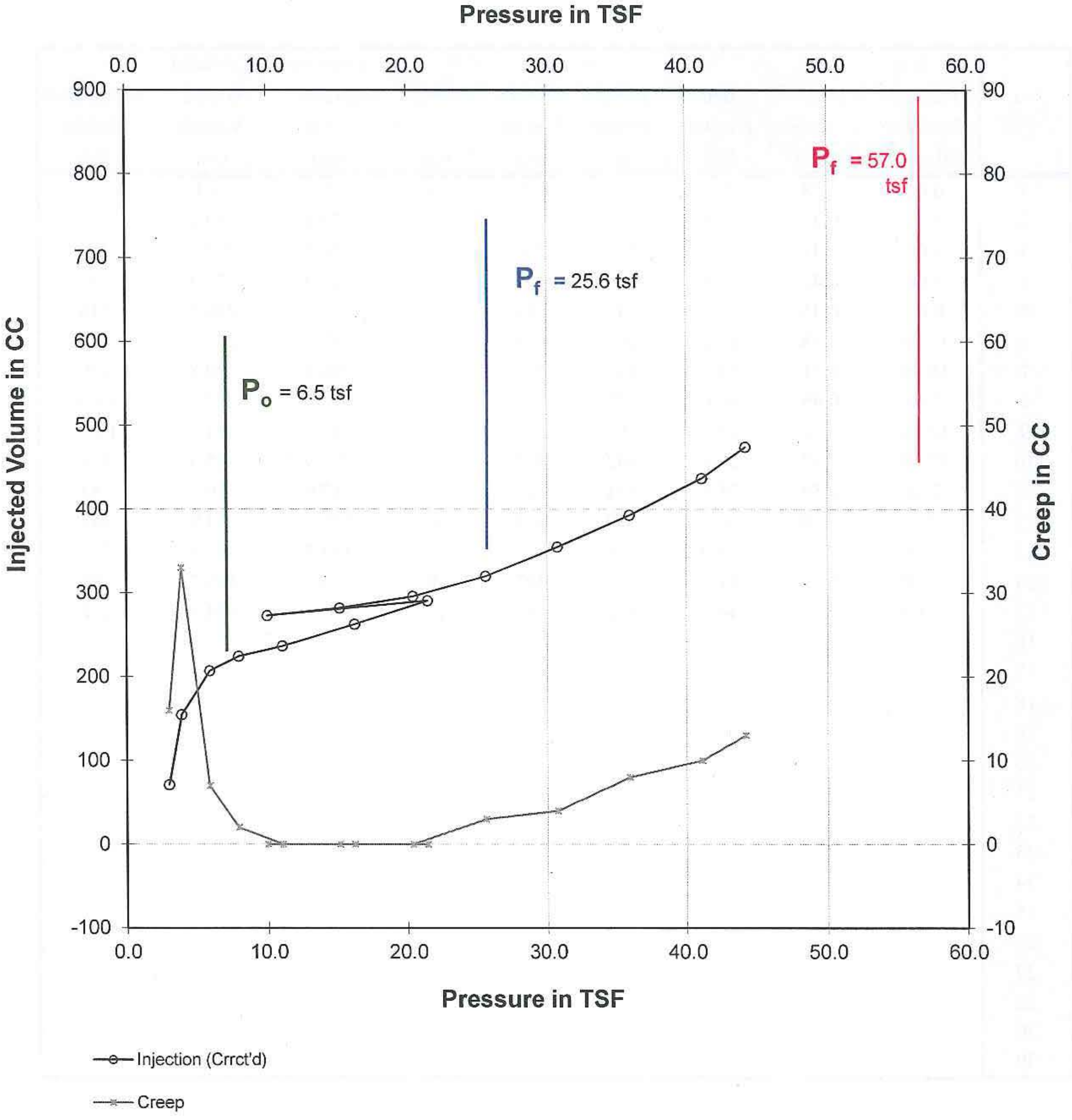
E_d= 646 TSF E^{+}= 1228 TSF P_l= NE TSF

Pressuremeter Data Reduction (BX)

Project Name:	228 E. Ontario, Chicago, IL	Operator:	RCR
GEI Job #:	1414680	Engineer:	PZ
Test Date:	December 23, 2014	Boring No.:	B-3

Test Depth (ft): 95.0 to 97.5



E_d = 444 TSF

E^+ = 1035 TSF

Pressuremeter Data Reduction (BX)

Project Name: 228 E. Ontario, Chicago, IL
GEI Job Number: 1414680
Test Date: Tuesday, December 23, 2014
Boring No.: B-3
Test Depth (ft): 95.0 to 97.5

Operator: RCR
Engineer: PZ
Instr. Hght (ft): 3
Water Correction: 3.03

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.18	3.0	57	73	16	55.1	71.1	
2	1.00	0.33	3.9	124	157	33	121.8	154.8	18
3	3.00	0.41	5.9	203	210	7	200.0	207.0	73
4	5.00	0.43	7.9	226	228	2	222.4	224.4	237
5	8.00	0.45	11.1	241	241	0	236.7	236.7	518
6	13.00	0.48	16.2	268	268	0	262.7	262.7	417
7	18.00	0.51	21.4	297	297	0	290.8	290.8	399
8	7.00	0.49	10.0	277	277	0	272.9	272.9	1398
9	12.00	0.50	15.2	287	287	0	281.9	281.9	1259
10	17.00	0.52	20.4	302	302	0	295.9	295.9	811
11	22.00	0.55	25.6	324	327	3	317.0	320.0	484
12	27.00	0.59	30.7	359	363	4	350.9	354.9	344
13	32.00	0.63	35.9	394	402	8	384.8	392.8	330
14	37.00	0.68	41.1	437	447	10	426.7	436.7	298
15	40.00	0.72	44.2	472	485	13	461.1	474.1	218
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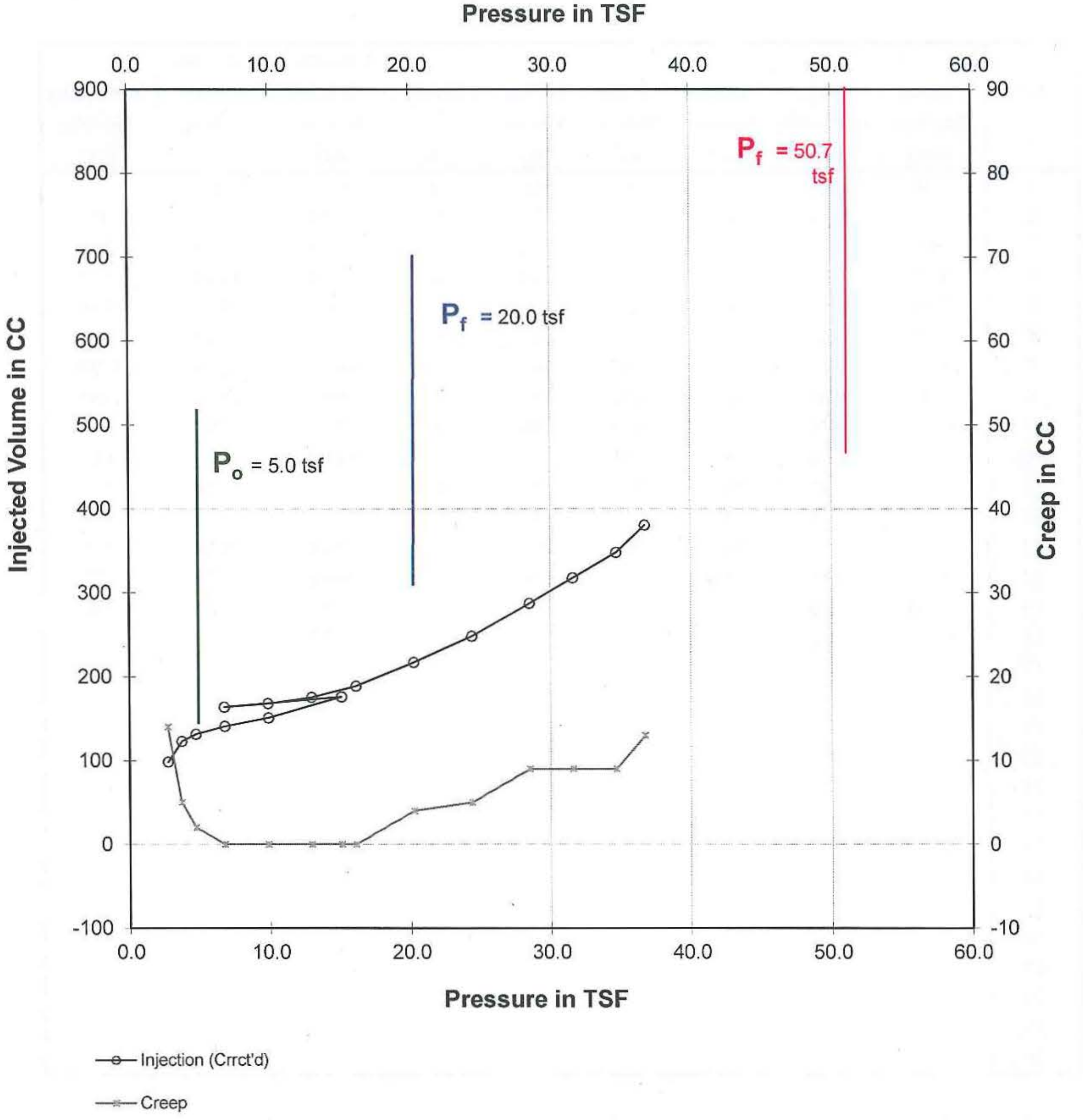
E_d= 444 TSF E^+= 1035 TSF P_l= #DIV/0! TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name:	228 E. Ontario, Chicago, IL	Operator:	RCR
GEI Job #:	1414680	Engineer:	PZ
Test Date:	January 14, 2015	Boring No.:	B-5

Test Depth (ft): 87.5 to 90.0



E_d = 413 TSF

E^+ = 1097 TSF

Pressuremeter Data Reduction (BX)

Project Name: 228 E. Ontario, Chicago, IL
GEI Job Number: 1414680
Test Date: Wednesday, January 14, 2015
Boring No.: B-5
Test Depth (ft): 87.5 to 90.0

Operator: RCR
Engineer: PZ
Instr. Hght (ft): 3
Water Correction: 2.80

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.23	2.7	86	100	14	84.3	98.3	
2	1.00	0.28	3.7	120	125	5	117.8	122.8	70
3	2.00	0.29	4.7	132	134	2	129.4	131.4	211
4	4.00	0.31	6.8	144	144	0	140.8	140.8	397
5	7.00	0.33	9.9	155	155	0	150.9	150.9	554
6	12.00	0.37	15.1	181	181	0	175.9	175.9	386
7	4.00	0.35	6.7	167	167	0	163.8	163.8	1289
8	7.00	0.35	9.9	172	172	0	168.0	168.0	1395
9	10.00	0.36	13.0	180	180	0	175.3	175.3	800
10	13.00	0.38	16.1	194	194	0	188.7	188.7	442
11	17.00	0.42	20.2	219	223	4	213.0	217.0	287
12	21.00	0.46	24.4	250	255	5	243.2	248.2	270
13	25.00	0.51	28.5	286	295	9	278.4	287.4	225
14	28.00	0.55	31.6	317	326	9	308.8	317.8	227
15	31.00	0.58	34.7	348	357	9	339.1	348.1	236
16	33.00	0.62	36.7	377	390	13	367.7	380.7	151
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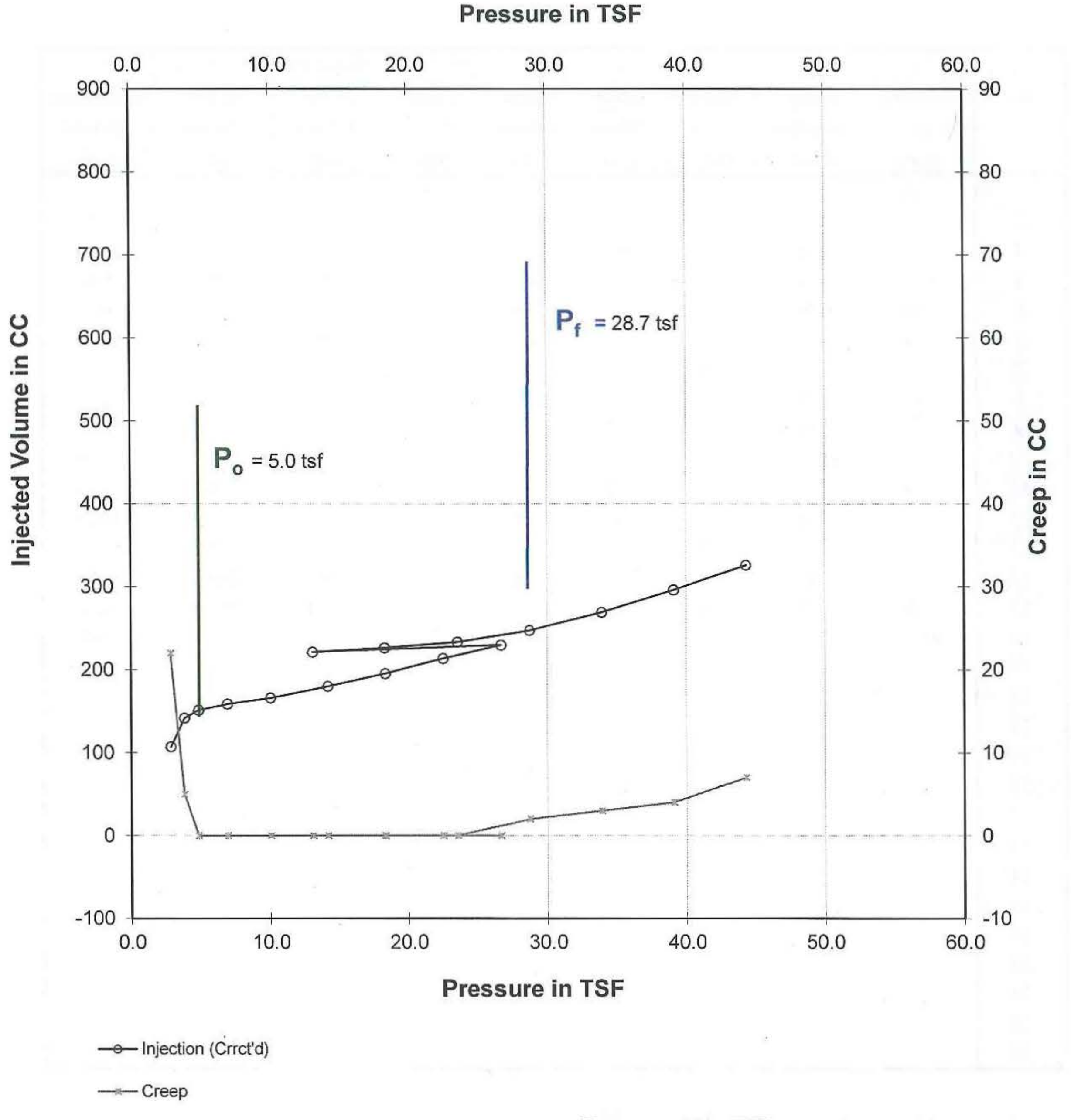
E_d= 413 TSF E^+= 1097 TSF P_l= 50.7 TSF

Pressuremeter Data Reduction (BX)

Project Name:	228 E. Ontario, Chicago, IL	Operator:	RCR
GEI Job #:	1414680	Engineer:	PZ
Test Date:	January 14, 2015	Boring No.:	B-5

Test Depth (ft): 93.0 to 95.5



E_d = 561 TSF

E^+ = 1795 TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name:	228 E. Ontario, Chicago, IL		
GEI Job Number:	1414680	Operator:	RCR
Test Date:	Wednesday, January 14, 2015	Engineer:	PZ
Boring No.:	B-5	Instr. Hght (ft):	3
Test Depth (ft):	93.0 to 95.5	Water Correction:	2.96

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.25	2.8	87	109	22	85.2	107.2	
2	1.00	0.31	3.8	139	144	5	136.8	141.8	50
3	2.00	0.33	4.8	154	154	0	151.4	151.4	194
4	4.00	0.34	6.9	162	162	0	158.7	158.7	520
5	7.00	0.35	10.0	170	170	0	165.9	165.9	805
6	11.00	0.37	14.2	185	185	0	180.1	180.1	553
7	15.00	0.39	18.4	201	201	0	195.3	195.3	524
8	19.00	0.42	22.5	220	220	0	213.6	213.6	447
9	23.00	0.44	26.7	237	237	0	229.8	229.8	516
10	10.00	0.43	13.1	226	226	0	221.3	221.3	3229
11	15.00	0.43	18.3	232	232	0	226.3	226.3	2086
12	20.00	0.44	23.5	240	240	0	233.4	233.4	1503
13	25.00	0.46	28.7	253	255	2	245.3	247.3	767
14	30.00	0.49	33.9	275	278	3	266.3	269.3	500
15	35.00	0.52	39.1	302	306	4	292.1	296.1	420
16	40.00	0.56	44.3	330	337	7	319.0	326.0	390
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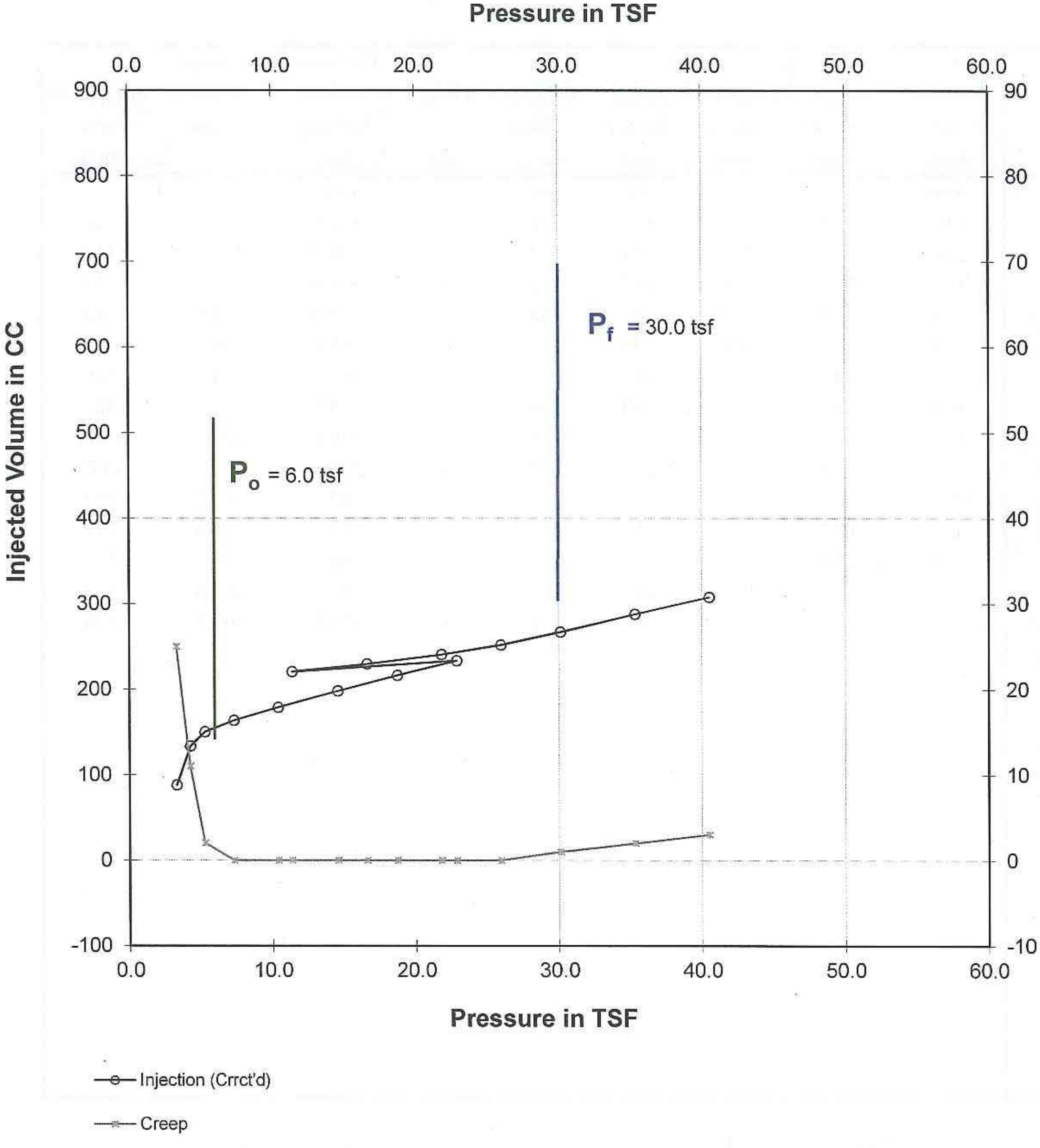
E_d= 561 TSF E^+= 1795 TSF P_l= NE TSF

Pressuremeter Data Reduction (BX)

Project Name:	228 E. Ontario, Chicago, IL	Operator:	RCR
GEI Job #:	1414680	Engineer:	PZ
Test Date:	January 14, 2015	Boring No.:	B-5

Test Depth (ft): 105.0 to 107.5



E_d = 434 TSF

E^+ = 1067 TSF

Pressuremeter Data Reduction (BX)

GEI Consultants

Project Name: 228 E. Ontario, Chicago, IL
GEI Job Number: 1414680
Test Date: Wednesday, January 14, 2015
Boring No.: B-5
Test Depth (ft): 105.0 to 107.5

Operator: RCR
Engineer: PZ
Instr. Hght (ft): 3
Water Correction: 3.33

No.	Pressure Readings (bars)	Inertia Correction (bars)	Corrected Pressure (tsf)	30 Sec. Volume (cc)	60 Sec. Volume (cc)	Creep (cc)	Corrected 30 Sec. Volume (cc)	Corrected 60 Sec. Volume (cc)	Incremental Modulus (tsf)
1	0.00	0.21	3.3	65	90	25	63.0	88.0	
2	1.00	0.30	4.2	125	136	11	122.6	133.6	36
3	2.00	0.32	5.2	151	153	2	148.3	150.3	110
4	4.00	0.35	7.3	167	167	0	163.6	163.6	285
5	7.00	0.37	10.4	183	183	0	178.8	178.8	384
6	11.00	0.40	14.6	203	203	0	198.0	198.0	417
7	15.00	0.42	18.7	222	222	0	216.2	216.2	449
8	19.00	0.44	22.9	240	240	0	233.5	233.5	487
9	8.00	0.43	11.4	225	225	0	220.6	220.6	1806
10	13.00	0.44	16.6	235	235	0	229.6	229.6	1170
11	18.00	0.45	21.8	247	247	0	240.7	240.7	964
12	22.00	0.47	26.0	259	259	0	251.9	251.9	771
13	26.00	0.49	30.1	274	275	1	266.1	267.1	579
14	31.00	0.51	35.3	295	297	2	286.0	288.0	537
15	36.00	0.54	40.5	315	318	3	304.8	307.8	579
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

E_d= 434 TSF E^+= 1067 TSF P_l= NE TSF

Appendix G

Caisson Bearing Capacity and Settlement Calculations

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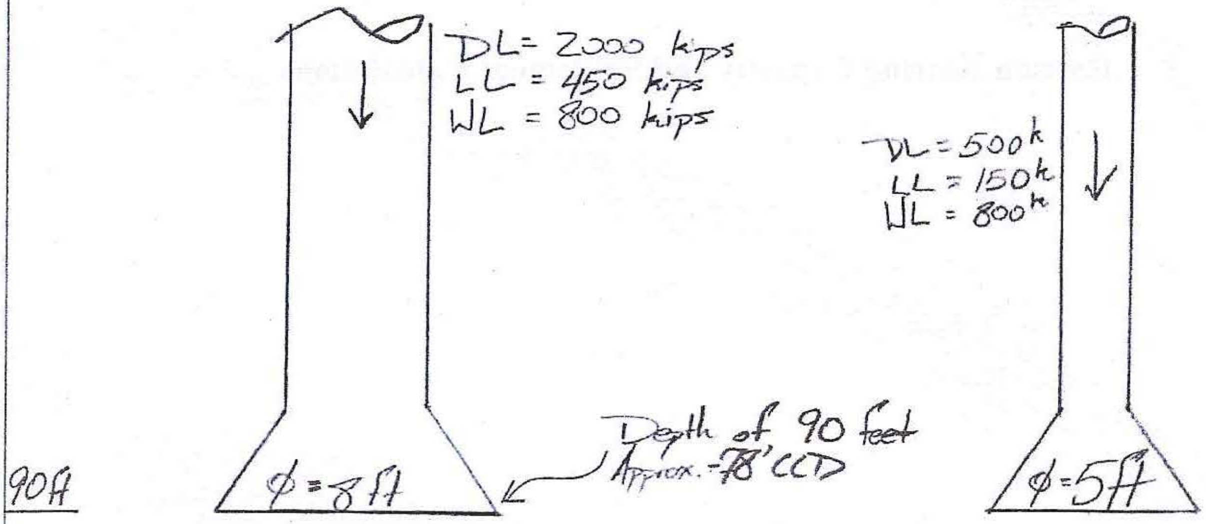
Project 224-228 E Ontario Page 1/6
Client SMASHotels
By DLZ Date 1/19/15
Subject Bearing Capacity + Settlement
Checked RCR Date 1/21/15
Approved WJW Date 1/22/15



~~Pf 379~~, Ed 1,025 tsf   Pf 32.6, Ed 646 tsf   R1, 5'ø

R1, 8'ø

Pf 28.7, Ed 561   R2, 5'ø

Pf 25.6, Ed 444   R3, 5'ø

R2, 8'ø

100 ft

R4, 5'ø

Pf 23.5, Ed 257   R3, 8'ø   R5, 5'ø

Pf 30.0, Ed 434   R4, 8'ø

Pf 26.0, Ed 335

110 ft   R5, 8'ø

GEI Consultants

Client SMASHotels
Subject B.C. + Settlement
Project 224-228 E Ontario Page 2/6
By PLZ Date 1/19/15
Checked RGR Date 1/21/15
Approved Date 1/22/15

① Maximum column loads

$DL + LL = 2{,}000 \text{ kips} + 450 \text{ kips} = 2{,}450 \text{ kips}$, maximum

Minimum column loads

$DL + LL = 500 \text{ kips} + 150 \text{ kips} = 650 \text{ kips}$, minimum

② Caisson sizing

$$Max = \frac{2{,}450 \text{ kips}}{50 \text{ ksf}} = 49 \text{ sf}$$

$$\phi = \sqrt{\frac{49 \text{ sf} \cdot 4}{3.14}} = 7.9', \text{ use } 8' \text{ for max}$$

$$Min = \frac{650 \text{ kips}}{50 \text{ ksf}} = 13 \text{ sf}$$

$$\phi = \sqrt{\frac{13 \text{ sf} \cdot 4}{3.14}} = 4.1', \text{ use } 5' \text{ for min}$$

③ Ed

Max: $E_1 = (646 + 561)/2 = 603 \text{ tsf}$
$E_2 = (561 + 444)/2 = 503 \text{ tsf}$
$E_3 = 257 \text{ tsf}$
$E_4 = 434 \text{ tsf}$
$E_5 = 335 \text{ tsf}$

Min $E_1 = 646 \text{ tsf}$
$E_2 = 561 \text{ tsf}$
$E_3 = 444 \text{ tsf}$
$E_4 = (444 + 257)/2 = 350 \text{ tsf}$
$E_5 = 257 \text{ tsf}$

GEI Consultants

Project 224-228 E Ontario Page 3/6
Client SMASHotels
By TLZ Date 1/19/15
Subject BC + Settlement
Checked RCR Date 1/21/15
Approved Date 1/22/15

④ Settlement Parameters

Max.

$E_A = E_1 = 603 \text{ tsf}$

$$E_{3,4,5} = \frac{3}{\frac{1}{257} + \frac{1}{434} + \frac{1}{335}} = 327 \text{ tsf}$$

$$E_B = \frac{3.2}{\frac{1}{603} + \frac{1}{.85(503)} + \frac{1}{327}} = 453 \text{ tsf}$$

$\lambda_2 = \lambda_3 = 1$

$R_o = 1$

$R = 4 \text{ ft}$

$$P = \frac{2000 \text{kips} + \frac{1}{2}(450 \text{kips})}{\frac{64\pi}{4}} = 44.3 \text{ksf} = 22.1 \text{ tsf}$$

$\alpha = 0.5 \Longrightarrow$ average for project $= 0.37$, use $\alpha = 0.5$

Min

$E_a = E_1 = 646 \text{ tsf}$

$$E_{3,4,5} = \frac{3}{1/444 + 1/350 + 1/257} = 333 \text{ tsf}$$

$$E_B = \frac{3.2}{1/646 + 1/(0.85)(501) + 1/333} = 481 \text{ tsf}$$

$\lambda_2 = \lambda_3 = 1$

$R_o = 1$

$R = 2.5 \text{ ft}$

$$P = \frac{500 + \frac{1}{2}(150)}{2.5^2 \pi} = 29.3 \text{ksf} = 14.6 \text{tsf}$$

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Project 224-228 E Ohio　Page 4/6
Client SMAS Hotels　By PLZ　Date 1/19/15
Subject BC + Settlement　Checked RLR　Date 1/21/15
Approved　Date 1/22/15

⑤ Settlement

$$\Delta = \frac{1.33P}{3E_B} R_o \left(\lambda_2 \frac{R}{R_o}\right)^{\alpha} + \frac{\alpha P \lambda_3 R}{4.5 E_A}$$

Max

$$\Delta = \frac{1.33 \cdot 22.1\text{tsf}}{3 \cdot 453\ \text{tsf}} \cdot 1'\left(1 \cdot \frac{4'}{1'}\right)^{0.5} + \frac{0.5 \cdot 22.1\text{tsf} \cdot 1 \cdot 4'}{4.5 \cdot 603\text{tsf}}$$

$\Delta = 0.0433 + 0.0163 = 0.0596$ ft $= 0.72$ inches, 8'ø

Min

$$\Delta = \frac{1.33 \cdot 14.6\text{tsf} \cdot 1 \cdot \left(1 \cdot \frac{2.5}{1}\right)^{0.5}}{3 \cdot 481\ \text{tsf}} + \frac{0.5 \cdot 14.6\text{tsf} \cdot 1 \cdot 2.5'}{4.5 \cdot 646\ \text{tsf}}$$

$\Delta = 0.0213 + 0.0063 = 0.0276$ ft $= 0.33$ ft, 5'ø

⑥ P_f check within 1R

Max ø8'　$P_{f\,Avg} = (32.6 + 25.6 + 28.7)/3 = 29.0$ tsf

Min, 5ø　$P_{f\,Avg} = (32.6 + 28.7)/2 = 30.7$ tsf

$P_{f\,Avg} >$ Sustained pressure, $P + \sigma_v$

$P_{max} = 22.1$ tsf
$P_{min} = 14.6$ tsf

$\sigma_v = 90' \cdot 125\text{pcf} = 11{,}250\text{psf} = 5.6\text{tsf}$

GEI Consultants

Project 224-228 E Ontario | Page 5/6
Client SMASHotels | By PLZ | Date 1/19/15
Subject BC + Settlement | Checked ECR | Date 1/21/15
Approved MHW | Date 1/22/15

⑥ Cont.

8'ϕ $29.0 \text{ tsf} \overset{?}{>} 22.1 \text{ tsf} + 5.6 \text{ tsf}$

$29.0 \text{ tsf} > 27.7 \text{ tsf}$

5'ϕ $30.7 \text{ tsf} \overset{?}{>} 14.6 + 5.6 \text{ tsf}$

$30.7 \text{ tsf} > 20.2 \text{ tsf}$

⑦ Bearing Capacity

Within 1R of base

8'ϕ $P_{1Avg} = (65 + 57 + 57)/3 = 59.7 \text{ tsf}$

$P_{0Avg} = (6 + 6.5 + 5)/3 = 5.8 \text{ tsf}$

5'ϕ $P_{1Avg} = (65 + 57)/2 = 61 \text{ tsf}$

$P_{0Avg} = (6 + 5.0)/2 = 5.5 \text{ tsf}$

$q_{net} = k(P_1 - P_0)$

$k = 1.4$

8'ϕ $q_{net} = 1.4(59.7 - 5.8) = 75.5 \text{ tsf}$

5'ϕ $q_{net} = 1.4(61 - 5.5) = 77.7 \text{ tsf}$

$q_{allow} = \frac{q_{net}}{FS = 2.5}$

8'ϕ $q_{allow} = 75.5/2.5 = 30.2 \text{ tsf} > 25 \text{ tsf}$ $\quad FS = \frac{75.5}{25.0} = 3.0$ ✓

5'ϕ $q_{allow} = 77.7/2.5 = 31.1 \text{ tsf} > 25 \text{ tsf}$ $\quad FS = \frac{77.7}{25.0} = 3.1$ ✓

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Project 224-228 E. Ontario Page 6/6

Client SMAS Hotels

By PLZ Date 1/19/15

Subject BC + Settlement

Checked Rcr Date 1/21/15

Approved Date 1/22/15

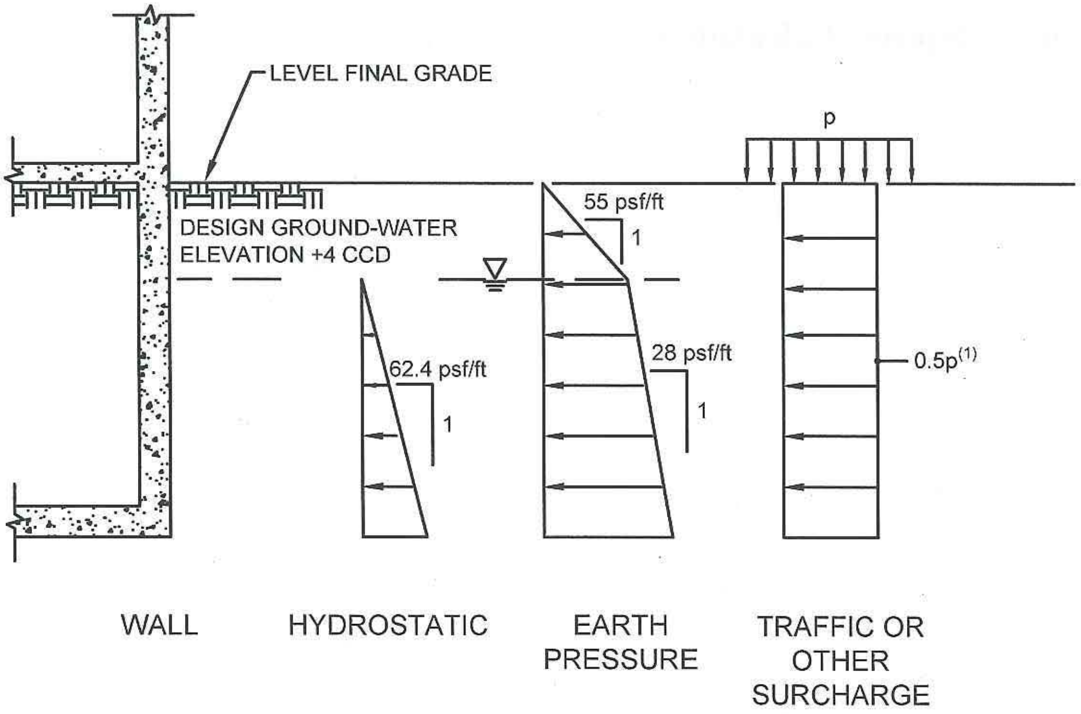
⑦ Cont

Worst case $P_1 - P_0$, with FS = 2

$$q_{allow} = \frac{1.4(57-6.5)}{2.2} = 35.4 \text{ tsf} > 25 \text{ tsf}$$

Appendix H

Recommended Permanent Lateral Earth Pressures



NOTES:

1. p = TOTAL PRESSURE (psf) FROM TEMPORARY AND LONG TERM UNIFORM SURFACE SURCHARGE. A MINIMUM UNIFORM SURFACE SURCHARGE OF 250 POUNDS PER SQUARE FOOT SHOULD BE USED UNLESS OTHER MORE CRITICAL SURCHARGES EXIST. OTHER SURCHARGES DURING CONSTRUCTION (E.G., HEAVY EQUIPMENT AND STOCKPILES) THAT MAY RESULT IN A DIFFERENT MAGNITUDE AND DISTRIBUTION SHOULD BE ADDED, AS NEEDED.

224 East Ontario
CHICAGO, IL

SMASHotels CHICAGO, LLC
CHICAGO, IL

GEI Consultants

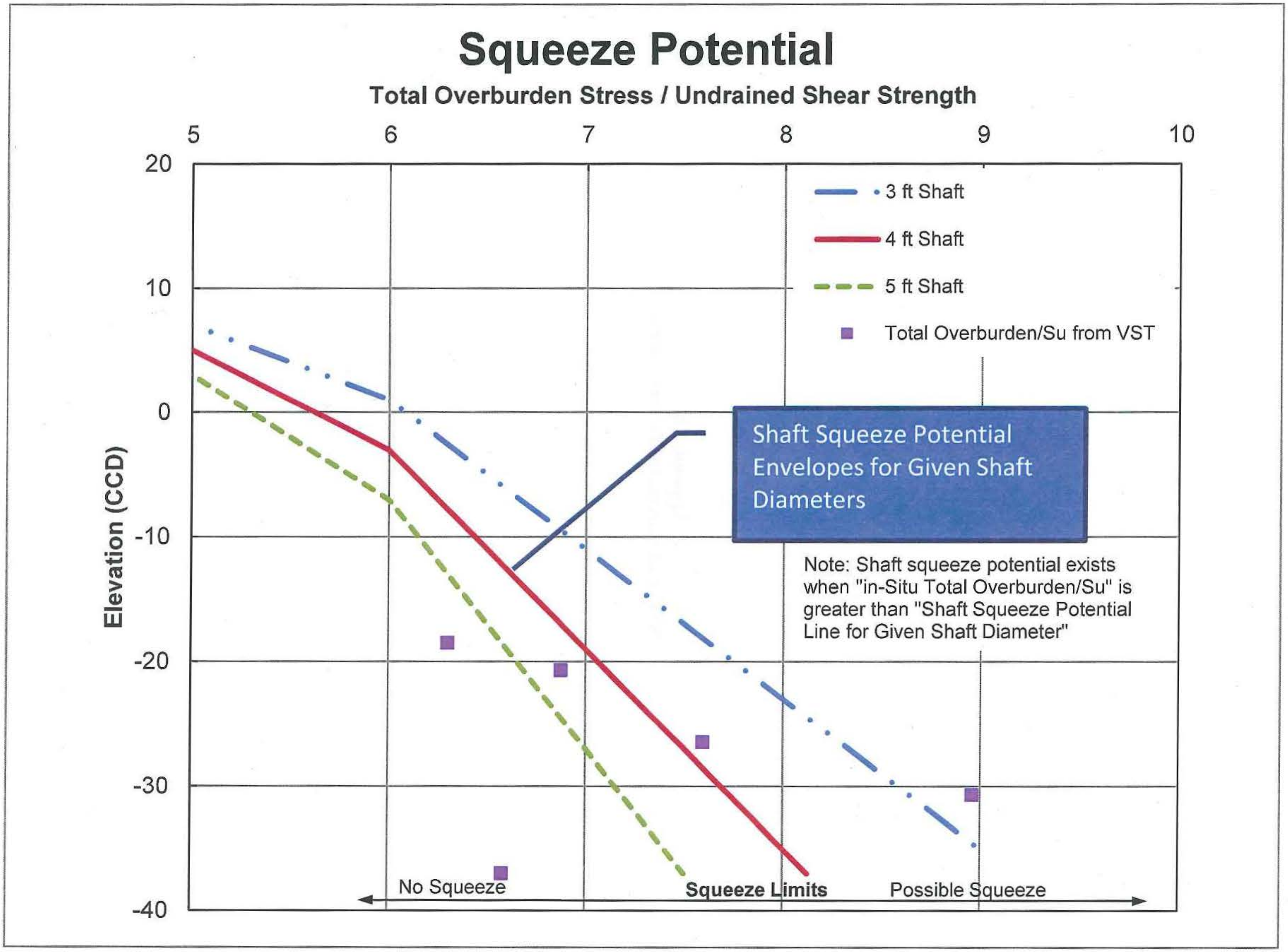
RECOMMENDED PERMANENT
LATERAL EARTH PRESSURES

Project No: 1414680

January 2015

Appendix I

Caisson Squeeze Calculations

Squeeze Potential
Total Overburden Stress / Undrained Shear Strength
5
6
7
8
9
10
20
10
0
-10
-20
-30
-40
Elevation (CCD)
3 ft Shaft
4 ft Shaft
5 ft Shaft
Total Overburden/Su from VST
Shaft Squeeze Potential Envelopes for Given Shaft Diameters
Note: Shaft squeeze potential exists when "in-Situ Total Overburden/Su" is greater than "Shaft Squeeze Potential Line for Given Shaft Diameter"
No Squeeze
Squeeze Limits
Possible Squeeze

Appendix B
Notice of Successful Release Survey

Notice of Successful Release Survey

Area Identification: ____

Date of Release Survey: ______________________________________

Time of Release Survey: ______________________________________

The above-described excavation was surveyed at the time and date indicated above. The results of this survey indicated the 7.1 pCi/g cleanup criterion was achieved.

Documents pertaining to this survey are attached for review and approval by the USEPA.

Signed: ____

Date: ____

Print Name: ____

Print Title: ____

GaiaTech

The attached Release Survey documents were reviewed by USEPA Region 5 on __________. The results of this survey indicated the 7.1 pCi/g cleanup criterion was achieved.

Authorization is hereby granted to release this area for construction activities.

Date: ____

Print Name: ____

Print Title: ____

For USEPA Region 5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

SE-5J

SEP 14 2015

VIA EMAIL AND U.S. MAIL

Mr. John Yang
RPS GaiaTech
135 South LaSalle Street, Suite 3500
Chicago, Illinois 60603

RE: Proposed Work Plan
Proposed Hotel Development Site
224-228 East Ontario Street dated September 12, 2015

Dear Mr. Yang:

USEPA approves the above-referenced Work Plan. This Work Plan will be incorporated into the Lindsay Light II Site OU 22 Administrative Settlement Agreement and Order on Consent as satisfying the Work Plan requirement and will be referred to as the Final Work Plan.

If you have any questions or want to discuss this matter further, please contact me at (312) 886-3601 or Eugene Jablonowski, Health Physicist, at (312) 886-4591. Legal questions should be directed to Cathleen Martwick, Associate Regional Counsel, at (312) 886-7166 and Mary Fulghum, Associate Regional Counsel, at (312) 886-4683.

Sincerely,

Verneta Simon

Verneta Simon, P.E.
On-Scene Coordinator