rubino
ENGINEERING INC.

REPORT TRANSMITTAL

May 18, 2022

To: Ian Wade
Capitals Projects Manager
City of Aurora
77 S. Broadway, 2nd Floor
Aurora, Illinois 60507

Re: **Geotechnical Engineering Services Report**
Aurora Public Works Facility
Aurora, Illinois

Rubino Report No. G21.037

Via email: IWade@aurora-il.org

Dear Mr. Wade,

Rubino Engineering, Inc. (Rubino) is pleased to submit our Geotechnical Engineering Services Report for the proposed Consolidated Public Works Facility in Aurora, Illinois. Revised on May 18, 2022 to remove Draft from the cover page.

Report Description

Enclosed is the Geotechnical Engineering Services Report including results of field and laboratory testing, as well as recommendations for foundation design, pavement design, detention basin design, and general site development.

Authorization and Correspondence History

- Rubino Proposal No. Q21.002g_REV1 dated January 26, 2021; Signed and authorized by Jolene Coulter, Director of Purchasing for City of Aurora on February 11, 2021.

Closing

Rubino appreciates the opportunity to provide geotechnical services for this project and we look forward to continued participation during the design and in future construction phases of this project.

If you have questions pertaining to this report, or if Rubino may be of further service, please contact our office at (847) 931-1555.

Respectfully submitted,
RUBINO ENGINEERING, INC.

Michelle A. Lipinski, PE
President

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MAL/file/ Enclosures

Geotechnical Engineering Services Report

AURORA PUBLIC WORKS FACILITY

AURORA, ILLINOIS

RUBINO PROJECT NO. G21.037

Drilling
Laboratory Testing
Geotechnical Analysis

PREPARED BY:

SABINA SCHMID
STAFF ENGINEER

rubino ENGINEERING INC.

Michelle A. Lipinski, PE
President
IL No. 062-061241, Exp. 11/30/23

PREPARED FOR:

CITY OF AURORA

77 S. BROADWAY, 2ND FLOOR

AURORA, ILLINOIS

MAY 18, 2022

TABLE OF CONTENTS

PROJECT INFORMATION

Rubino Engineering, Inc. (Rubino) understands that the City of Aurora is planning to construct a new consolidated public works facility located off Liberty Street in Aurora, Illinois. Rubino previously performed 5 borings to an approximate depth of 25 feet below existing grade and issued a Geotechnical Report (G19.022) dated May 29, 2020 for the proposed salt storage facility at this site. Below is a summary of Rubino's understanding of the proposed project.

Project information provided to Rubino by the City of Aurora:

Size of subject property (acres)	25 Acres
Building Addition or Stand-alone structure?	Stand Alone Structure
Plan area? (square feet)	217,000 ft^2 First Floor = 40,000 ft^2, Second Floor 40,000 ft^2, Garage Building = 137,000 ft^2
Number of stories?	2 Stories
Slab on grade or basement?	Slab on Grade
Structure materials?	Steel beams and joists supported by load bearing precast exterior walls and interior steel columns for the garage areas. Office area anticipated to have non-load bearing light gauged framed exterior walls.
Which way does the site slope, and what is the elevation differential?	Existing surface elevation of site ranges from 714 feet to 729 feet Anticipated Finished Floor Elevations: Office: 726 feet (Updated Via phone call on 3/24/22) Garage: 726 feet (Updated Via phone call on 3/24/22) Brine Building: 723.0 feet (Received via email on 1/26/22) Fuel Station: 721.0 feet (Received via email on 4/7/22)
Paved parking locations referenced to the proposed building:	Parking/Drop off Area on south side of proposed building
Number of Detention Basins?	Two (2) total, One in SW corner of site, One at south end of site near New York Street (Borings within detention pond areas to determine suitable structural fill material to balance the site) TT Technologies west basin bottom elevation: 705.2 feet East on-site basin bottom elevation: 702.8 feet (Received via email on 4/7/22)
Desired Bearing Capacity?	Office/Garage: 4,000 psf (received via phone call on 3/24/22)

Approximate Structural Loads: from "1291 - Ltr - Geotechnical Testing Services RFP" prepared by Kluber Architects and Engineers

- Perimeter precast walls 5 klf to 10 klf depending on height and locations
- Columns 50 kips to 200 kips

Site Grading information given:

- Grading will be evaluated in order to balance the site

Pavement Design information was not provided but is based on the following assumptions:

- Light Duty Pavement 18-kip ESALS: 30,000.
- Heavy Duty Pavement 18-kip ESALS: 60,000.
- Pavement Life Expectancy: 15 years.

Documents received:

- Drawing – Included in "1291 - Ltr - Geotechnical Testing Services RFP" prepared by Kluber Architects and Engineers
- Drawing – "reduced updated borings" dated January 14, 2021.
- "1291 - Ltr - Geotechnical Testing Services RFP 2021-01-14" prepared by Kluber Architects and Engineers
- Drawing – "Master Building Plan" received January 11, 2021
- Drawing – "Site Plan Alternate Layout", Sheet A101.2 received January 11, 2021
- Existing Topographic Site Map received January 20, 2021
- Elevations used for this report were provided to the Village of Aurora by EEI

Project Correspondence:

- RFP Email from Ian Wade of City of Aurora on January 7, 2021.
- Email from Ian Wade of City of Aurora on January 19, 2021 asking to exclude CCDD testing, include additional borings, and reduced depth of detention pond borings.
- Phone call with project team (Ian Wade, Chris Hansen, Clay Schuler, Jeff Bruns, Clayton Haldeman, and Michelle Lipinski) on March 24, 2022

The geotechnical recommendations presented in this report are based on the available project information and the subsurface materials described in this report. If any of the information on which this report is based is incorrect, please inform Rubino in writing so that we may amend the recommendations presented in this report (if appropriate, and if desired by the client). Rubino will not be responsible for the implementation of our recommendations if we are not notified of changes in the project.

Purpose / Scope of Services

The purpose of this study was to explore the subsurface conditions at the site in order to prepare geotechnical recommendations for foundation design, pavement design, detention basin design, and general site development for the proposed construction. Rubino's scope of services included the following drilling program:

Table 1: Drilling Scope

NUMBER OF BORINGS	DEPTH (FEET BEG*)	LOCATION
20	20	Proposed Building (B-01 thru B-20)
1	30	Fuel Island (B-21)
2	15	Proposed Detention Basins (B-22 and B-23)
3	15	Salt Storage, Mulch Storage (B-24, B-25)
1	15	Brine Building (B-26)
3	7 ½	Pavement (Storage Yard, Parking, Entrances) (B-27, B-30, B-32, B-35)

*BEG = below existing grade

Representative soil samples obtained during the field exploration program were transported to the laboratory for additional classification and laboratory testing. This report briefly outlines the following:

- *Summary of client-provided project information and report basis*
- *Overview of encountered subsurface conditions*
- *Overview of field and laboratory tests performed including results*
- *Geotechnical recommendations pertaining to:*
  - *Subgrade preparation and cut / fill recommendations*
  - *Foundations, including suitable foundation type(s), allowable bearing pressure(s), and estimated settlement*
  - *Pavements, including subgrade pavement sections for bituminous and Portland Cement Concrete (PCC) pavements*
  - *Seismic design site classification parameters*
  - *Detention Ponds including estimating infiltration rates based on hydrometer testing*
- *Construction considerations, including temporary excavation and construction control of water*

DRILLING, FIELD, AND LABORATORY TEST PROCEDURES

The City of Aurora selected the number of borings and the boring depths. Rubino located the borings in the field by measuring distances from known fixed site features. The borings were advanced utilizing 3 ¼ inch inside-diameter, hollow stem auger drilling methods and soil samples were routinely obtained during the drilling process.

Selected soil samples were tested in the laboratory to determine material properties for this report. Drilling, sampling, and laboratory tests were accomplished in general accordance with ASTM procedures. The following items are further described in the Appendix of this report.

- *Field Penetration Tests and Split-Barrel Sampling of Soils (ASTM D1586)*
- *Field Water Level Measurements*
- *Laboratory Determination of Unconfined Compressive Strength (ASTM D2166)*
- *Laboratory Determination of Water (Moisture) Content of Soil by Mass (ASTM D2216)*
- *Laboratory Determination of Atterberg Limits (ASTM D4318)*
- *Laboratory Organic Content by Loss on Ignition (ASTM D2974)*
- *Laboratory Determination of Particle Size (Hydrometer) Analysis of Soils (ASTM D422)*

The laboratory testing program was conducted in general accordance with applicable ASTM specifications. The results of these tests are to be found on the accompanying boring logs located in the Appendix as well as the Laboratory Results located in the Appendix.

SUMMARY OF GEOTECHNICAL CONSIDERATIONS

The main geotechnical design and construction considerations at this site are:

GENERAL SUBSURFACE

- **Subgrade soils** generally consisted of brown to gray, silty to sandy clay and silt soils. See *Subsurface Conditions* section for more detailed information.
    - **High Plasticity Soils** were encountered in some of the soil borings. See *Subsurface Conditions* and *Expansive Soils Discussion* sections for more detailed information.
- **Free groundwater was observed** within some of the borings during drilling operations. See *Groundwater Conditions* section for more information.

STRUCTURES

- **Shallow Foundations** are a possible foundation design option at this site **with removal of unstable soils.** See *Foundation Recommendations* section for more detailed information.
    - **Unstable soils** were encountered in some of the building areas and include soils with high moisture content, low shear strength, and high plasticity silt.

PAVEMENTS

- Surficial soils in proposed pavement areas are cohesive in nature with moderate shear strengths and moderate to high moisture contents. Please see *Site Preparation Recommendations* for additional information.
- Rubino has recommended a standard pavement section for the proposed project. See *Pavement Recommendations* section for additional information.
- Positive **drainage** of the subgrade soils combined with interceptor drains and positive surface drainage will help the life expectancy of the new pavement section. See the *Pavement Drainage and Maintenance* section for more detailed information.

STORAGE AREAS

- **Rubino previously provided a Geotechnical Engineering report for the proposed Salt Storage dome** at this site. The materials found within boring B-24 are consistent with the borings obtained for the previous report. Please see geotechnical report number *G19.022 Aurora Public Works Salt Dome* dated May 29, 2019 for more information. If there have been changes in plans or loading for the Salt Dome since this original report, Rubino should be notified immediately to determine if changes in the recommendations are required.
- Rubino has recommended a standard pavement/concrete pad section for the **Storage Yard and Mulch Storage areas.** See *Pavement Recommendations* section for detailed information.

DETENTION BASINS

- The soils in the area of the proposed detention basins were classified as silty clay loam which typically have lower permeability rates. In general, the lean clay soils are considered suitable for use as structural fill. See *Detention Pond Considerations* and *Infiltration Rate Discussion* sections for more detailed information.

The geotechnical-related recommendations in this report are presented based on the subsurface conditions encountered and Rubino's understanding of the project. Should changes in the project criteria occur, a review must be made by Rubino to determine if modifications to our recommendations will be necessary.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site for the proposed Consolidated Public Works Facility is located south of Liberty Street between Eastern Avenue and County Line Road in Aurora, Illinois. The existing property is approximately 25 acres. The proposed plan for this site will include a garage building, an office building, new parking lot pavement, salt and mulch storage, two detention ponds, a brine building, and a fuel station.

Subsurface Conditions

Subsurface conditions generally consisted of brown to gray, silty to sandy clay and silt soils.

- The **topsoil** thickness ranged between 6 and 14 inches
- The native **silty to sand clay and silt** soils were generally medium stiff to hard in consistency

See the table below and the borings logs in the Appendix for more detailed soil information pertaining to the borings that have already been drilled.

Table 2: Subsurface Conditions Summary

DEPTH RANGE (FEET BEG*)	SOIL DESCRIPTION	SPT N-VALUES (BLOWS PER FOOT)	MOISTURE CONTENT (%)	ESTIMATED SHEAR STRENGTH
Proposed Office/Garage Buildings (B-01 to B-20)				
729.5 – 714.0	Soft to medium stiff, brown and gray silty to sandy CLAY	3 – 7	15 - 28	c = 450 – 1,050 psf
724.0 – 712.0	Medium stiff to stiff, brown and gray SILT *(B-01, B-12, & B-19)*	4 – 6	21 – 28	c = 300 – 450 psf
721.0 – 716.0	Medium stiff, brown and gray **SILT OF HIGH PLASTICITY** *(B-07)*	4 – 5	27 – 30	---
729.5 – 715.0	Very stiff to hard, gray silty CLAY (*B-09 & B-15)*	15 – 35	12 – 17	c = 2,250 – 4,000 psf
729.5 – 700.0	Stiff to very stiff, brown and gray silty to sandy CLAY	9 – 29	10 – 26	c = 1,350 – 4,000 psf
Fuel Island (B-21)				
720.5 – 715.5	Stiff, light brown SILT	8 – 10	21	c = 600 – 800 psf
715.5 – 691.5	Stiff to very stiff, brown to gray silty CLAY	9 – 18	13 – 18	c = 1,350 – 2,700 psf
Detention Basins (B-22 & B-23)				
713.0 – 695.5	Medium stiff to very stiff, brown to gray silty CLAY	7 – 16	14 – 29	c = 1,050 – 2,400 psf
704.5 – 702.0	Medium dense, brown sandy SILT	9	18	$\phi = 29°$
Salt Storage, Mulch Storage (B-24 & B-25)				
720.5 – 703.0	Stiff to very stiff, brown to gray silty CLAY	8 – 21	15 – 18	c = 1,200 – 3,150 psf
Brine Building (B-26)				
721.5 – 707.0	Stiff to very stiff, brown to gray silty CLAY	9 – 19	15 – 18	c = 1,350 – 2,700 psf

Depth Range (feet BEG*)	Soil Description	SPT N-values (blows per foot)	Moisture Content (%)	Estimated Shear Strength
Pavement (Storage Yard and Entrances) (B-27, B-30, B-32, & B-35)				
729.0 – 704.5	Medium stiff to stiff, brown silty CLAY	4 – 8	18 – 30	c = 1,000 – 1,200 psf
727.0 – 711.0	Very stiff to hard, brown silty CLAY	12 – 32	13 – 18	c = 1,800 – 4,000 psf

*BEG = Below existing grade

The native soils were visually classified as silty clay (CL), sand-silt mixtures (SM), silt (ML), and high-plasticity silt (MH) according to the Unified Soil Classification System (USCS). The above table is a general summary of subsurface conditions. Please refer to the boring logs for more detailed information.

Estimated shear strength of clay soils is based on empirical correlations using N-values, moisture content, and unconfined compressive strength.

Groundwater Conditions

Groundwater was encountered in some of the borings during drilling operations. The following table summarizes groundwater observations from the field:

Table 3: Groundwater Observation Summary

Boring Number	Groundwater Level during drilling (Elevation)	Groundwater Level upon auger removal (Elevation)
B-07	716.5	N/A
B-11	701.5	N/A
B-12	N/A	707.0
B-14	710.0	N/A
B-22	704.0	705.5

*BEG = below existing grade

It should be noted that fluctuations in the groundwater level should be anticipated throughout the year depending on variations in climatological conditions and other factors not apparent at the time the borings were performed. Groundwater may not have been observed in some areas due to the low permeability of soils. Additionally, discontinuous zones of perched water may exist within the soils. The possibility of groundwater level fluctuation should be considered when developing the design and construction plans for the project.

When bidding this project, the contractor should anticipate that groundwater will be present during excavation.

Expansive Soil Discussion

Soils with moderate expansive properties were observed in one of the borings to an elevation of 716 feet (approximately 6 feet below existing grade) during the drilling operations. There is a possibility that expansive soils could be encountered at other locations on the site during construction and future drilling operations.

Table 4: Expansive Soils by Location

BORING NO. / LOCATION	SOIL DESCRIPTION	ELEVATION RANGE (FEET BEG*)	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)
B-07 (Garage Building)	Brown and gray **SILT of HIGH PLASTICITY**	722 – 716	51	22

*BEG = below existing grade

Expansive soils are considered unsuitable for construction due to their tendency to absorb moisture from the ground or atmosphere which causes swelling and, in turn, an increase in volume. Soils with Liquid Limits greater than 50% (LL > 50%) may exhibit highly plastic behavior and may be considered to have expansive properties (IDOT Manual 2015).

Expansive soils have high frost susceptibility and may have higher moisture contents which could contribute to failed proof rolls, however expansive soils are difficult to visually delineate in the field during construction.

Where expansive soils are encountered, subgrade treatment options may include, but are not limited to the following:

- Removal and replacement

Topsoil Discussion

Topsoil materials as described in this report have not been analyzed for quality according to any minimum specifications. If topsoil is to be imported to or exported from this site, Rubino recommends that it meet the minimum specifications defined in **Section 1081.05** of the "Standard Specifications for Road and Bridge Construction," adopted by the Illinois Department of Transportation, January 1st, 2022.

Rubino has reported topsoil thicknesses at each boring completed so far based on visual observation of surficial soils. Surficial topsoil thickness was visually observed to be between approximately 6 and 14 inches.

EVALUATION AND RECOMMENDATIONS

The geotechnical-related recommendations in this report are presented based on the subsurface conditions encountered and Rubino's understanding of the project. Should changes in the project criteria occur, a review must be made by Rubino to determine if modifications to our recommendations will be necessary.

Suitability of On-Site Soils for Use as Structural Fill

Where fill materials are required, the fill materials for construction must meet the requirements of the Appendix of this report.

Composite soils need to be blended to have a consistent classification. Soils should be stockpiled separately by classification and tested as recommended in the Appendix. For budget purposes, Rubino recommends a shrinkage factor of 15 percent be used to determine earthwork quantities.

It is Rubino's understanding that the detention basins proposed bottom elevations are 702.8 and 705.2 which are approximately 8 ½ feet below existing grade. The materials in the area of the detention basins from surface to 8 ½ below existing grade generally consist of brown silty clay which could be a candidate for use as structural fill. Suitable fill materials should meet the requirements in the *Fill Recommendations* Appendix C of this report at the time of construction.

Site Preparation & Fill Recommendations

The following comments are considered site-specific. To reference general subgrade preparation recommendations and compaction recommendations, please refer to the Appendix of this report.

- Prior to placing and compacting structural fill, the site should be cleared of vegetation, trees, roots, unstable soils (low shear strength, high moisture content), and deleterious materials as applicable.
    - Within the building pad, lower shear strength soils within the building pad area can be removed as part of mass grading. Rubino recommends removing higher moisture content, lower shear strength soils as part of mass grading operations.
    - Soils that meet the requirements for structural fill should be stockpiled as needed for mass grading.
- If the construction of the building pad will occur prior to foundation excavation, the building pad should be over-built by at least 2 feet if it will be built prior to digging foundations to protect from freeze/thaw. Construction traffic should be directed around the building pad.
- Please note that clay subgrade soils are sensitive to moisture and can be easily disturbed by precipitation, groundwater, or construction equipment. Therefore, extra care should be used to avoid disturbing these soils during construction activities.

Fill materials should be compacted and documented and meet the fill requirements shown in the Appendix of this report. To reference general subgrade preparation recommendations and compaction recommendations, please refer to the Appendix of this report.

Foundation Recommendations

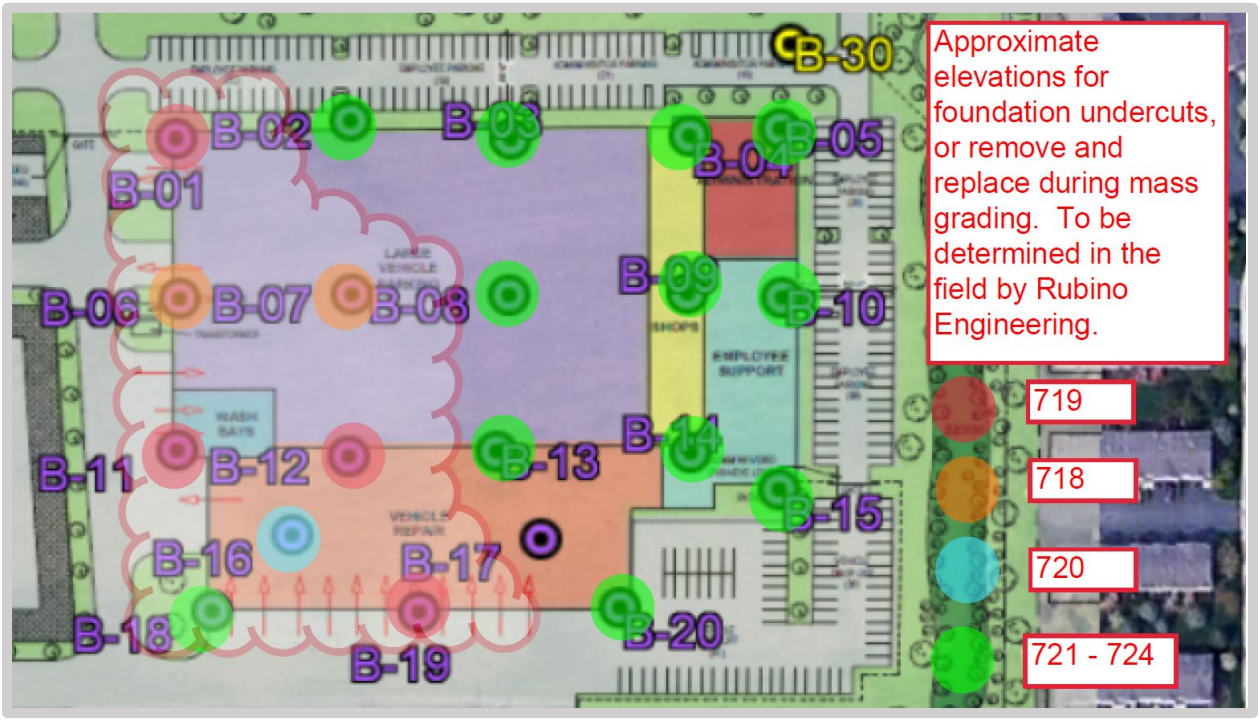
Design – Soil Bearing Pressure

The proposed buildings can be built as slab-on-grade structures supported on shallow, spread footing foundations. Rubino recommends that foundations extend through any soft, high plasticity soils and be supported on the stiff to very stiff silty clay soils or compacted and documented structural fill.

Rubino recommends that soils that do not meet the required strengths outlined in the bearing capacity tables below be removed and replaced with properly compacted structural to bring the grade back up to the proposed bearing elevation. Removal and replacement can occur during mass grading or at each foundation location during foundation excavation. Testing and inspection by Rubino should be performed continuously in both cases.

Foundations should bear on at least 4 feet of compacted structural fill. Prior to placing fill, the bearing soil should be scarified and recompacted to the compaction requirements herein. Details on structural fill can be found in the Appendix and in *Suitability of On-Site Soils for Use as Structural Fill* section of this report.

Locations and estimated excavation elevations to achieve are outlined on the map below:



Settlement controlled the bearing capacity recommendations in the parking garage. Maximum net allowable soil bearing pressures based on dead load plus design live load for sizing the shallow foundations:

Table 5: Bearing Capacity Recommendations - Garage

DESCRIPTION	PROPOSED BUILDING RECOMMENDATIONS	
PROPOSED GARAGE AND OFFICE BUILDING STRUCTURE		
Anticipated Foundation Type:	Wall Footing	Column Footing
Design Loads:	10 kips/lf	200 kips
Max Net Allowable Bearing Pressure (psf):	4,000 psf*	4,500 psf*
Minimum Dimensions:	2 ft.	3 ft. x 3 ft.
Proposed Finished Floor Elevation	726	
Anticipated Bearing Elevation:	Approximately 722 Exterior, 724 Interior or to suitable bearing*	
Recommended Bearing Soil classification:	Brown to gray silty CLAY*; $Q_u \geq 2.5$ tsf Or Bear on at least 4 feet of properly compacted Structural Fill	
Applicable Borings:	B-01 thru B-20	

Table 6: Bearing Capacity Recommendations – Brine Building

DESCRIPTION	PROPOSED BUILDING RECOMMENDATIONS	
PROPOSED BRINE BUILDING		
Anticipated Foundation Type:	Wall Footing	Column Footing
Design Loads:	Report Basis: 4 klf	Report Basis: 70 kips
Max Net Allowable Bearing Pressure (psf):	4,000 psf	4,500 psf
Minimum Dimensions:	2 ft.	3 ft. x 3 ft.
Proposed Finished Floor Elevation	723.0	
Anticipated Bearing Elevation:	Approximately 719 or to suitable bearing	
Recommended Bearing Soil classification:	Brown to gray silty CLAY; $Q_u \geq 2.25$ tsf	
Applicable Borings:	B-26	

Table 7: Bearing Capacity Recommendations – Fuel Station

DESCRIPTION	PROPOSED BUILDING RECOMMENDATIONS	
PROPOSED FUEL STATION		
Anticipated Foundation Type:	Wall Footing	Column Footing
Design Loads:	Report Basis: 4 klf	Report Basis: 70 kips
Max Net Allowable Bearing Pressure (psf):	3,000 psf	3,500 psf
Minimum Dimensions:	2 ft.	3 ft. x 3 ft.
Proposed Finished Floor Elevation	721.0	
Expected Bearing Elevation:	Approximately 717 or to suitable bearing	
Recommended Bearing Soil classification:	Brown Silt / Silty Clay; $Q_u \geq 1.75$ tsf Or Properly compacted Structural Fill	
Applicable Boring:	B-21	

Different bearing pressures are given for wall footings vs. column footings due to the difference in the shape factor applied to the *Terzaghi-Meyerhof* general bearing capacity equation as follows:

Wall Footing: $q_{ult} = cN_c + \frac{1}{2}\gamma_t B N_\gamma + \gamma_t D_f N_q$

Square Column Footing: $q_{ult} = 1.25 * cN_c + \frac{1}{2}\gamma_t B * 0.85 * N_\gamma + \gamma_t D_f N_q$

c = *cohesion / shear strength*
N_c, N_γ, N_q = *Vesic's Bearing Capacity Factors*
γ_t = *total density*
B = *Footing width*
D_f = *Depth to bottom of footing*

Design / Construction – Frost Protection

Exterior footings should be located at a depth of at least 3 ½ feet below the outside final exterior grades to provide adequate frost protection. If the building is constructed during winter months or if the footings will likely be subjected to freezing temperatures after construction is completed, then the footings should be protected from freezing.

Interior footings should be founded at least 2 feet below the final floor slab level for proper confinement of the bearing soils or as recommended above. Both depths should bear on soils or ground improvement as described above.

- **Fine-grained soils such as silts and clays are susceptible to moisture fluctuations and freezing weather**, therefore concrete for the foundations should ideally be poured right after the foundations have been dug and formed if rain is being predicted. Otherwise, foundations that have already been excavated should be protected from rain or surface runoff water.

Settlement

Based on the known subsurface conditions, laboratory testing, and past experience, Rubino anticipates that properly designed and constructed footings supported on the recommended, observed and documented natural clay soils, or properly compacted structural fill should experience maximum total and differential settlements between adjacent columns of less than 1 inch and ¾ inches, respectively.

Seismic Site Classification

The 2015 International Building Code requires a site class for the calculation of earthquake design forces. This class is a function of soil type (i.e., depth of soil and strata types). Based on the estimated depth to rock and the estimated shear strength of the soil at the boring locations, Site Class "D" is recommended.

This site class is recommended based on Rubino's opinion and experience in the area that the consistency of the soils below the depth explored remain consistent or improve in density. Actual determination of soil properties to a depth of 100 feet was beyond the scope of this project.

The SEAOC/OSHPD probabilistic ground motion values near latitude 41.763940° and longitude –88.264591° are shown in the table to the right.

Design Code Reference Document	IBC-2015
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	0.16	MCE_R ground motion. (for 0.2 second period)
S_1	0.066	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.256	Site-modified spectral acceleration value
S_{M1}	0.159	Site-modified spectral acceleration value
S_{DS}	0.171	Numeric seismic design value at 0.2 second SA
S_{D1}	0.106	Numeric seismic design value at 1.0 second SA

Dewatering Recommendations

Dewatering will likely be necessary during excavation of soils due to shallow groundwater, precipitation, surficial runoff, and the presence of sand seams or other conditions not apparent at the time of drilling. Shoring or trench boxes may be required where the soils are granular, saturated, or have low shear strengths. Please reference the anticipated groundwater levels on the attached boring logs and in the *Groundwater Conditions* section of this report.

Detention Basin Recommendations

Rubino understands that there are two proposed detention basins on site. The TT Technologies west basin has a proposed bottom elevation of 705.2 feet and the east on-site basin has a proposed bottom elevation of 702.8 feet. The soils located in the areas of the proposed detention basins generally consisted of silty clay to silty clay loam soils with the exception of a

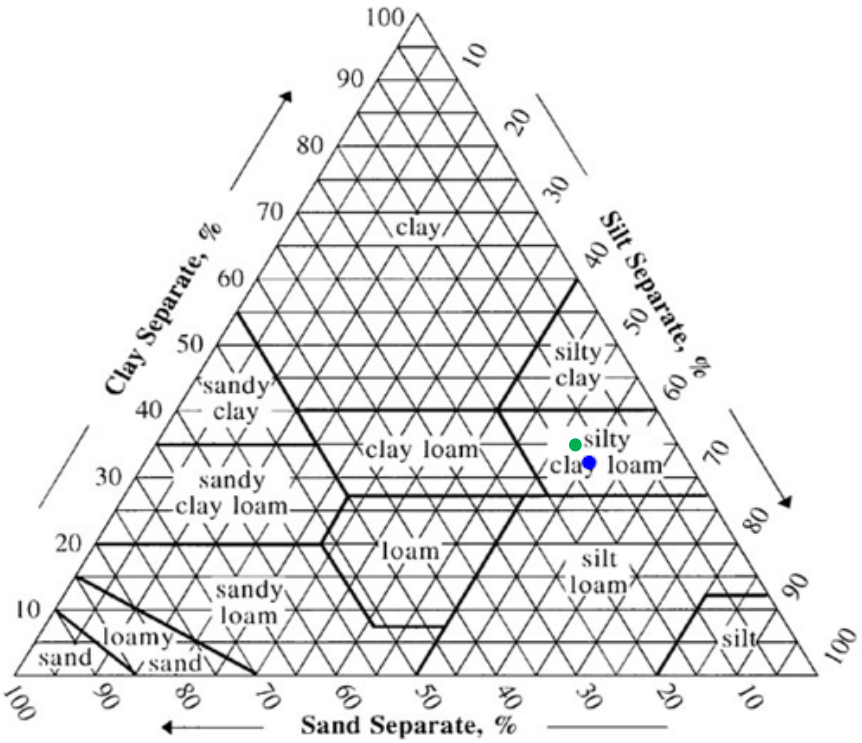
sandy silt layer observed in boring B-22 in the east basin vicinity (*see boring logs in Appendix for more detailed information*).

The side slopes of the basin should be designed to be 1V:3H or flatter. Detailed slope stability analysis was outside of the scope of this project but can be performed as a supplemental report. The slopes will require permanent protection to prevent erosion and storm water runoff. The slope protection system should provide a structurally stable topsoil environment for grass growth.

Infiltration Rate Discussion

Soils at the basins' proposed bottom elevations were used to run hydrometer lab tests and were then characterized by the USDA soil texture classification in order to estimate the infiltration rates of the soil. It is Rubino's understanding that the initial design basin depths are approximately 8 ½ feet below existing grade.

Results from the hydrometer tests are included in the Appendix. The following table includes soil classification based on USDA as well as recommendations for design infiltration rates for soils based on USDA soil texture classification (Univ. of Wisconsin, Madison, 2006).



USDA Soil Texture	Design Infiltration Rate (in/hr)
Sand	3.60
Loamy Sand	1.63
Sandy Loam	0.50
Loam	0.24
Silt Loam	0.13
Sandy Clay Loam	0.11
Silty Clay Loam	0.19
Clay Loam	0.03
Sandy Clay	0.04
Silty Clay	0.07
Clay	0.07

Table 8: Design Infiltration Rates

KEY	BORING	ELEVATION (FEET)	USDA SOIL TEXTURE CLASSIFICATION	DESIGN INFILTRATION RATE (IN/HR)
●	B-22 (On-site east basin)	702.5 – 695.5	SILTY CLAY LOAM	0.11

KEY	BORING	ELEVATION (FEET)	USDA SOIL TEXTURE CLASSIFICATION	DESIGN INFILTRATION RATE (IN/HR)
●	B-23 (TT Technologies west basin)	705.0 – 698.5	SILTY CLAY LOAM	0.11

Parking Lot Pavement Recommendations

Prior to paving, the prepared subgrade should be proofrolled and documented by a representative of Rubino. Localized soft areas identified should be repaired prior to paving. Please reference the Appendix for subgrade preparation, stability, and pavement design recommendations.

- The prepared pavement subgrade may require rework when the subgrade is either desiccated or wet.
- In conjunction with proper maintenance, removing unstable soils at the time of construction will extend the life of the pavement.
- Please reference the Appendix for subgrade preparation, stability, and pavement design recommendations.

Based on the boring information in the proposed pavement areas for the North Storage Yard (B-27), the East Parking area (B-30), the South Entrance (B-32), and the West Access Road (B-35) Rubino believes the existing soils at this site will have a subgrade pavement bearing characteristic typical of soil with a CBR value of 3 (typical for clayey soils). Subgrade stability should be checked during construction by performing a proofroll on the soils prior to placing subbase stone. Based on this value, it is possible to use a locally typical "standard" pavement section consisting of the following:

Table 9: Recommended Pavement Section

Recommended Thicknesses (Inches) based on a CBR of 3		
Pavement Materials	**Light Duty**	**Heavy Duty**
Asphaltic Surface Course	1 ½	1 ½
Asphaltic Binder Course	2 ½	3 ½
Base Aggregate	10	12
Or		
Portland Cement Concrete	6	8
Base Aggregate	10	12
Notes: Grade subgrade soil to positively drain. Add underdrains to avoid collecting water at transitions in pavement section thickness. Place Filter Fabric placed between open-graded stone and subgrade soil		

Rigid concrete pavement is recommended in the North Storage Yard and Mulch Storage areas and/or where trash dumpsters or semi-trailers are to be parked on the pavement or where a considerable load is transferred from relatively small steel wheels or other point loads.

- Structural concrete pads should be at least 8-inches thick and properly reinforced.

In large areas of pavement, or where pavements are subject to significant traffic, a more detailed analysis of the subgrade and traffic conditions should be made. The results of such a study will provide information necessary to design an economical and serviceable pavement. Additional pavement considerations are located in the Appendix to this report.

Storage Area Settlement

Based on the known subsurface conditions, laboratory testing, and past experience, Rubino anticipates that properly designed and constructed concrete pads in the North Storage Yard and Mulch Storage areas supported on the recommended, observed and documented natural clay soils should experience maximum total settlement of less than 1 inch.

Pavement Drainage and Maintenance

Fine-grained soils can be sensitive to remolding in the presence of water. In the areas of surficial clays, the surface should be maintained in a graded condition to prevent standing water on the subgrade. Appropriate measures may include, but are not limited to:

1. **Shaping/pitching the sub-grade to drain toward side drainage ditch along the pavement.**
2. Providing proper filtration for runoff waters. Proper drainage of the pavement is mandated by Article 202.05 of the IDOT Standard Specifications.
3. Rubino recommends placing CA-06 as the fill at the interface of clay and the new pavement. If open-graded stone is used, a geotextile should be placed between the fine-grained soil and the stone.
4. Rubino recommends pavements be sloped to provide rapid surface drainage. Water allowed to pond on or adjacent to the pavement could saturate the subgrade and cause premature deterioration of pavements, and removal and replacement may be required.
5. **Consideration should be given to the use of an interceptor drain to collect and remove water collecting in the granular base.** The interceptor drains could be incorporated with the storm drains of other utilities located in the pavement areas.
6. Periodic maintenance of the pavement should be anticipated. This should include sealing of cracks and joints and by maintaining proper surface drainage to avoid ponding of water on or near the pavement area.

Recommendations for Additional Testing

Once the structural loads, site plan and grading plans are finalized, please notify Rubino so that we can review our recommendations for the direct use of the structure and development of the site.

Changes in building location, foundation depth, and structural loading can affect the geotechnical recommendations for this site.

During construction, Rubino recommends that one of our representatives be onsite for typical **observations and documentation** of exposed subgrade for support of floor slabs, foundations, and pavements, including proofrolling and penetrometer testing.

CLOSING

The recommendations submitted are based on the available subsurface information obtained by Rubino Engineering, Inc. and design details furnished by City of Aurora for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, Rubino should be notified immediately to determine if changes in the recommendations are required. If Rubino is not retained to perform these functions, we will not be responsible for the impact of those conditions on the project.

The scope of services did not include an environmental assessment to determine the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater or air on, below, or around this site. Any statements in this report and/or on the boring logs regarding odors, colors, and/or unusual or suspicious items or conditions are strictly for informational purposes.

After the plans and specifications are more complete, the geotechnical engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of City of Aurora and their consultants for the specific application to the proposed Consolidated Public Works Facility in Aurora, Illinois.

Appendix A – Drilling, Field, and Laboratory Test Procedures

ASTM D1586 Penetration Tests and Split-Barrel Sampling of Soils

During the sampling procedure, Standard Penetration Tests (SPT's) were performed at regular intervals to obtain the standard penetration (N-value) of the soil. The results of the standard penetration test are used to estimate the relative strength and compressibility of the soil profile components through empirical correlations to the soils' relative density and consistency. The split-barrel sampler obtains a soil sample for classification purposes and laboratory testing, as appropriate for the type of soil obtained.

Water Level Measurements

Water level observations were attempted during and upon completion of the drilling operation using a 100-foot tape measure. The depths of observed water levels in the boreholes are noted on the boring logs presented in the appendix of this report. In the borings where water is unable to be observed during the field activities, in relatively impervious soils, the accurate determination of the groundwater elevation may not be possible even after several days of observation. Seasonal variations, temperature and recent rainfall conditions may influence the levels of the groundwater table and volumes of water will depend on the permeability of the soils.

Ground Surface Elevations

The elevations on the boring logs were provided by the City of Aurora. Ground surface elevations can be obtained by Rubino utilizing a Trimble R2 GPS with subfoot accuracy but would still need to be verified by others; accuracy of the elevations provided by Rubino may be limited by tree or brush cover, nearby tall buildings, cloudy weather, precipitation, overhead utility lines, or other factors that can limit GPS accuracy. Rubino can provide estimated horizontal and vertical accuracy as collected from the field upon request. The depths indicated on the attached boring logs are relative to the existing ground surface for each individual boring at the time of the exploration. Copies of the boring logs are located in the Appendix of this report.

ASTM D2166 Unconfined Compressive Strength

Unconfined compression tests are used to obtain approximate compressive strength of cohesive soils by recording the maximum load attained per unit area of a soil sample at failure or at 15% axial strain, whichever occurs first. A compression device may be a platform weighing scale equipped with a device with sufficient capacity and control to provide a specific rate of loading.

ASTM D2216 Water (Moisture) Content of Soil by Mass (Laboratory)

The water content is an important index property used in expressing the phase relationship of solids, water, and air in a given volume of material and can be used to correlate soil behavior with its index properties. In fine grained cohesive soils, the behavior of a given soil type often depends on its natural water content. The water content of a cohesive soil along with its liquid and plastic limits as determined by Atterberg Limit testing are used to express the soil's relative consistency or liquidity index.

ASTM D2974 Standard Test Method for Organic Soils using Loss on Ignition (Laboratory)

These test methods cover the measurement of moisture content, ash content, and organic matter in peats and other organic soils, such as organic clays, silts, and mucks. Ash content of a peat or organic soil sample is determined by igniting the oven-dried sample from the moisture content determination in a muffle furnace at 440°C (Method C) or 750°C (Method D). The substance remaining after ignition is the ash. The ash content is expressed as a percentage of the mass of the oven-dried sample. 2.4 Organic matter is determined by subtracting percent ash content from 100.

ASTM D4318 Atterberg Limits (Laboratory)

Atterberg limit testing defines the liquid limit (LL) and plastic limit (PL) states of a given soil. These limits are used to determine the moisture content limits where the soil characteristics changes from behaving more like a fluid on the liquid limit end to where the soil behaves more like individual soil particles on the plastic limit end. The liquid limit is often used to determine if a soil is a low or high plasticity soil. The plasticity index (PI) is difference between the liquid limit and the plastic limit. The plasticity index is used in conjunction with the liquid limit to determine if the material will behave like a silt or clay.

Appendix B – Site Preparation – Clearing & Grubbing

Rubino recommends that unsuitable soils or fill be removed from the site, as applicable. Unsuitable soils or fills can be described as, but are not limited to:

- organic soil / topsoil / plants / trees / shrubs / grass
- frozen soil
- existing asphalt or concrete pavement sections
- existing foundations
- building debris
- existing curbs

Stripping operations should extend a minimum of: **10** feet beyond proposed building limits and **5** feet beyond proposed pavement limits

Exceptions: where property limits allow. Notify geotechnical engineer if there are property boundary limitations. Stripping operations should be monitored and documented by a representative of the geotechnical engineer at the time of construction.

Proofrolling:

After stripping and excavating to the proposed subgrade level, as required, the paved parking lot and driveway areas should be proof-rolled and scarified and compacted to at least 95 percent of the standard Proctor maximum dry density ASTM D 698 for a depth of at least 8 inches below the surface during a period of dry weather.

Proofrolling Equipment:

Tandem-axle dump truck or similar rubber-tired vehicles are acceptable and should be loaded with at least 9 tons per axle.

Benefits of Proofrolling:

- Aids in providing a firm base for compaction of fill soils
- Helps to delineate soft, loose, or disturbed areas that may exist below subgrade level.

Subgrade Stability:

Soils which are observed to rut or deflect excessively (typically greater than 1 inch) under the moving load should either be scarified and re-compacted, or undercut and replaced.
Subgrade soils may be **stabilized** by one of the following **options**:

- **Scarifying and re-compacting** the existing subgrade soil to at least 95% compaction per ASTM D698 Standard Proctor (12-inch depth).
- **Remove and replace** with non-woven filter fabric and 3-inch stone capped with CA-06 stone.
  - A layer of non-woven filter geotextile should be placed between silty clay soil and an open-graded stone.
  - The contractor can also attempt to stabilize the existing subgrade in place by “losing” 3-inch stone into the subgrade until the until the voids of the 3-inch stone are filled with the soft soil and the subgrade “locks up,” showing minimal deflection under a proofroll.
- **Geogrid and a stone mat** per manufacturer’s installation specifications could reduce the amount of stone required and provide additional lateral support for foundation loads in service.
- **Lime or other chemical additive** stabilization (12 to 14 inches). This can be done as part of a lift structure. Compaction requirements still apply.

Appendix C – Fill Recommendations

In general, fill materials should meet the following:

- Standard Proctor maximum dry density >100 pcf
- Free of organic or other deleterious materials
- Have a maximum particle size no greater than 3 inches
- Have a liquid limit <45 and plasticity index <25
- Testing should include areas at least 5 feet outside the parking area perimeters, if applicable
- Each lift of compacted, engineered fill should be tested and documented by a representative of the geotechnical engineer prior to placement of subsequent lifts

Suitable Soil Classifications:

CL, SC, GW, and SW will generally be suitable for use as structural fill under pavements.

Unsuitable Soil Classifications:

OL, OH, MH, ML, SM, CH and PT should be considered unsuitable.

- If a fine-grained silt or clay soil is used for fill (CL or ML), close moisture content control will be essential to achieve the recommended degree of compaction
- If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying

Structural fill added to the site shall be evaluated in accordance with the following table:

Material Tested	Proctor Type*-1	Min % Dry Density	Placement Moisture Content Range	Frequency of Testing*-2	Maximum Loose Lift Height
Structural Fill (Cohesive & Well-graded Granular)	Standard	98%	-2 to +3 %	1 per 2,500 yd^2 of fill placed	8 inches
Random Fill (non-load bearing)	Standard	95%	-3 to +3 %	1 per 5,000 yd^2 of fill placed	8 inches
Utility Trench Backfill	Standard	95%	-2 to +2 %	1 per 50 LF of fill placed	6 inches

*-1 The test frequency for the laboratory reference shall be one laboratory Proctor or Relative Density test for each material used on the site. If the borrow or source of fill material changes, a new reference moisture/density test should be performed.

*-2A minimum of one test per lift is recommended unless otherwise specified.

Tested fill materials that do not achieve either the required dry density or moisture content range shall be recorded, the location noted, and reported to the Contractor and Owner. A re-test of that area should be performed after the Contractor performs remedial measures. The above test frequencies should be discussed with the contractor prior to starting the work.

The geotechnical engineer of record can only certify work that was performed under their direct observation, or under the observation of a competent person under their specific direction.

Appendix D – Foundation Construction Recommendations

Rubino recommends that soils at the bottom of the footing design elevation be observed, documented, and tested by a representative of Rubino prior to concrete placement to evaluate the consistency of the soils in the field with the geotechnical report findings. The remedial procedures described in the following paragraph can be used to provide suitable foundation support where unsuitable material such as soft or loose soils, existing fill, or organic soils are encountered.

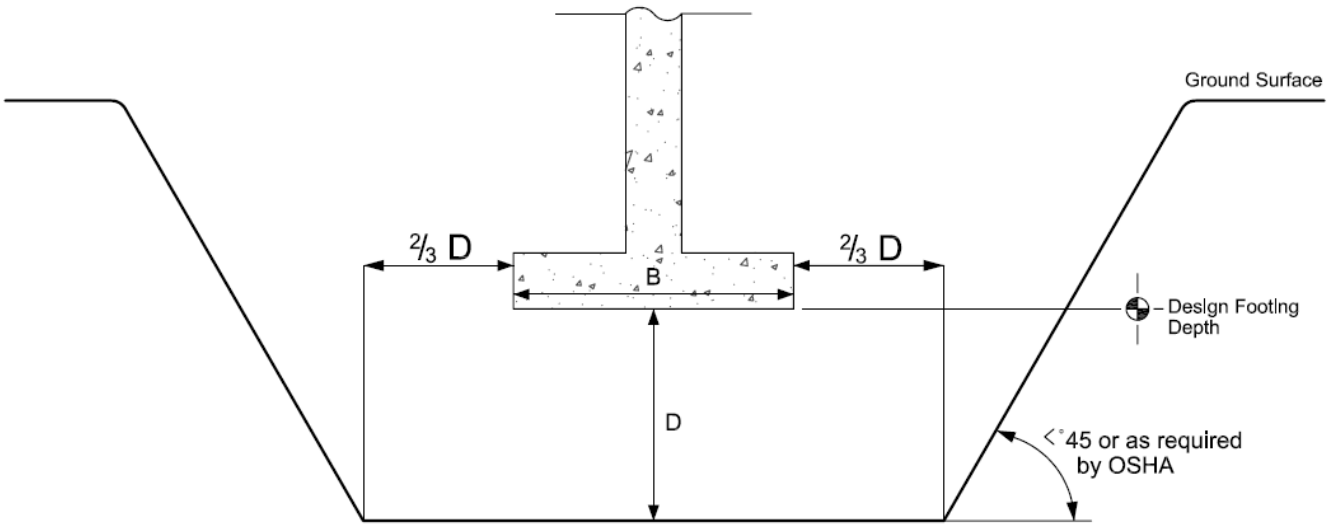
After opening, footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface runoff water should be drained away from the excavations and not be allowed to pond. If possible, the foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, the soils in the excavation should be protected to reduce evaporation or entry of moisture.

If unsuitable bearing soils are encountered in a footing excavation, the footing should be deepened to competent bearing soil and the footing could be lowered, or an over excavation and backfill procedure could be performed. If an over excavation and backfill procedure will be utilized, it would require widening the deepened excavation in all directions at least 8 inches beyond the edges of the footing for each 12 inches of over excavation depth (See "Over Excavation and Backfill Procedure" diagram below).

The over excavation should then be backfilled in a maximum of 8-inches thick loose lifts with suitable granular fill material, such as ¾ -inch stone with fines (CA-6), compacted to at least 98% of the maximum Standard Proctor dry density (ASTM D 698).

Another alternative is to undercut and refill the unsuitable area with flowable mortar up to the design elevation of the footings. The flowable mortar would serve as a protection to the subgrade during construction of the foundations. In this case, widening the footings is not necessary.

Over Excavation and Backfill Procedure



* Drawing not to scale

Appendix E – Slab-on-Grade Considerations

The subgrade modulus provided in the main report should be adjusted for larger areas of loading using the following expression for cohesive and cohesionless soil:

Modulus of Subgrade Reaction, $k_s = (\frac{k}{B})$ for cohesive soil and

$$k_s = k(\frac{B+1}{2B})^2 \text{ for cohesionless soil}$$

where: k_s = coefficient of vertical subgrade reaction for loaded area,
k = coefficient of vertical subgrade reaction for 1x1 square foot area, and
B = width of area loaded, in feet

The precautions listed below should be followed for construction of slab-on-grade pads.

- Cracking of slab-on-grade concrete is normal and should be expected.
- Cracking can occur not only as a result of heaving or compression of the supporting soil and/or fill material, but also as a result of concrete curing stresses.
- The occurrence of concrete shrinkage cracks and problems associated with concrete curing may be reduced and/or controlled by:
  - Limiting the slump of the concrete
  - Proper concrete placement, finishing, and curing
  - The placement of crack control joints at frequent intervals, particularly where re-entrance slab corners occur.
    - The American Concrete Institute (ACI) recommends a maximum panel size (in feet) equal to approximately three times the thickness of the slab (in inches) in both directions.
- The floor slab should be independent of the foundation walls.
- Areas supporting slabs should be properly moisture conditioned and compacted. Backfill in all interior and exterior water and sewer line trenches should be carefully compacted to reduce the shear stress in the concrete extending over these areas.
- Exterior slabs should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.
- Rubino recommends that a minimum 4-inch thick, free-draining granular mat be placed beneath the floor slab to enhance drainage. The floor slabs should have an adequate number of joints to reduce cracking resulting from differential movement and shrinkage. Floor slabs should not be rigidly connected to columns, walls, or foundations.
- A vapor retarder should be considered in areas of tile, carpet, or other moisture sensitive floor finishes. Appropriate curing procedures should be followed to reduce the risk of slab "curling" if a vapor retarder is used.

These details will not reduce the amount of movement but are intended to reduce potential damage should some settlement of the supporting subgrade take place. Some increase in moisture content in the floor slab is inevitable as a result of development and associated landscaping. However, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices.

Appendix F – Pavement Considerations

Pavement Design Criteria

Pavement sections were evaluated using Pavement Assessment Software (PAS) which is based on the 1993 AASHTO Design equations; a reliability of 80%; and a 20-year 18-kip single axle load (ESAL) of 30,000 for light duty and 60,000 for drive areas.

Flexible Pavements were evaluated based on an initial serviceability of 4.2 and a terminal service of 2.0.

Rigid Pavements were evaluated based on an initial serviceability of 4.5 and a terminal service of 2.0; an unreinforced concrete mix with a 28-day modulus of rupture of 550 psi.

Pavement Drainage & Maintenance

Rubino recommends pavements be sloped to provide rapid surface drainage. Water allowed to pond on or adjacent to the pavement could saturate the subgrade and cause premature deterioration of pavements. In this case, removal and replacement may be required.

Consideration should be given to the use of an interceptor drain to remove water collecting in the granular base. The interceptor drains could be incorporated with the storm drains of other utilities located in the pavement areas.

Periodic maintenance of the pavement should be anticipated. This should include sealing of cracks and joints and maintenance of proper surface drainage to avoid ponding of water on or near the pavement area.

Asphalt Pavement Planning Guidelines	***Concrete Pavement Planning Guidelines***
The granular base course should be built at least 2 feet wider than the pavement on each side to support the tracks of the slipform paver. This extra width is structurally beneficial for wheel loads applied at pavement edge. The asphalt base course should comply with **IL-19.0L N-50** binder and be compacted to a minimum of 93.0% of the Maximum Theoretical Density as determined by ASTM D2041. Asphaltic surface mixture should comply with **IL-9.5L N-50** surface and be compacted to a minimum of 92.5% of the Maximum Theoretical Density as determined by ASTM D2041. Asphaltic concrete mix designs should be reviewed to determine if they are consistent with the recommendations given in this report.	Because the pavement at this site will be subjected to freeze-thaw cycles, Rubino recommends that an air entrainment admixture be added to the concrete mix to achieve an air content in the range of 5% to 7% to provide freeze-thaw durability in the concrete. Concrete with a 28-day specified compressive strength of 4,000 psi is typically adequate. Pavement for the dumpster area should be planned to be constructed of Portland cement concrete with load transfer device installed where construction joints are required. A thickened edge is recommended on the outside of slabs subjected to wheel loads. This thickened edge usually takes the form of an integral curb. Fill material should be compacted behind the curb or thicken edge of the outside slabs.

Pavement may be placed after the subgrade has been properly compacted, fine graded and proofrolled. The work should be done in accordance with State Department of Transportation guidelines. Pavement materials should conform to local and state guidelines, if applicable.

Appendix G – Report Limitations

Subsurface Conditions:

The subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the appendix should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratifications, penetration resistances, locations of the samples and laboratory test data as well as water level information. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition between layers may be gradual. The samples, which were not altered by laboratory testing, will be retained for up to 60 days from the date of this report and then will be discarded.

Geotechnical Risk:

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools that geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free, and more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations, presented in the preceding section, constitute Rubino's professional estimate of the necessary measures for the proposed structure to perform according to the proposed design based on the information generated and reference during this evaluation, and Rubino's experience in working with these conditions.

Warranty:

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

Federal Excavation Regulations:

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better ensure the safety of workmen entering trenches or excavations. This federal regulation mandates that all excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person," as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. Rubino is providing this information solely as a service to our client. Rubino is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

Appendix H – Soil Classification General Notes

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1 3/8" I.D., 2" O.D., unless otherwise noted	PS:	Piston Sample
ST:	Thin-Walled Tube - 3" O.D., Unless otherwise noted	WS:	Wash Sample
PM:	Pressuremeter	HA:	Hand Auger
RB:	Rock Bit	HS:	Hollow Stem Auger
DB:	Diamond Bit - 4", N, B	BS:	Bulk Sample

Standard "N" Penetration: Blows per foot of a 140-pound hammer falling 30 inches on a 2-inch O.D. split spoon sampler (SS), except where noted.

WATER LEVEL MEASUREMENT SYMBOLS:

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of ground water levels is not possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION:

Soil Classification is based on the Unified Soil Classification System as defined in ASTM D-2487 and D-2488. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays, if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse grained soils are defined on the basis of their relative in-place density and fine-grained soils on the basis of their consistency. Example: Lean clay with sand, trace gravel, stiff (CL); silty sand, trace gravel, medium dense (SM).

CONSISTENCY OF FINE-GRAINED SOILS:

Unconfined Compressive Strength, Qu (tsf)			N-Blows/ft.			Consistency
	<	0.25	< 2			Very Soft
0.25	-	0.5	2	-	4	Soft
0.5	-	1	4	-	8	Medium Stiff
1	-	2	8	-	15	Stiff
2	-	4	15	-	30	Very Stiff
4	-	8	30	-	50	Hard
>	-	8	> 50			Very Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

N-Blows/ft.			Relative Density
0	-	3	Very Loose
4	-	9	Loose
10	-	29	Medium Dense
30	-	49	Dense
50	-	80	Very Dense
		80+	Extremely Dense

RELATIVE PROPORTIONS OF SAND & GRAVEL

Descriptive Term	% of Dry Weight		
Trace		<	15
With	15	-	29
Modifier		>	30

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% of Dry Weight		
Trace		<	5
With	5	-	12
Modifier		>	12

*Descriptive Terms apply to components also present in sample

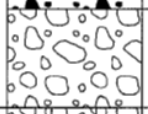
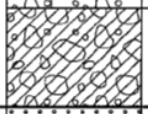
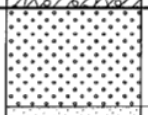
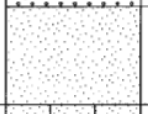
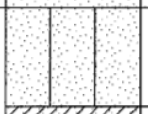
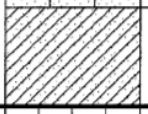
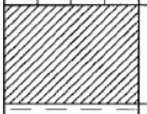
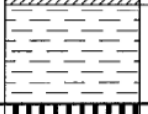
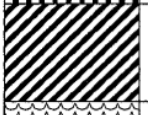
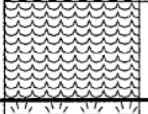
GRAIN SIZE TERMINOLOGY

Major Component	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. To 3 in. (300mm to 75mm)
Gravel	3 in. To #4 sieve (75mm to 4.75mm)
Sand	#4 to #200 sieve (4.75mm to 0.75mm)

Appendix I – Soil Classification Chart

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

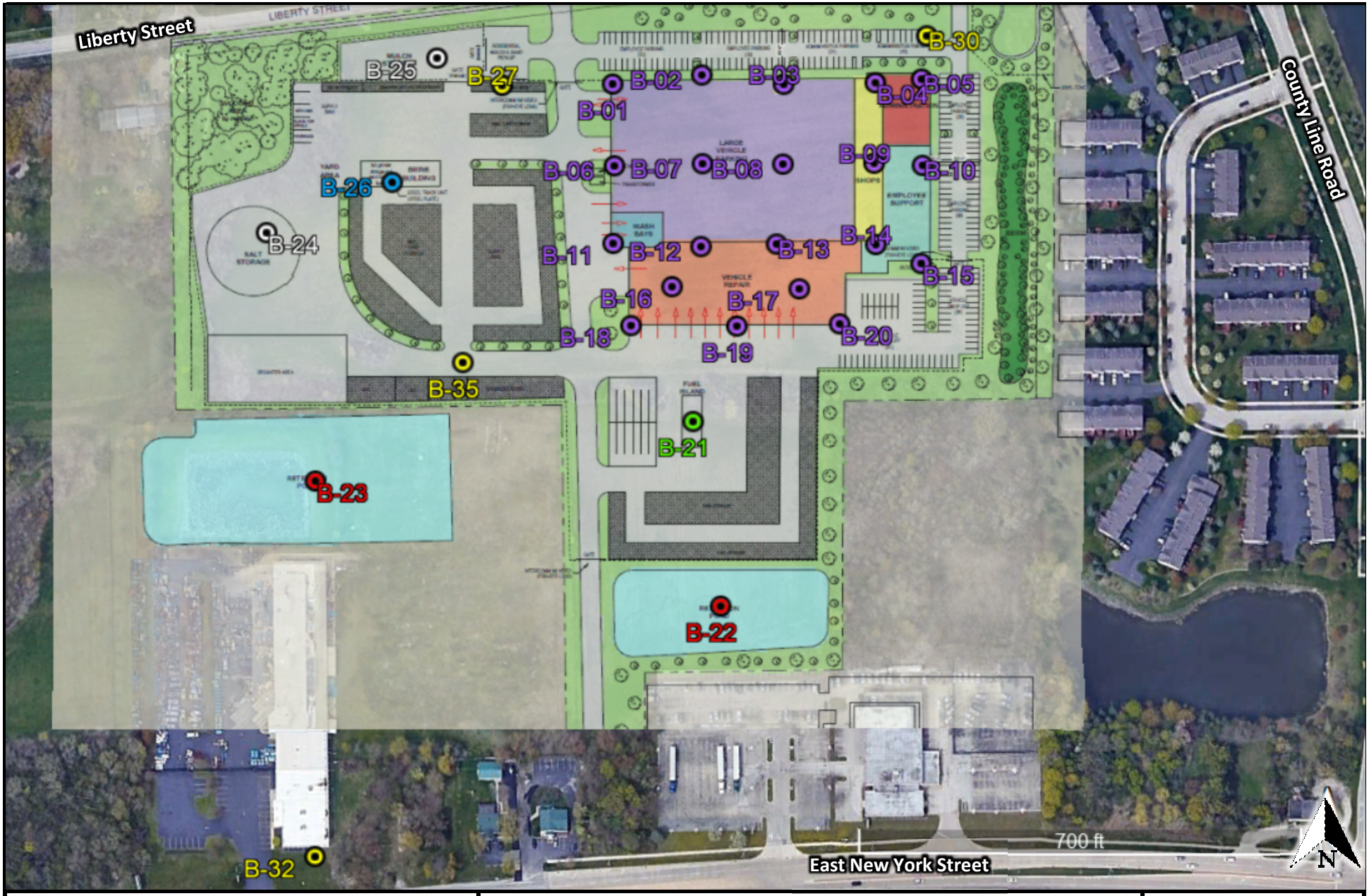
Appendix J – Site Vicinity Map & Boring Location Plan

rubino ENGINEERING INC.

425 Shepard Drive
Elgin, Illinois 60123

Project Name:	**Consolidated Public Works Facility**
Project Location:	Liberty Street Aurora, Illinois
Client:	**City of Aurora**
Rubino Project # :	G21.037

Site Vicinity Map



rubino ENGINEERING INC.

425 Shepard Drive
Elgin, Illinois 60123

Project Name:	**Consolidated Public Works Facility**
Project Location:	Liberty Street Aurora, Illinois
Client:	**City of Aurora**
Rubino Project # :	G21.037

Boring Location Plan
IN PROGRESS

Appendix K – Borings Logs

rubino ENGINEERING INC.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-01

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora

Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	NW corner of Garage

WATER LEVELS***

While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Surface Elev.: 720.4 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
720	0			Approximately 14 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
		1	13	Medium stiff, brown and gray SILT, trace sand and gravel		2-2-4 N=6	25	Qp=1.8 tsf 5% Organic Content
		2	12		ML	2-2-4 N=6	28	Qp=1.8 tsf 4% Organic Content LL = 39 PL = 26 Q_u = 1.4 tsf
715	5	3	17			3-1-4 N=5	21	Qp=1.8 tsf
		4	18	Stiff, brown silty CLAY, trace sand and gravel		6-5-6 N=11	14	Qp=3.3 tsf
710	10	5	16	*Color transitions to gray at approximately 11 feet below existing grade.*		4-6-7 N=13	16	Qp=3.8 tsf
		6	16		CL	3-4-8 N=12	15	Qp=3.3 tsf
705	15	7	15			3-4-6 N=10	17	Qp=2.5 tsf
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	1/11/22
Date Boring Completed:	1/11/22
Logged By:	H.G.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763940
Longitude: -88.264591
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-02

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	Mid West North Bld Line	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 722.7 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 14 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
720		1	11	Stiff to very stiff, brown silty CLAY, trace sand and gravel		3-2-4 N=6	23	Qp=1.8 tsf
	5	2	15			3-4-6 N=10	21	Qp=2.0 tsf
715		3	17		CL	3-4-6 N=10	18	Qp=2.5 tsf
	10	4	18			5-9-12 N=21	19	Qp=>4.5 tsf
		5	9	Stiff to very stiff, gray silty CLAY, trace sand and gravel		7-7-9 N=16	16	Qp=>4.5 tsf
710		6	15			3-4-6 N=10	18	Qp=3.5 tsf
	15				CL			
705		7	10			5-7-7 N=14	13	Qp=4.0 tsf
	20			End of boring at approximately 20 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	1/12/22
Date Boring Completed:	1/12/22
Logged By:	H.G.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763938
Longitude: -88.264080
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-03

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora

Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	Mid East North Bld Line

WATER LEVELS***

While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
				Surface Elev.: 727.8 ft				
	0			Approximately 6 inches of TOPSOIL: dark brown silty clay				
		1	18	Stiff, brown silty CLAY, trace sand and gravel		2-4-7 N=11	15	Qp=3.0 tsf
725		2	18			5-7-9 N=16	16	>>Qp=4.5 tsf
	5	3	18			5-7-9 N=16	18	>>Qp=4.5 tsf
720		4	18		CL	4-6-9 N=15	17	>>Qp=4.5 tsf
	10	5	18			5-7-9 N=16	17	>>Qp=4.5 tsf
715		6	6			4-5-8 N=13	13	Qp=3.0 tsf
	15							
710								
		7	14	Stiff, gray silty CLAY, trace sand and gravel	CL	5-6-8 N=14	12	Qp=3.5 tsf
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	3/4/22
Date Boring Completed:	3/4/22
Logged By:	J.W.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763933
Longitude: -88.263614
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-04

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	NE corner of Garage	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD PENETRATION TEST DATA: Moisture, PL, LL (0 / 25 / 50); STRENGTH, tsf: Qu (Rimac), Qp (0 / 2.0 / 4.0)	Additional Remarks
						Surface Elev.: 730.3 ft					
730	0					Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter					
						Stiff to very stiff, brown silty CLAY, trace sand and gravel					
				1	16			3-3-6 N=9	19		Qp=>4.5 tsf
				2	18			7-8-9 N=17	14		Qp=>4.5 tsf
725	5			3	18			6-6-11 N=17	16		Qp=>4.5 tsf
				4	17		CL	7-9-12 N=21	17		Qp=>4.5 tsf
720	10			5	13			13-7-10 N=17	15		Qp=>4.5 tsf
				6	5			7-10-8 N=18	18		Qp=>4.5 tsf
715	15										
				7	14	Stiff, gray silty CLAY, trace sand and gravel	CL	4-5-6 N=11	12		Qp=1.8 tsf
	20					End of boring at approximately 20 feet below existing grade.					

Completion Depth:	20.0 ft	Sample Types:		Latitude: 41.763938
Date Boring Started:	1/5/22	Auger Cutting	Pressuremeter	Longitude: -88.263092
Date Boring Completed:	1/5/22	Split-Spoon	Shelby Tube	Drill Rig: Geoprobe 7822DT
Logged By:	P.P	Rock Core	Hand Auger	Remarks:
Drilling Contractor:	Rubino Engineering, Inc.		No Recovery	

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-05

Rubino Job No.: G21.037
Project: Aurora Public Works Facility
Location: Liberty Street
City, State: Aurora, Illinois
Client: City of Aurora

Drilling Method: 3 ¼ Hollow Stem Auger
Sampling Method: Shelby Tube/Split Spoon
Hammer Type: Automatic
Boring Location: NE Bld Corner

WATER LEVELS***
While Drilling N/A
Upon Completion N/A
Delay N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
				Surface Elev.: 730.5 ft				
730	0			Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
		1	17	Medium stiff, brown silty CLAY, trace sand and gravel	CL	2-3-4 N=7	26	Qp=1.3 tsf 3% Organic Content
		2	14	Stiff to very stiff, brown silty CLAY, with sand and gravel		3-5-9 N=14	10	>>>Qp=4.5 tsf
725	5	3	0		CL	9-12-15 N=27	16	
		4	15	Stiff to very stiff, gray silty CLAY, trace sand and gravel		10-8-15 N=23	16	Qp=>4.5 tsf
720	10	5	18			8-8-11 N=19	15	Qp=>4.5 tsf
		6	18		CL	5-6-10 N=16	18	Qp=>4.5 tsf
715	15	7	13			5-6-5 N=11	12	Qp=2.5 tsf
	20			End of boring at approximately 20 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0, 25, 50)
STRENGTH, tsf: Qu (Rimac), Qp (0, 2.0, 4.0)

Completion Depth: 20.0 ft
Date Boring Started: 1/4/22
Date Boring Completed: 1/4/22
Logged By: P.P.
Drilling Contractor: Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763954
Longitude: -88.262830
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-06

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	West side of Garage	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 719.9 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 10 inches of TOPSOIL: dark brown to black silty clay				
		1	12	Medium stiff, brown to gray silty CLAY, trace sand and gravel	CL	2-3-3 N=6	28	Qp=2.0 tsf
		2	18			2-2-3 N=5	27	Qp=1.5 tsf
715	5							
		3	18	Stiff to very stiff, brown silty CLAY, trace sand and gravel		5-5-7 N=12	18	Qp=4.0 tsf
		4	12			7-8-9 N=17	16	>>Qp=4.5 tsf
710	10							
		5		*Color transitions to gray between approximately 11 and 13 feet below existing grade*		7-8-8 N=16	16	
		6	16		CL	7-6-5 N=11	17	Qp=3.0 tsf
705	15							
		7	14			3-3-4 N=7	18	Qp=2.0 tsf
700	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL (0 – 25 – 50)
STRENGTH, tsf: Qu (Rimac) | Qp (0 – 2.0 – 4.0)

Completion Depth:	20.0 ft
Date Boring Started:	3/4/22
Date Boring Completed:	3/4/22
Logged By:	J.W.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
- Auger Cutting
- Split-Spoon
- Rock Core
- Pressuremeter
- Shelby Tube
- Hand Auger
- No Recovery

Latitude: 41.763582
Longitude: -88.264581
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-07

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora

Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	Middle west of Garage

WATER LEVELS***

While Drilling	6 ft
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
				Surface Elev.: 722.2 ft				
	0			Approximately 14 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
720		1	11	Medium stiff, brown and gray SILT OF HIGH PLASTICITY, trace sand and gravel	MH	3-2-3 N=5	30	Qp=2.0 tsf LL = 51 PL = 29 5% Organic Content
	5	2	15			2-1-3 N=4	27	Qp=0.8 tsf 4% Organic Content
715		3	16	Stiff, brown silty CLAY, trace sand and gravel		4-6-8 N=14	16	Qp=4.5 tsf
	10	4	16			4-5-8 N=13	16	Qp=4.5 tsf
710		5	14	*Color transitions to gray at approximately 11 feet below existing grade.*	CL	4-4-8 N=12	16	Qp=4.3 tsf
	15	6	16			3-4-6 N=10	16	Qp=3.3 tsf
705		7	15	Very stiff, gray silty CLAY, with rock chips, trace sand and gravel	CL	12-8-9 N=17	12	Qp=0.8 tsf
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0 – 25 – 50)
STRENGTH, tsf: Qu (Rimac), Qp (0 – 2.0 – 4.0)

Completion Depth:	20.0 ft
Date Boring Started:	1/11/22
Date Boring Completed:	1/11/22
Logged By:	H.G.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763591
Longitude: -88.264076
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

rubino ENGINEERING INC.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-08

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora

Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	Middle East of Garage

WATER LEVELS***

While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD PENETRATION TEST DATA: Moisture; PL; LL; STRENGTH, tsf: Qu (Rimac); Qp	Additional Remarks
	0					**Surface Elev.:** 727.6 ft					
						Approximately 8 inches of TOPSOIL: dark brown silty clay, with roots and organic matter					
						Stiff, brown silty CLAY, trace sand and gravel					
725				1	16			6-6-7 N=13	14		Qp=>4.5 tsf
				2	18			6-7-9 N=16	17		Qp=>4.5 tsf
	5										
				3	17			6-7-10 N=17	17		Qp=>4.5 tsf
720											
				4	16		CL	5-6-10 N=16	16		Qp=>4.5 tsf
	10										
				5	14			7-5-7 N=12	14		Qp=0.8 tsf
715											
				6	14			5-4-7 N=11	12		Qp=3.0 tsf
	15										
710											
				7	4	Very stiff, gray silty CLAY, trace sand and gravel	CL	8-12-17 N=29	10		
	20					End of boring at approximately 20 feet below existing grade					

Completion Depth:	20.0 ft
Date Boring Started:	1/5/22
Date Boring Completed:	1/5/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
- Auger Cutting
- Split-Spoon
- Rock Core
- Pressuremeter
- Shelby Tube
- Hand Auger
- No Recovery

Latitude: 41.763586
Longitude: -88.263618
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-09

Rubino Job No.: G21.037
Project: Aurora Public Works Facility
Location: Liberty Street
City, State: Aurora, Illinois
Client: City of Aurora

Drilling Method: 3 ¼ Hollow Stem Auger
Sampling Method: Shelby Tube/Split Spoon
Hammer Type: Automatic
Boring Location: East side of Garage

WATER LEVELS***
While Drilling N/A
Upon Completion N/A
Delay N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD PENETRATION TEST DATA (Moisture, PL, LL; STRENGTH, tsf: Qu (Rimac), Qp)	Additional Remarks
						Surface Elev.: 730.5 ft					
730	0					Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter					
				1	18	Very stiff to hard, brown silty CLAY, trace sand and gravel		4-6-9 N=15	15		Qp=>4.5 tsf
				2	18			8-8-12 N=20	14		Qp=>4.5 tsf
725	5			3	17		CL	9-8-11 N=19	12		Qp=>4.5 tsf
				4	0			17-17-18 N=35	15		
720	10			5	16	Stiff to very stiff, gray silty CLAY, trace sand and gravel		4-7-8 N=15	18		Qp=>4.5 tsf
				6	17	*Increase in gravel at approximately 13 ½ feet below existing grade*		6-7-10 N=17	11		>>Qp=4.5 tsf
715	15			7	10		CL	4-5-8 N=13	12		Qp=3.3 tsf
	20					End of boring at approximately 20 feet below existing grade					

Completion Depth: 20.0 ft
Date Boring Started: 1/4/22
Date Boring Completed: 1/4/22
Logged By: P.P.
Drilling Contractor: Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763588
Longitude: -88.263099
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-10

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora
Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	Mid East Office

WATER LEVELS***

While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Surface Elev.: 730.4 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
730	0			Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
		1	15	Stiff to very stiff, brown silty CLAY, trace sand and gravel		3-4-8 N=12	26	Qp=1.8 tsf 4% Organic Content
		2	18			7-9-13 N=22	15	Qp=>4.5 tsf
725	5	3	16		CL	6-9-10 N=19	16	Qp=>4.5 tsf
		4	17			4-8-13 N=21	15	Qp=>4.5 tsf
720	10	5	16	*Increase of sand and gravel at approximately 11 feet below existing grade* Medium stiff to stiff, gray silty CLAY, trace sand and gravel		7-9-9 N=18	18	Qp=>4.5 tsf
		6	16			4-4-6 N=10	15	Qp=>4.5 tsf
715	15				CL			
		7	18			2-3-5 N=8	13	Qp=2.3 tsf
	20			End of boring at approximately 20 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	1/4/22
Date Boring Completed:	1/4/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763579
Longitude: -88.262822
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-11

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora

Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	SW corner of Garage

WATER LEVELS***

While Drilling	18.5 ft
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
				Surface Elev.: 720.3 ft				
720	0			Approximately 12 inches of TOPSOIL: silty clay, with roots and organic matter				
		1	15	Medium stiff, brown silty CLAY, trace sand and gravel	CL	3-3-4 N=7	15	Qp=2.5 tsf
		2	17	Stiff to very stiff, brown silty CLAY, trace sand and gravel		3-5-9 N=14	12	>>Qp=4.5 tsf
715	5	3	0		CL	8-7-8 N=15	16	
		4	18			5-6-10 N=16	16	>>Qp=4.5 tsf
710	10	5	16	Very stiff, gray silty CLAY, trace sand and gravel		6-7-9 N=16	15	>>Qp=4.5 tsf
		6	0	*Rock chips observed in 13½ ft spoon*		5-7-9 N=16	18	
705	15	7	9		CL	7-12-10 N=22	13	Qp=4.0 tsf
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0, 25, 50)
STRENGTH, tsf: Qu (Rimac), Qp (0, 2.0, 4.0)

Completion Depth:	20.0 ft
Date Boring Started:	1/11/22
Date Boring Completed:	1/11/22
Logged By:	H.G.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763244
Longitude: -88.264588
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-12

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora
Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	South side of Garage

WATER LEVELS***

While Drilling	N/A
Upon Completion	16 ft
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
				Surface Elev.: 723.2 ft				
	0			Approximately 14 inches of TOPSOIL: dark brown to black silty clay				
		1	12	Medium stiff, brown and gray silty CLAY, trace sand and gravel	CL	2-2-3 N=5	27	Qp=2.0 tsf
720								
		2	18	Medium stiff, brown and gray clayey SILT, trace sand and gravel	ML	1-2-3 N=5	21	Qp=1.3 tsf
	5							
		3	18	Stiff, brown silty CLAY, trace sand and gravel		2-4-7 N=11	14	Qp=4.0 tsf
715								
		4	10	*Large rock observed at approximately 9 feet below existing grade, N-values may be skewed*	CL	16-52-23 N=75	12	>>Qp=4.5 tsf
	10							
		5				6-5-7 N=12	21	
710								
		6	16	Stiff, gray silty CLAY, trace sand and gravel		5-6-8 N=14	17	Qp=3.5 tsf
	15				CL			
705								
		7	18			4-5-7 N=12	18	Qp=3.5 tsf
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	3/4/22
Date Boring Completed:	3/4/22
Logged By:	J.W.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763229
Longitude: -88.264085
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-13

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	Mid East South Garage	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			**Surface Elev.:** 727.6 ft				
				Approximately 8 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
725		1	10	Medium stiff, brown silty CLAY with sand, trace gravel	CL	2-2-4 N=6	21	Qp=0.8 tsf
	5	2	13	Stiff to very stiff, gray silty CLAY, trace sand and gravel		5-5-9 N=14	15	Qp=>4.5 tsf
720		3	17			5-8-10 N=18	16	Qp=>4.5 tsf
	10	4	0			12-13-14 N=27	15	
715		5	13		CL	4-6-7 N=13	16	Qp=4.0 tsf
	15	6	13			5-6-8 N=14	16	
710		7	6			10-21-8 N=29	12	Qp=2.3 tsf
	20			End of boring at approximately 20 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	1/5/22
Date Boring Completed:	1/5/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763239
Longitude: -88.263654
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
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Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-14

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	20 ft
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	SE Garage Corner	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 730.1 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
		1	14	Stiff to very stiff, brown silty CLAY, trace sand and gravel		4-6-8 N=14	17	Qp=>4.5 tsf
		2	15			5-7-11 N=18	15	Qp=>4.5 tsf
725	5				CL			
		3	18			8-7-10 N=17	16	Qp=>4.5 tsf
		4	18			6-7-12 N=19	19	>>Qp=4.5 tsf
720	10							
		5	14	Stiff to very stiff, gray silty CLAY, trace sand and gravel		7-8-11 N=19	16	>>Qp=4.5 tsf
		6	17			3-4-4 N=8	16	Qp=1.5 tsf
715	15				CL			
		7	18			9-7-9 N=16	12	Qp=1.5 tsf
	20			End of boring at approximately 20 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	1/4/22
Date Boring Completed:	1/4/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763235
Longitude: -88.263089
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-15

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	SE Office Corner	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 728.7 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
		1	18	Very stiff to hard, brown silty CLAY, trace sand and gravel		4-7-9 N=16	16	Qp=>4.5 tsf
725		2	14			8-9-11 N=20	15	Qp=>4.5 tsf
	5	3	18		CL	4-6-9 N=15	16	Qp=>4.5 tsf
720		4	15			6-17-18 N=35	17	Qp=>4.5 tsf
	10	5	16			9-12-15 N=27	17	Qp=>4.5 tsf
715		6	18	Very stiff, gray silty CLAY, trace sand and gravel		4-6-9 N=15	14	Qp=4.0 tsf
	15				CL			
710		7	4	Very stiff, gray silty CLAY, with sand and gravel	CL	17-18-10 N=28	12	
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	20.0 ft
Date Boring Started:	1/4/22
Date Boring Completed:	1/4/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763153
Longitude: -88.262830
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-16

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	West Mid Vehicle Main	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 723.3 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 10 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
		1	17	Medium stiff, brown and gray silty CLAY, trace sand and gravel	CL	3-3-4 N=7	28	Qp=1.5 tsf 4% Organic Content
720								
		2	18	Stiff to very stiff, brown silty CLAY, trace sand and gravel		4-4-6 N=10	18	Qp=4.0 tsf
	5							
		3	16		CL	4-7-8 N=15	17	>>Qp=4.5 tsf
715								
		4	18			4-7-10 N=17	16	>>Qp=4.5 tsf
	10							
		5	15	Stiff, gray silty CLAY, trace sand and gravel		4-4-6 N=10	15	Qp=3.0 tsf
710								
		6	18			4-3-6 N=9	15	Qp=2.8 tsf
	15				CL			
705								
		7	0	*Rock chips observed in 18½ ft spoon*		9-50/2"-		>>
				Auger and spoon refusal at approximately 19 feet 2 inches below existing grade due to possible bedrock. End of boring at approximately 19 feet 2 inches below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0, 25, 50)
STRENGTH, tsf: Qu (Rimac), Qp (0, 2.0, 4.0)

Completion Depth:	19.2 ft	Sample Types:	Pressuremeter, Auger Cutting, Shelby Tube, Split-Spoon, Hand Auger, Rock Core, No Recovery
Date Boring Started:	1/11/22		
Date Boring Completed:	1/11/22		
Logged By:	H.G.		
Drilling Contractor:	Rubino Engineering, Inc.		

Latitude: 41.763054
Longitude: -88.264251
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-17

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora
Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	East Mid Vehicle Main

WATER LEVELS***

While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
				Surface Elev.: 728.2 ft				
	0			Approximately 6 inches of TOPSOIL: dark brown to black silty clay				
				Medium stiff, brown silty CLAY, trace sand and gravel	CL			
		1	12	Medium stiff, light brown sandy, silty CLAY, trace gravel	CL	1-2-3 N=5	22	Qp=0.5 tsf
725								
				Stiff to very stiff, brown silty CLAY, trace sand and gravel				
		2	18			4-3-7 N=10	15	
	5							
		3	18			3-6-7 N=13	17	>>Qp=4.5 tsf
720								
		4				7-8-11 N=19	18	
	10							
							16	
		5	18	*Increase in gravel observed between approximately 11 to 11½ feet below existing grade*	CL	13-14-10 N=24	10	Qp=4.0 tsf
715								
				Color transitions to gray at approximately 13½ feet below existing grade				
		6	6			7-8-8 N=16	14	Qp=3.5 tsf
	15							
710								
		7	18			5-5-7 N=12	12	Qp=2.5 tsf
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0 – 25 – 50)
STRENGTH, tsf: Qu (Rimac), Qp (0 – 2.0 – 4.0)

Completion Depth:	20.0 ft
Date Boring Started:	3/4/22
Date Boring Completed:	3/4/22
Logged By:	J.W.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
- Auger Cutting
- Split-Spoon
- Rock Core
- Pressuremeter
- Shelby Tube
- Hand Auger
- No Recovery

Latitude: 41.763043
Longitude: -88.263525
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-18

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora

Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	SW corner of Vehicle Main

WATER LEVELS***	
While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			**Surface Elev.:** 724.2 ft				
				Approximately 8 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
		1	14	Medium stiff to stiff, brown silty CLAY, trace sand and gravel		2-3-3 N=6	25	Qp=2.3 tsf 4% Organic Content
720	5	2	18			4-6-7 N=13	14	Qp=3.5 tsf
		3	18		CL	3-3-5 N=8	13	Qp=2.0 tsf
715	10	4	18			4-5-8 N=13	14	Qp=3.0 tsf
		5	18	Medium stiff to stiff, gray silty CLAY, trace sand and gravel		7-7-7 N=14	13	Qp=1.0 tsf
710	15	6	18		CL	3-4-5 N=9	13	Qp=2.0 tsf
705	20	7	18			3-2-4 N=6	12	Qp=1.5 tsf
				End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL: 0 — 25 — 50
STRENGTH, tsf: Qu (Rimac), Qp: 0 — 2.0 — 4.0

Completion Depth:	20.0 ft
Date Boring Started:	1/11/22
Date Boring Completed:	1/11/22
Logged By:	H.G.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
- Auger Cutting
- Split-Spoon
- Rock Core
- Pressuremeter
- Shelby Tube
- Hand Auger
- No Recovery

Latitude: 41.762884
Longitude: -88.264486
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-19

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora
Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	South Vehicle Main

WATER LEVELS***

While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			**Surface Elev.:** 727.1 ft				
				Approximately 6 inches of TOPSOIL: dark brown to black silty clay				
725		1	12	Soft, brown to light brown silty CLAY, trace sand and gravel	CL	0-1-2 N=3	24	Qp=0.8 tsf
	5	2	18	Medium stiff, light brown clayey SILT		1-2-2 N=4	24	Qp=0.5 tsf
720		3	18		ML	2-2-3 N=5	23	Qp=1.8 tsf
	10	4	18	Medium stiff, brown silty CLAY, trace sand and gravel	CL	2-2-3 N=5	24	Qp=1.5 tsf
		5	18	Stiff, brown silty sandy CLAY, trace sand and gravel	CL	14-10-9 N=19	10	
715				Stiff, brown to gray silty CLAY, trace sand and gravel			17	
	15	6	4			7-7-10 N=17	13	Qp=3.5 tsf
710					CL			
	20	7	16			4-6-8 N=14	17	Qp=3.5 tsf
				End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0 – 25 – 50)
STRENGTH, tsf: Qu (Rimac), Qp (0 – 2.0 – 4.0)

Completion Depth:	20.0 ft
Date Boring Started:	3/4/22
Date Boring Completed:	3/4/22
Logged By:	J.W.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.762881
Longitude: -88.263881
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-20

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	SE corner of Vehicle Main	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			**Surface Elev.:** 726.5 ft				
	0			Approximately 8 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
725		1	14	Stiff to very stiff, brown silty CLAY, trace sand and gravel		2-3-5 N=8	17	Qp=2.0 tsf
		2	9			5-11-10 N=21	15	>>Qp=4.5 tsf
	5				CL			
720		3	18			5-10-12 N=22	18	>>Qp=4.5 tsf
		4	17			3-5-7 N=12	18	Qp=4.0 tsf
	10							
715		5	17	Medium stiff to stiff, brown silty CLAY, with gravel, trace sand		3-3-3 N=6	15	Qp=1.3 tsf
		6	0		CL	6-6-7 N=13	14	
	15							
710								
		7	9	Very stiff, gray silty CLAY, with gravel, trace sand	CL	9-7-8 N=15	14	
	20			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0, 25, 50)
STRENGTH, tsf: Qu (Rimac), Qp (0, 2.0, 4.0)

Completion Depth:	20.0 ft	Sample Types:	Pressuremeter, Auger Cutting, Shelby Tube, Split-Spoon, Hand Auger, Rock Core, No Recovery
Date Boring Started:	1/11/22		
Date Boring Completed:	1/11/22		
Logged By:	H.G.		
Drilling Contractor:	Rubino Engineering, Inc.		

Latitude: 41.762891
Longitude: -88.263293
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-21

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora
Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	Fuel Station

WATER LEVELS***

While Drilling	N/A
Upon Completion	N/A
Delay	N/A

Station: N/A
Offset: N/A

Surface Elev.: 721.5 ft

Elevation (feet)	Depth (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
720		1	16	Stiff, light brown SILT, trace sand and gravel	ML	3-3-5 N=8	21	
	5	2	11			4-3-7 N=10	21	Qp=2.0 tsf
715		3	18	Stiff to very stiff, brown to gray silty CLAY, trace sand and gravel		3-4-5 N=9	17	Qp=3.5 tsf
	10	4	0	*Color transitions to gray at approximately 9 feet below existing grade*		7-8-9 N=17	18	
710		5	18			4-6-8 N=14	15	Qp=2.3 tsf
	15	6	18			3-6-6 N=12	16	>>Qp=4.5 tsf
705					CL			
	20	7	18			6-7-8 N=15	13	>>Qp=4.5 tsf
700								
	25	8	0			8-8-10 N=18	17	
695								
	30	9	18			4-7-9 N=16	18	Qp=3.3 tsf
				End of boring at approximately 30 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	30.0 ft
Date Boring Started:	3/30/22
Date Boring Completed:	3/30/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.762466
Longitude: -88.264130
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

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425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-22

Rubino Job No.:	G21.037
Project:	Aurora Public Works Facility
Location:	Liberty Street
City, State:	Aurora, Illinois
Client:	City of Aurora
Drilling Method:	3 ¼ Hollow Stem Auger
Sampling Method:	Shelby Tube/Split Spoon
Hammer Type:	Automatic
Boring Location:	Detention Basin

WATER LEVELS***

While Drilling	6.5 ft
Upon Completion	5 ft
Delay	N/A

Station: N/A
Offset: N/A

Surface Elev.: 710.6 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
710	0			Approximately 10 inches of TOPSOIL: dark brown silty clay with organic matter				
				Medium stiff, brown silty CLAY, trace sand and gravel				
		1	18		CL	2-4-3 N=7	29	Qp=1.0 tsf 2% Organic Content
		2	18			3-3-4 N=7	25	Qp=2.3 tsf 2% Organic Content
705	5			Stiff, brown SILT, trace sand and gravel *Sand seam observed at approximately 6 ½ feet below existing grade*	SM		18	
		3	16			4-5-4 N=9	15	Qp=3.3 tsf
				Stiff to very stiff, brown to gray silty CLAY, trace sand and gravel				
		4	18			3-5-6 N=11	17	Qp=3.5 tsf
700	10							
		5	13		CL	7-7-9 N=16	19	>>Qp=4.5 tsf
		6	12			6-5-6 N=11	15	>>Qp=4.5 tsf
	15			End of boring at approximately 15 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0 – 25 – 50)
STRENGTH, tsf: Qu (Rimac), Qp (0 – 2.0 – 4.0)

Completion Depth:	15.0 ft
Date Boring Started:	3/30/22
Date Boring Completed:	3/30/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.761656
Longitude: -88.263968
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-23

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	Detention Basin	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 713.6 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 6 inches of TOPSOIL: black silty clay with organic matter				
		1	4	Medium stiff, brown silty CLAY, trace sand and gravel	CL	3-4-3 N=7	14	>>Qp=4.5 tsf
710		2	17	Medium stiff to stiff, brown and gray mottled silty CLAY, trace sand and gravel		0-4-3 N=7	22	>>Qp=4.5 tsf
	5	3	13	*Increase in sand and gravel at approximately 6 feet below existing grade*	CL	4-3-5 N=8	16	>>Qp=4.5 tsf
705		4	17	Stiff, gray silty CLAY, trace sand and gravel		3-4-5 N=9	17	>>Qp=4.3 tsf
	10	5	16		CL	4-7-6 N=13	16	>>Qp=4.5 tsf
700		6	18			4-6-7 N=13	16	Qp=3.8 tsf
	15			End of boring at approximately 20 feet below existing grade.				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	15.0 ft
Date Boring Started:	3/30/22
Date Boring Completed:	3/30/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.762203
Longitude: -88.266301
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-24

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	Salt Storage	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 718.0 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 6 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
				Stiff to very stiff, brown silty CLAY, trace sand and gravel				
		1	11			1-3-5 N=8	16	Qp=3.0 tsf
715								
		2	17			6-7-9 N=16	16	Qp=>4.5 tsf
	5							
		3	14		CL	4-6-8 N=14	18	Qp=>4.5 tsf
710								
		4	18			4-6-10 N=16	18	Qp=>4.5 tsf
	10			*Large rock encountered at approximately 11 feet below existing grade, N-values may be skewed*				
		5	10			5-35-50/5	17	Qp=>4.5 tsf
705								
		6	15	Very stiff, brown and gray silty CLAY, with gravel, trace sand	CL	19-9-12 N=21	15	>>Qp=4.5 tsf
	15			End of boring approximately 15 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture | PL | LL
0 25 50
STRENGTH, tsf
Qu (Rimac) | Qp
0 2.0 4.0

Completion Depth:	15.0 ft
Date Boring Started:	1/12/22
Date Boring Completed:	1/12/22
Logged By:	H.G.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763292
Longitude: -88.266578
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-25

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	Mulch Relocated	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			**Surface Elev.:** 721.0 ft				
				Approximately 6 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
720				Stiff to very stiff, brown silty CLAY, trace sand and gravel				
		1	16			2-4-7 N=11	18	Qp=1.5 tsf
		2	12			5-8-10 N=18	15	Qp=>4.5 tsf
	5							
715				*Large rock encountered at approximately 6 feet below existing grade, N-values may be skewed*				
		3	0			8-9-12 N=21	16	
					CL			
		4	15			5-8-13 N=21	17	Qp=>4.5 tsf
	10							
710								
		5	15			3-6-9 N=15	16	Qp=>4.5 tsf
				Color changes to brownish gray at approximately 13 ½ feet below existing grade				
		6	16			4-6-10 N=16	16	>>Qp=4.3 tsf
	15			End of boring at approximately 15 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL (0, 25, 50)
STRENGTH, tsf: Qu (Rimac), Qp (0, 2.0, 4.0)

Completion Depth:	15.0 ft	Sample Types:	Pressuremeter, Auger Cutting, Shelby Tube, Split-Spoon, Hand Auger, Rock Core, No Recovery
Date Boring Started:	1/12/22		
Date Boring Completed:	1/12/22		
Logged By:	H.G.		
Drilling Contractor:	Rubino Engineering, Inc.		

Latitude: 41.764053
Longitude: -88.265598
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-26

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	Brine Bldg Relocated	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 722.0 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
	0			Approximately 6 inches of TOPSOIL: dark brown silty clay, with roots and organic matter				
				Stiff to very stiff, brown silty CLAY, trace sand and gravel				
720		1	12			2-3-6 N=9	17	Qp=3.0 tsf
		2	18			6-8-10 N=18	15	Qp=>4.5 tsf
	5							
715		3	15		CL	6-8-11 N=19	16	Qp=>4.5 tsf
		4	14			5-7-9 N=16	17	Qp=>4.5 tsf
	10							
710		5	18			4-6-10 N=16	18	Qp=>4.5 tsf
				Color transitions to gray at approximately 13 ½ feet below existing grade				
		6	18			4-6-10 N=16	18	Qp=>4.5 tsf
	15			End of boring at approximately 15 feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL: 0 – 25 – 50
STRENGTH, tsf: Qu (Rimac), Qp: 0 – 2.0 – 4.0

Completion Depth:	15.0 ft	Sample Types:	Pressuremeter
Date Boring Started:	1/12/22		Auger Cutting
Date Boring Completed:	1/12/22		Shelby Tube
Logged By:	H.G.		Split-Spoon
Drilling Contractor:	Rubino Engineering, Inc.		Hand Auger
			Rock Core
			No Recovery

Latitude: 41.763510
Longitude: -88.265855
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

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425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-27

Rubino Job No.: G21.037
Project: Aurora Public Works Facility
Location: Liberty Street
City, State: Aurora, Illinois
Client: City of Aurora

Drilling Method: 3 ¼ Hollow Stem Auger
Sampling Method: Shelby Tube/Split Spoon
Hammer Type: Automatic
Boring Location: North Storage Yard

WATER LEVELS***
While Drilling N/A
Upon Completion N/A
Delay N/A

Station: N/A
Offset: N/A

Surface Elev.: 720.5 ft

Elevation (feet)	Depth, (feet)	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	Additional Remarks
720	0			Approximately 14 inches of TOPSOIL: dark brown silty clay loam				
		1	12	Medium stiff, dark brown silty CLAY, trace sand and gravel	CL	1-2-4 N=6	25	Qp=2.0 tsf 3% Organic Content
		2	18	Stiff to very stiff, brown silty CLAY, trace sand and gravel		3-6-8 N=14	17	Qp=>4.5 tsf
715	5	3	15		CL	5-7-10 N=17	14	Qp=>4.5 tsf
				End of boring at approximately 7 ½ feet below existing grade				

STANDARD PENETRATION TEST DATA
Moisture, PL, LL: 0 — 25 — 50
STRENGTH, tsf
Qu (Rimac), Qp: 0 — 2.0 — 4.0

Completion Depth: 7.5 ft
Date Boring Started: 1/12/22
Date Boring Completed: 1/12/22
Logged By: H.G.
Drilling Contractor: Rubino Engineering, Inc.

Sample Types:
Auger Cutting
Split-Spoon
Rock Core
Pressuremeter
Shelby Tube
Hand Auger
No Recovery

Latitude: 41.763934
Longitude: -88.265225
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-30

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	East North Parking	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 730.4 ft

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD PENETRATION TEST DATA / STRENGTH, tsf	Additional Remarks
730	0					Approximately 12 inches of TOPSOIL: dark brown silty clay, with roots and organic matter					
				1	14	Stiff, brown silty CLAY, trace sand and gravel	CL	3-4-4 N=8	30		Qp=1.5 tsf 3% Organic Content
				2	15	Very stiff to hard, brown silty CLAY, trace sand and gravel		4-17-15 N=32	13		Qp=>4.5 tsf
725	5			3	8	End of boring at approximately 7 ½ feet below existing grade	CL	7-9-11 N=20	17		

Moisture × PL ◪ LL ✚ (0, 25, 50)
STRENGTH, tsf: ▲ Qu (Rimac) ✳ Qp (0, 2.0, 4.0)

Completion Depth:	7.5 ft
Date Boring Started:	1/4/22
Date Boring Completed:	1/4/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
- Auger Cutting
- Split-Spoon
- Rock Core
- Pressuremeter
- Shelby Tube
- Hand Auger
- No Recovery

Latitude: 41.764142
Longitude: -88.262798
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-32

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	Pavement - South Entrance	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 711.8 ft

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD PENETRATION TEST DATA: Moisture (×), PL, LL (0 / 25 / 50); STRENGTH, tsf: Qu (Rimac) (▲), Qp (✳) (0 / 2.0 / 4.0)	Additional Remarks
	0					Approximately 8 inches of TOPSOIL: dark brown silty clay, with roots and organic matter					
						Medium stiff to stiff, dark brown silty CLAY, trace sand and gravel					
710				1	14			3-4-4 N=8	22		Qp=2.8 tsf
				2	15		CL	2-3-4 N=7	23		Qp=2.3 tsf
	5										
705				3	13			3-4-4 N=8	28		Qp=2.0 tsf 3% Organic Content
						End of boring at approximately 7 ½ feet below existing grade.					

Completion Depth:	7.5 ft
Date Boring Started:	3/30/22
Date Boring Completed:	3/30/22
Logged By:	P.P.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
- Auger Cutting
- Split-Spoon
- Rock Core
- Pressuremeter
- Shelby Tube
- Hand Auger
- No Recovery

Latitude: 41.760566
Longitude: -88.264668
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Rubino Engineering, Inc.
425 Shepard Drive
Elgin, IL 60123
Telephone: 847-931-1555
Fax: 847-931-1560

LOG OF BORING B-35

Rubino Job No.:	G21.037	Drilling Method:	3 ¼ Hollow Stem Auger	WATER LEVELS***	
Project:	Aurora Public Works Facility	Sampling Method:	Shelby Tube/Split Spoon	While Drilling	N/A
Location:	Liberty Street	Hammer Type:	Automatic	Upon Completion	N/A
City, State:	Aurora, Illinois	Boring Location:	West Access Road	Delay	N/A
Client:	City of Aurora				

Station: N/A
Offset: N/A

Surface Elev.: 718.5 ft

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD PENETRATION TEST DATA / STRENGTH, tsf	Additional Remarks
	0					Approximately 14 inches of TOPSOIL: dark brown silty clay, with roots and organic matter					
						Medium stiff, brown silty CLAY, trace sand and gravel					
				1	13		CL	2-1-3 N=4	24		Qp=2.5 tsf
715						Stiff, brown silty CLAY, trace sand and gravel					
				2	16			2-3-5 N=8	18		Qp=4.0 tsf
	5						CL				
				3	18			4-5-7 N=12	17		>>Qp=4.5 tsf
						End of boring at approximately 7 ½ feet below existing grade					

STANDARD PENETRATION TEST DATA: Moisture, PL, LL (0, 25, 50)
STRENGTH, tsf: Qu (Rimac), Qp (0, 2.0, 4.0)

Completion Depth:	7.5 ft
Date Boring Started:	1/12/22
Date Boring Completed:	1/12/22
Logged By:	H.G.
Drilling Contractor:	Rubino Engineering, Inc.

Sample Types:
- Auger Cutting
- Split-Spoon
- Rock Core
- Pressuremeter
- Shelby Tube
- Hand Auger
- No Recovery

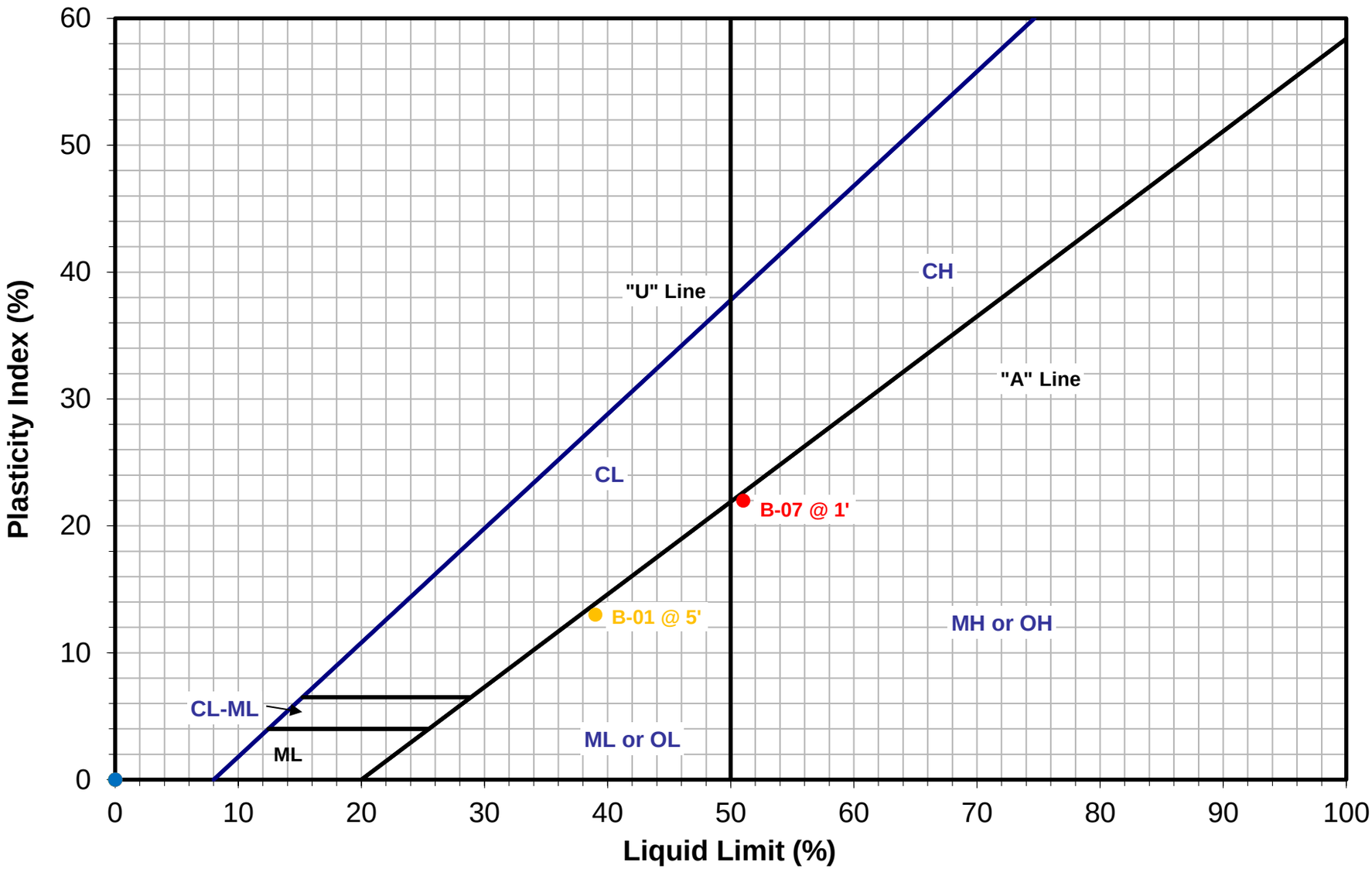
Latitude: 41.762724
Longitude: -88.265451
Drill Rig: Geoprobe 7822DT
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.
***Please reference the geotechnical report text for specific groundwater / dewatering recommendations.

Appendix L – Laboratory Results

rubino ENGINEERING INC.

Report of Atterberg Limits Test (ASTM D4318 / AASHTO T89 / AASHTO T90)

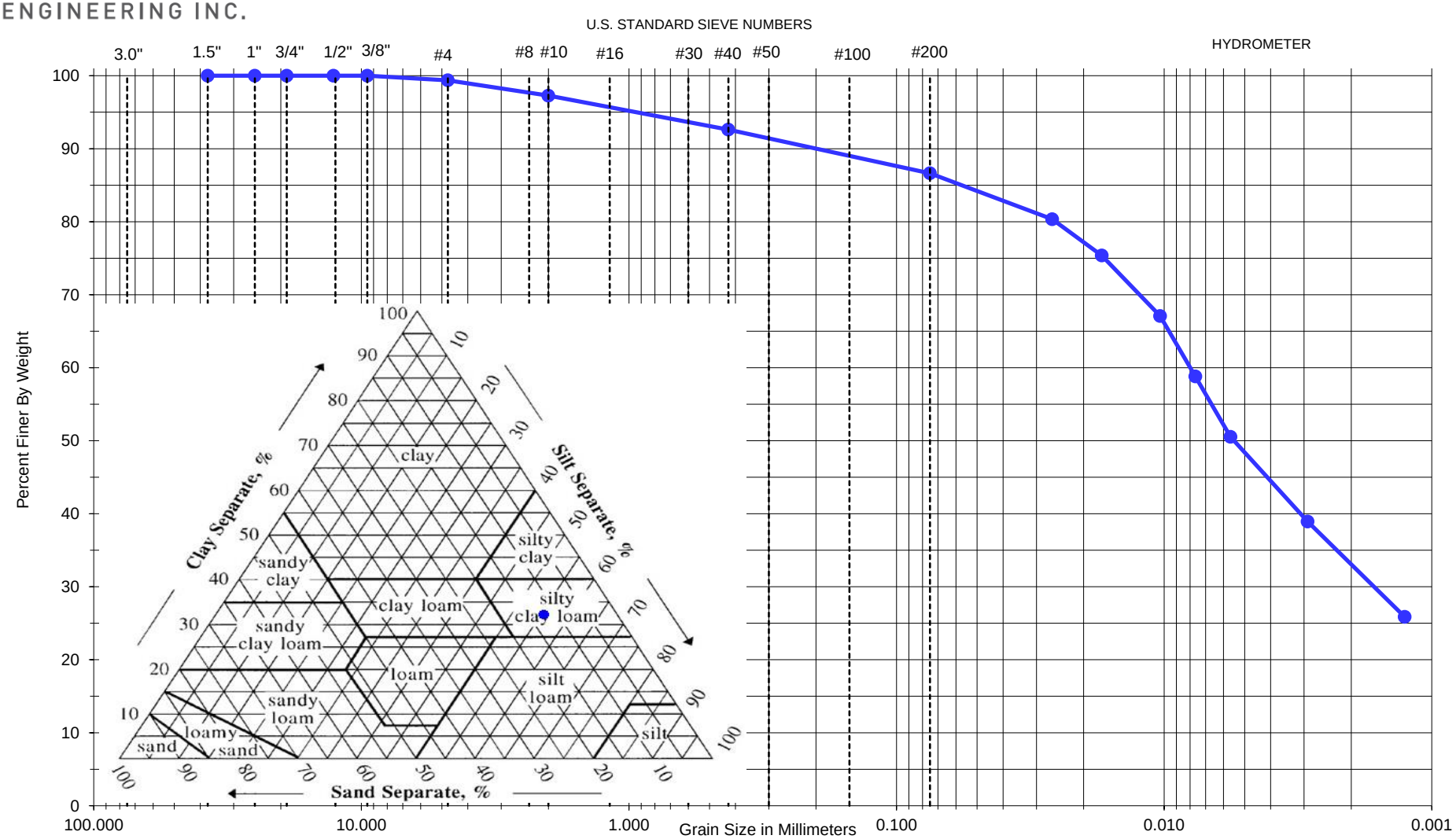


Boring #	B-01 @ 5'	B-07 @ 1'				
LL	39	51				
PL	26	29				
PI	13	22				

Project: Consolidated Public Works Facility
Location: Aurora, Illinois
Client: City of Aurora
Project #: G21.037

rubino ENGINEERING INC.

REPORT OF PARTICLE-SIZE ANALYSIS OF SOIL



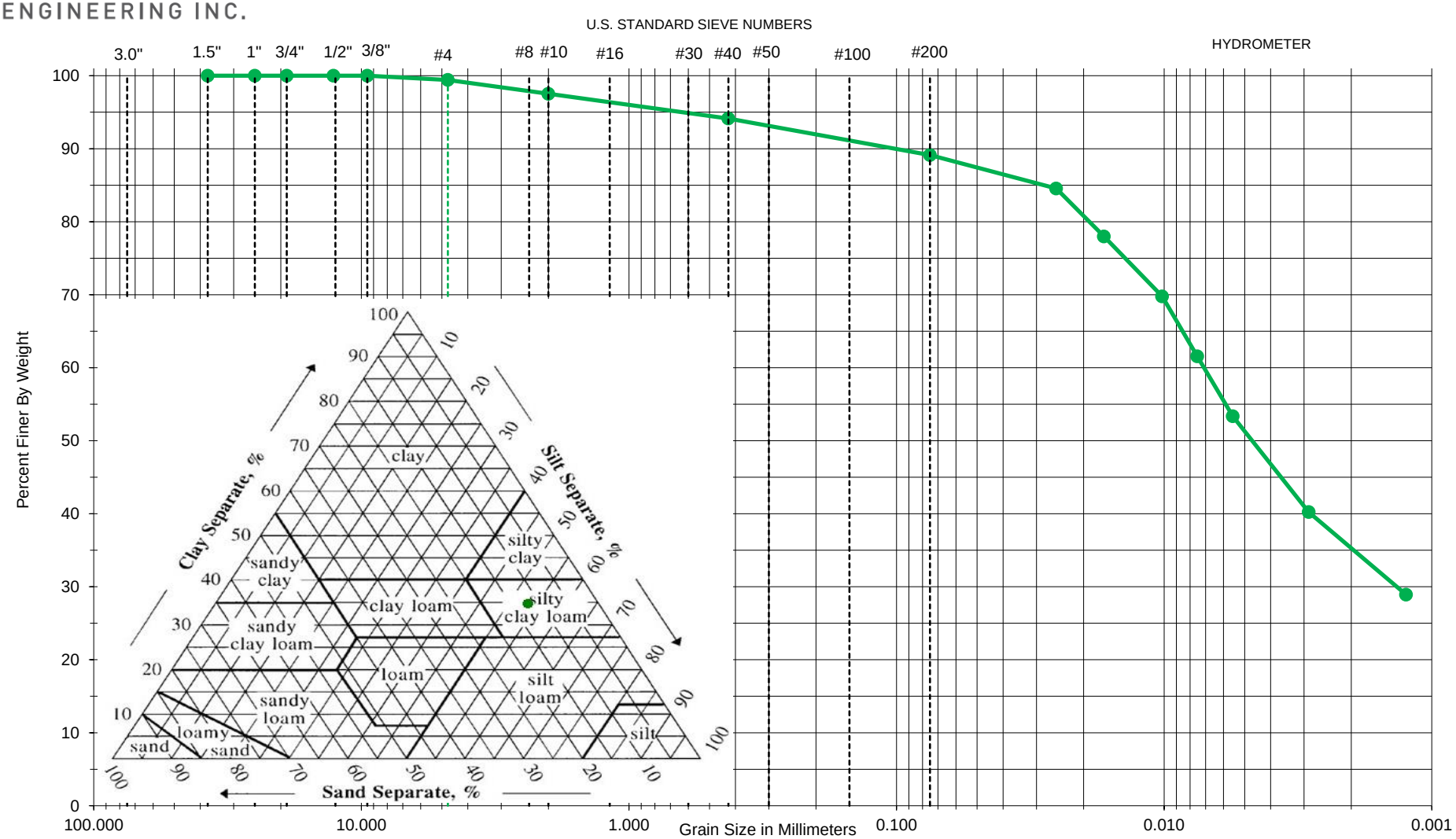
Key	Boring No.	Depth	USDA Classification	WC%	ORG%	Cc	Cu	%Gravel	%Sand	%Silt	%Clay	D60	D30	D10
●	B-22	8.5'	SILTY CLAY LOAM	17	N/A	N/A	N/A	2.7	13.85	51.7	31.7	0.008	0.002	N/A

REPORT OF PARTICLE-SIZE ANALYSIS OF SOIL	Aurora Public Works Facility	File No. G21.037

Rubino Engineering Inc ● 425 Shepard Drive ● Elgin, IL 60123 ● 847-931-1555 ● 847-931-1560 (Fax)

rubino ENGINEERING INC.

REPORT OF PARTICLE-SIZE ANALYSIS OF SOIL



Key	Boring No.	Depth	USDA Classification	WC%	ORG%	Cc	Cu	%Gravel	%Sand	%Silt	%Clay	D60	D30	D10
●	B-23	8.5'	SILTY CLAY LOAM	17	N/A	N/A	N/A	2.5	10.70	52.7	34.1	0.007	0.001	N/A

REPORT OF PARTICLE-SIZE ANALYSIS OF SOIL	Aurora Public Works Facility	File No. G21.037

Rubino Engineering Inc ● 425 Shepard Drive ● Elgin, IL 60123 ● 847-931-1555 ● 847-931-1560 (Fax)

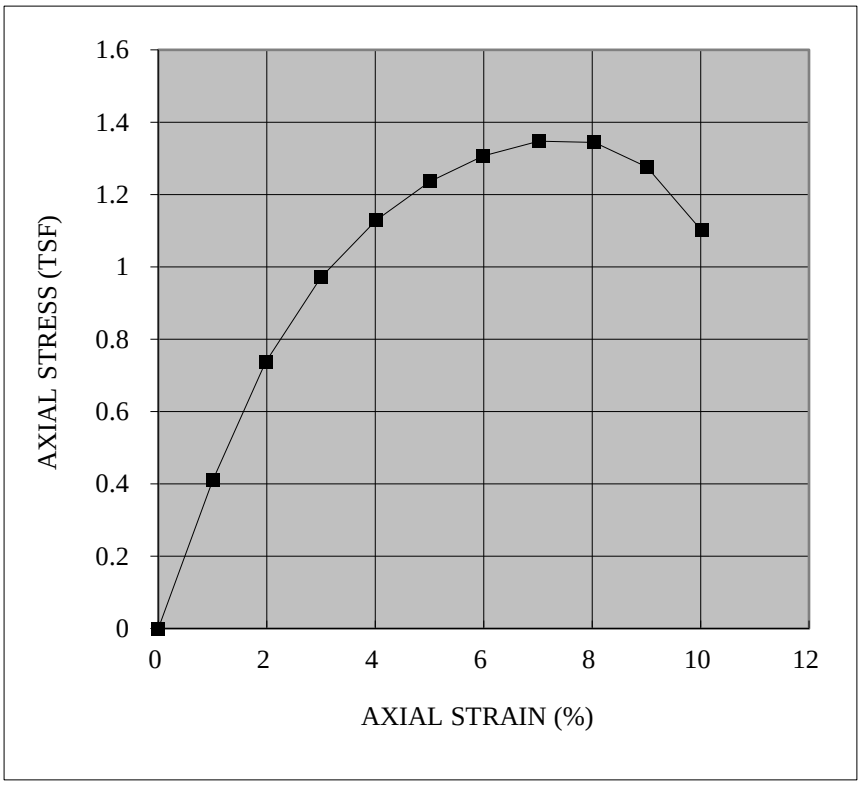
UNCONFINED COMPRESSION TEST

Rubino Project No.: G21.037
Project: Consolidated Public Works Facility
Client: City of Aurora
Date Tested: January 18, 2022
Soil Description: Brown & gray SILT, trace sand & gravel
Boring No.: B-01
Depth (ft): 5
Remarks: Shear failure

Strain rate (%/min): 2
Specimen type: Intact
Moisture source: Trimmings

Height:	5.67 inches	**Weight (lb):**	2.604
Diameter:	2.87 inches	**Volume (ft^3):**	0.02124
Moisture Content:	27.1%	**Saturation (%):**	97.0
Ht.-Diameter Ratio:	1.97	**Specific Gravity:**	2.72
Unit Weight (pcf):	122.6	**Dry Unit Weight (pcf):**	96.4

READING NUMBER	READING TIME	DEFORM. (in.)	LOAD (lbs)	STRAIN (%)	CORRECTED AREA (in^2)	AXIAL STRESS (tsf)
0	000:00:00		0.30	0.0	6.47	0.00
1	000:00:30	0.06	37.20	1.0	6.54	0.41
2	000:01:00	0.11	67.50	2.0	6.60	0.74
3	000:01:30	0.17	90.00	3.0	6.67	0.97
4	000:02:00	0.23	105.80	4.0	6.74	1.13
5	000:02:30	0.28	117.00	5.0	6.82	1.24
6	000:03:00	0.34	125.00	6.0	6.89	1.31
7	000:03:30	0.40	130.30	7.0	6.96	1.35
8	000:04:00	0.46	131.40	8.0	7.04	1.34
9	000:04:30	0.51	126.10	9.0	7.11	1.28
10	000:05:00	0.57	110.00	10.0	7.19	1.10
Qu =	1.35	tsf		Strain	7.0%	



FAILURE SKETCH

FRONT

BACK