

May 18, 2022

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

REPORT TRANSMITTAL

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

Rubino Report No. G21.037

Via email: <u>IWade@aurora-il.org</u>

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.

<u>Closing</u>

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



AURORA, ILLINOIS

RUBINO PROJECT NO. G21.037

Geotechnical Engineering

Services

Report

Drilling Laboratory Testing Geotechnical Analysis

PREPARED BY:

SABINA SCHMID STAFF ENGINEER



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

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- Appendix A Drilling, Field, and Laboratory Test Procedures
- Appendix B Site Preparation Clearing & Grubbing
- Appendix C Fill Recommendations
- Appendix D Foundation Construction Recommendations
- Appendix E Slab-on-Grade Considerations
- Appendix F Pavement Considerations
- Appendix G Report Limitations
- Appendix H Soil Classification General Notes
- Appendix I Soil Classification Chart
- Appendix J Site Vicinity Map & Boring Location Plan
- Appendix K Borings Logs
- Appendix L Laboratory Results

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
	217,000 ft ²
Plan area? (square feet)	First Floor = $40,000 \text{ ft}^2$, Second Floor $40,000 \text{ ft}^2$,
	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:

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)

Table 1: Drilling Scope

*BEG = below existing grade

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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 ¹/₄ 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 <u>Subsurface Conditions</u> section for more detailed information.
 - **High Plasticity Soils** were encountered in some of the soil borings. See <u>Subsurface Conditions</u> and <u>Expansive Soils Discussion</u> sections for more detailed information.
- Free groundwater was observed within some of the borings during drilling operations. See <u>Groundwater Conditions</u> 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 <u>Site Preparation</u> <u>Recommendations</u> for additional information.
- Rubino has recommended a standard pavement section for the proposed project. See <u>Pavement Recommendations</u> 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 <u>Pavement Drainage and Maintenance</u> 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 <u>G19.022</u> <u>Aurora Public Works Salt Dome</u> 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 <u>Pavement Recommendations</u> 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 <u>Detention Pond Considerations</u> and <u>Infiltration Rate Discussion</u> 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.

DEPTH RANGE (FEET BEG*)	SOIL DESCRIPTION	SPT N- VALUES (BLOWS PER FOOT)	Moisture Content (%)	Estimated Shear Strength
	Proposed Office/Garage (B-01 to B-20)	Buildings		
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 (<i>B-07</i>)	4-5	27 – 30	
729.5 – 715.0	Very stiff to hard, gray silty CLAY (<i>B-</i> 09 & <i>B-</i> 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	φ = 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

Table 2: Subsurface Conditions Summary



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:

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

Table 3: Groundwater Observation Summary

*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 $\frac{1}{2}$ feet below existing grade. The materials in the area of the detention basins from surface to 8 $\frac{1}{2}$ 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 *<u>Fill Recommendations</u>* 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 <u>Suitability of On-Site Soils for Use</u> <u>as Structural Fill</u> 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 A	ND OFFICE BUILDING STRUCT	URE	
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 ≥ 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		
PROPOSE	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; $Q_u \ge 2.25$ tsf		
Applicable Borings:	B-26		



Table 1. Dearing Capacity Recommendations – Puer Station			
DESCRIPTION	PROPOSED BUILDING RECOMMENDATIONS		
PROPOSE	D 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 ≥ 1.75 tsf Or Properly compacted Structural Fill		
Applicable Boring:	B-21		

Table 7: Rearing Canacity Percommondations - Fuel Station

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: $q_{ult} = cN_c + \frac{1}{2}\gamma_t BN_\gamma + \gamma_t D_f N_q$	
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	
$\gamma_t = total \ density$	
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 1/2 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.



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<u>Settlement</u>

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 ³/₄ 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.

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

Desig	n Code	Reference Document	IBC-2015	
Risk Category			II	
Site C	lass		D - Stiff Soil	
Туре	Value	Description		
SS	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 a	acceleration value	
S _{M1}	0.159	Site-modified spectral a	acceleration value	
S _{DS}	0.171	Numeric seismic desigr	n value at 0.2 second SA	
S _{D1}	0.106	Numeric seismic desigr	n value at 1.0 second SA	

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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

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:

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

Table 9: Recommended Pavement Section



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.



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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.

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 (<u>typically greater than 1 inch</u>) 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 opengraded 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.



Proofrolling Equipment:

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

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.

^{*-2}A 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 $\frac{3}{4}$ -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



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
 $k_s = k (\frac{B+1}{2B})^2$ 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	Because the pavement at this site will be subjected
feet wider than the pavement on each side to	to freeze-thaw cycles, Rubino recommends that an
support the tracks of the slipform paver. This extra	air entrainment admixture be added to the concrete
width is structurally beneficial for wheel loads	mix to achieve an air content in the range of 5% to
applied at pavement edge. The asphalt base	7% to provide freeze-thaw durability in the concrete.
course should comply with IL-19.0L N-50 binder	Concrete with a 28-day specified compressive
and be compacted to a minimum of 93.0% of the	strength of 4,000 psi is typically adequate.
Maximum Theoretical Density as determined by	Pavement for the dumpster area should be
ASTM D2041. Asphaltic surface mixture should	planned to be constructed of Portland cement
comply with IL-9.5L N-50 surface and be	concrete with load transfer device installed where
compacted to a minimum of 92.5% of the Maximum	construction joints are required. A thickened edge
Theoretical Density as determined by ASTM	is recommended on the outside of slabs subjected
D2041.	to wheel loads. This thickened edge usually takes
Asphaltic concrete mix designs should be reviewed	the form of an integral curb. Fill material should
to determine if they are consistent with the	be compacted behind the curb or thicken edge of
recommendations given in this report.	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.



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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:

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Unconfine Stren	ed Con gth, Qı	npressive u (tsf)	N-E	Blows	s/ft.	Consistency	N-E	Blow	/s/ft.	Relative Density
	<	0.25	< 2			Very Soft	0	-	3	Very Loose
0.25	-	0.5	2	-	4	Soft	4	-	9	Loose
0.5	-	1	4	-	8	Medium Stiff	10	-	29	Medium Dense
1	-	2	8	-	15	Stiff	30	-	49	Dense
2	-	4	15	-	30	Very Stiff	50	-	80	Very Dense
4	-	8	30	-	50	Hard			80+	Extremely Dense
>	-	8	> 50			Verv Hard				

RELATIVE PROPORTIONS OF SAND & GRAVEL

Descriptive Term	% of I	Dry W	leight	
Trace		<	15	
With	15	-	29	
Modifier		>	30	

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% of [Dry W	eight
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

NA NA		ONS	SYME	BOLS	TYPICAL
IVI			GRAPH	LETTER	DESCRIPTIONS
	GRAVEL AND	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	GRAVELLY SOILS	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
COARSE GRAINED SOILS	MORE THAN 50% OF COARSE FRACTION	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	RETAINED ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS	SAND AND	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
LARGER THAN NO. 200 SIEVE SIZE	SANDY SOILS	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
	PASSING ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
				ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
00120				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIZE				мн	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		СН	INORGANIC CLAYS OF HIGH PLASTICITY
				ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HI	GHLY ORGANIC S	SOILS	70 70 70 70 70 7 75 75 76 7 7 73 73 76 76 7	РТ	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS



G21.037 Aurora Public Works Facility – Aurora, Illinois

Appendix J – Site Vicinity Map & Boring Location Plan



G21.037 Aurora Public Works Facility – Aurora, Illinois





425 Shepard Drive Elgin, Illinois 60123 Project Name: Project Location:

Client: Rubino Project # : Liberty Street Aurora, Illinois **City of Aurora** G21.037

Site Vicinity Map



Appendix K – Borings Logs



G21.037 Aurora Public Works Facility – Aurora, Illinois

Humo bo ho: 621.037 Project: Aurora Public Works Facility Liberty Street Liberty Street L	Sheet 1 of	<u> </u>	14/			•			0.17.1		047-331-1300	Fax: 84						
Construct Litery Street Numer Type: Boring Location: Automatic NW corner of Garage Strate Decision Street NW corner of Garage 1000 000					N	Auger Spoo	em / Split	lollow Ster	3 ¼ H Shelby	Drilling Method: Sampling Method		Norks Facility	ublic V	1.037 ora P	G21 Auro	D.:	Job N	≀ubino ?roiect
Borng Location: NW corner of Garage Transport initiation: City of Aurora Station: N/A initiation: City of Aurora Station: N/A initiation: City of Aurora Station: N/A initiation: N/A MATERIAL DESCRIPTION initiation: Station: N/A initiation: N/A MATERIAL DESCRIPTION initiation: N/A Netset	npletion N/	on Com				•		natic	Autom	Hammer Type:			treet	erty S	Libe		n:	ocatio
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705-	 - 15 - 			6	15			CL	3-4-6 N=10	18	0	×		*	Qp=3.5 tsf
				7	10	End of boring at approximately existing grade	20 feet below		5-7-7 N=14	13	*			;	₩Qp=4.0 tsf
omple ate Bo ate Bo	tion D ring S ring (epth: Started: Comple	ted:		20.0 1/12/ 1/12/	ft Sample 7 22 22 Auger	Types: P F	Pressure Shelby T	emeter Tube	Latituc Longit Drill R	le: 41.7 ude: -8 ig: Geo	763938 8.2640 probe	 80 7822DT		

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Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC Surface Elev.: 727.8 ft	CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD I TEST × Moisture 0 STREN QU (Rin 0	PENETRATION DATA \bigcirc \downarrow PL $_{25}$ \downarrow LL $_{25}$ $_{50}$ GTH, tsf nac) $\%$ Qp $_{20}$ $_{40}$	Additional Remarks
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roject: ocatio ity, Sta lient:	n: ate:		Libe Auro City	ora P erty S ora, I of A	ublic treet Ilinois urora	Works Facility	Hammer Type: Boring Location:	Auton NE co	natic prner of Ga	rage	11	⊥ Whi ⊥ Upo ⊥ Dela	ile Drillii n Comp ay	ng N oletion N N
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DES	CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD TES Moisture	PENETRA © DATA © 25 GTH, tsf mac) ¥	ATION PL LL 50	Additional Remarks
730-	- 0 - 			1	16	Surface Elev.: 730.3 ft Approximately 12 inches of TC brown silty clay, with roots and Stiff to very stiff, brown silty Cl and gravel	PSOIL: dark organic matter AY, trace sand		3-3-6 N=9	19		2.0	4.0	Qp=>4.5 tsf
725-			M	2	18				7-8-9 N=17	14				Qp=>4.5 tsf
	 		M	3	18				6-6-11 N=17	16				Qp=>4.5 tsf
720-	 - 10 -		M	4	17			CL	7-9-12 N=21	17				Qp=>4.5 tsf
			M	5	13				13-7-10 N=17	15	×			Qp=>4.5 tsf
'15—	 - 15 - 		M	6	5				7-10-8 N=18	18				Qp=>4.5 tsf
				7	14	Stiff, gray silty CLAY, trace sar End of boring at approximately existing grade.	nd and gravel 20 feet below	CL	4-5-6 N=11	12	× *			Qp=1.8 tsf
mple te Bo te Bo	tion D pring S pring ()epth: Started: Comple	: ted:		20.0 1/5/2 1/5/2	ft Sample 1 2 2 2 Xuger X Split-5	Types: P F Cutting Spoon W H	Pressur Shelby ⁻	emeter Tube	Latitud Longit Drill R Rema	de: 41.76393 ude: -88.263 lig: Geoprobe rks:	8 092 7822DT		

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E	NGI	NEEF		G I	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931 Fax: 847-931-1560	Inc. 1-1555	L	OG (OF	BO	RII	NG	B-0) 5 Sheet 1	of 1
Rubino Project: Location City, Sta Client:	Job N n: ate:	lo.:	G2 Aur Libe Aur City	1.037 ora F erty S ora, / of A	7 Public Street Illinois Nurora	Works Facility	Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ H Shelb Auton NE Bl	łollow Stem y Tube/Spli natic d Corner	Auge t Spoo	r n		W. ∑ Wh ∑ Upo ∑ Del	ATER ile Drillir on Comp ay	LEVELS* ng pletion	** N/A N/A N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC	CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANE	DARD F TEST loisture	PENETR DATA © 25 CTH, tsf	ATION PL LL 50	Additior Remarl	nal ks
	-0-	N				Surface Elev.: 730.5 ft Approximately 12 inches of TOP	PSOIL: dark				<u> </u>		2.0	4.0		
730-				1	17	brown silty clay, with roots and Medium stiff, brown silty CLAY, gravel	, trace sand and	CL	2-3-4 N=7	26	®	*	×		Qp=1.3 tsf 3% Organic Content	
725-			X	2	14	Stiff to very stiff, brown silty CL and gravel	AY, with sand		3-5-9 N=14	10	×<			>>>	Qp=4.5 tsf	
125			M	3	0			CL	9-12-15 N=27	16		×	0			
720-				4	15	Stiff to very stiff, gray silty CLA' gravel	Y, trace sand and		10-8-15 N=23	16		×	>		Qp=>4.5 tsf -	
			X	5	18				8-8-11 N=19	15		×ø			Qp=>4.5 tsf	
715—	 - 15 - 		X	6	18			CL	5-6-10 N=16	18					Qp=>4.5 tsf	
				7	13	End of boring at approximately 2 existing grade	20 feet below		5-6-5 N=11	12		(*		Qp=2.5 tsf	
Comple Date Bo Date Bo Logged Drilling The stra	tion D oring S oring C By: Contra atifical	epth: Started: Comple actor:	eted:	pres	20.0 1/4/2 1/4/2 P.P. Rubin	ft Sample T 2 2 no Engineering, Inc. Auger Split-S Rock (proximate boundaries. The transi	ypes: P F Cutting S Spoon [®] H Core O N tion may be gradual.	Pressur Shelby ⁻ Hand Au No Reco	emeter Tube uger overy	Latituo Longit Drill R Rema	de: 41.7 ude: -8 ig: Geo rks:	763954 8.2628 pprobe	4 330 7822DT	-		

						Fax: 847-931-1560	1						Sheet	: 1 of 1
Rubino	Job N	lo.:	G21	.037	, 		Drilling Method:	3 ¼ H	lollow Stem	Auge	r	WA	TER LEVE	LS***
Project:			Auro	ora F arty S	Public \ Street	Norks Facility	Sampling Method:	Autor	y Tube/Spli natic	t Spoo	n	\bigvee While	e Drilling	N/A
City, Sta	ite:		Auro	ora, I	Illinois		Boring Location:	West	side of Gar	age		I Upon	Completion	N/A
lient:			City	of A	urora							$\underline{\Psi}$ Delay	/	N/A
					(Station: N/A Offset: N/A		۲	÷		STANDARD		TION	
set)	et)	b	be		ches			catio	6-in		TEC	©		
n (fe	(fee	ic Lo	e Ty	e N	, (ing	MATERIAL DESC	RIPTION	assifi	s per	rre, º	imes Moistu	re 🖬 F	PL Ad	ditional
vatio	epth	raph	du	amp	ver)			s Cla	Blows	loistu	0	25	Re	emarks
Шè	ð	Ū	Sa	ő	leco			JSC:	PT E	≥	STRE	NGTH, tsf		
					ш	Surface Elev.: 719.9 ft			S		🔺 Qu (R	imac) 米	Qp	
	0	<u>x, 1</u> x, . <u>.(</u>				Approximately 10 inches of TOF	SOIL: dark				0	2.0	4.0	
-						brown to black silty clay Medium stiff, brown to gray silty	CLAY, trace							
			¥.	1	12	sand and gravel	- ,		2-3-3	28	O	*×	Qp=2.0	tsf
F			Δ	-					N=6					
ŀ	· -													
			\mathbf{M}					CL						
Γ			X	2	18				2-2-3	27	🍳 *	×	Qp=1.5	tsf
715-	5 -								C-N		-+			
			M	2	10	Stiff to very stiff, brown silty CLA and gravel	AY, trace sand		E E 7	10				
-			Μ	3	10	5			N=12	10			7Qp=4.0	tst
F			X	4	12				7-8-9	16			>> 米 Qp=4.5	tsf
710-	10 -		\square						N=17					
			MI	_		Color transitions to gray betwee	en approximately rade		700	10				
-			\mathbb{N}	5			1000		7-8-8 N=16	16				
								CI						
								02						
F			X	6	16				7-6-5	17	¢ ×	*	Qp=3.0	tsf
705-	15 -		Δ						N=11			_		
F														
+	· -													
F			¥.	7	14				3-3-4	18		*	On=2.0	tsf
700-	. 20 -		Δ						N=7					
	20					End of boring at approximately 2 existing grade.	20 feet below							
					20.0	e	/maai		1	1				
omplet ate Boi	ion D rina S	eptn: Started:			20.01 3/4/2	n Sample Ty 2 ∎		Pressure	emeter	Longit	ude: 41.7635 ude: -88.26	5∠ 4581		
ate Bo	ring C	Comple	ted:		3/4/2	2 Auger (Cutting	Shelby 7	Tube	Drill	tig: Geoprob	e 7822DT		
									1000		1 K C.			

E		NEEF		G II	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931 Fax: 847-931-1560	Inc. -1555	L	OG (DF	BORI	NG E	3-0	7
Rubino Project: Location City, Sta Client:	Job N n: ate:	o.:	G21 Auro Libe Auro City	037 ora P erty S ora, I	Public N Street Illinois urora	Works Facility	Drilling Method: Sampling Method Hammer Type: Boring Location:	3 ¼ H : Shelb Auton Middle	Hollow Sterr y Tube/Spli natic e west of G	n Auge it Spoo	r n	WA [™] ∑ While ▼ Upon ▼ Delay	TER Drillin Comp	g 6 ft letion N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC	RIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD TES Moisture	PENETRAT	FION PL L 50	Additional Remarks
720-	- 0 - 	<u>17 - 14 - 17</u>		1	11	Surface Elev.: 722.2 ft Approximately 14 inches of TOF brown silty clay, with roots and o Medium stiff, brown and gray SI PLASTICITY, trace sand and gr	PSOIL: dark organic matter LT OF HIGH avel	MH	3-2-3 N=5	30		* ∠	4.0 4.0	Qp=2.0 tsf LL = 51 PL = 29 5% Organic Content
715-	- 5 - 			3	13 <u>7</u> 16	7 Stiff, brown silty CLAY, trace sa	nd and gravel		4-6-8 N=14	16			>>*	Qp=0.8 Isf 4% Organic Content Qp=4.5 tsf
710-	- 10 - 			5	14	Color transitions to gray at appr below existing grade.	oximately 11 feet	CL	4-4-8 N=12	16			>>*	Qp=4.3 tsf
705-	- 15 - 			7	15	Very stiff, gray silty CLAY, with sand and gravel	rock chips, trace	CL	12-8-9 N=17	12	** 0			Qp=0.8 tsf
Comple Date Bo Date Bo Logged	tion D oring S oring C By:	epth: tarted: Comple	ted:		20.0 1/11/ 1/11/ H.G.	ft Sample Ty 22 22 22	/pes: P r Cutting S poon W h	Pressur Shelby ⁻ Hand Ar	emeter Tube uger	Latitud Longit Drill R Rema	de: 41.76359 rude: -88.264 tig: Geoprobe rks:	1 076 7822DT		

E	NOT		(TIN	0 11	ч с .	Fax: 847-931-1560	-1555						Sheet 1 of
Rubino Project Locatio City, Sl Client:	Job N : n: :ate:	lo.:	G21 Auro Libe Auro Citv	.037 ora P orty S ora, I of A	ublic V treet Ilinois urora	Norks Facility	Drilling Method: Sampling Method Hammer Type: Boring Location:	3 ¼ H Shelb Auton Middle	lollow Stem y Tube/Split natic e East of Ga	Auge t Spoo arage	r n	WATE ∑ While Dr ∑ Upon Co ∑ Delay	R LEVELS*** illing N/. mpletion N/. N/.
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC Surface Elev.: 727.6 ft	RIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARE TES Moistu STRE Qu (R	PENETRATION ST DATA ⊚ PL 25 LL 25 LL NGTH, tsf imac)	Additional Remarks
725-	- 0 - 			1	16	Approximately 8 inches of TOPS silty clay, with roots and organic Stiff, brown silty CLAY, trace sa	SOIL: dark brown matter nd and gravel		6-6-7 N=13	14	e A		Qp=>4.5 tsf
			M	2	18				6-7-9 N=16	17			Qp=>4.5 tsf
720-	 		M	3	17				6-7-10 N=17	17	Ø		Qp=>4.5 tsf
	 - 10 -		M	4	16			CL	5-6-10 N=16	16			Qp=>4.5 tsf
715-	 		M	5	14				7-5-7 N=12	14	* ©<		Qp=0.8 tsf
	 - 15 - 			6	14				5-4-7 N=11	12		*	Qp=3.0 tsf
710-	 - 20 -		X	7	4	Very stiff, gray silty CLAY, trace End of boring at approximately 2 existing grade	e sand and gravel 20 feet below	CL	8-12-17 N=29	10	×		
omple ate Bo ate Bo	etion D pring S pring ()epth: Started: Comple	ted:		20.0 f 1/5/22 1/5/22	ft Sample Ty 2 2	rpes: Pr	Pressur Shelby ⁻	emeter Tube	Latituo Longit Drill R	de: 41.7635 ude: -88.26 ig: Geoprob	36 3618 e 7822DT	

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Rubino Project: Locatio City, St	Job N n: ate:	lo.:	G21 Auro Libe Auro City	1.037 ora F erty S ora, I	Public V Street	Fax: 847-931-1560 Works Facility	Drilling Method: Sampling Method Hammer Type: Boring Location:	3 ¼ F Shelb Auton East s	lollow Stem y Tube/Split natic side of Gara	Auge Spoc	r on	WA ∑ Whi ⊈ Upo ∡ Dela	ATER ile Drilli n Com	Sheet 1 c LEVELS** ng pletion	of 1 * N/A N/A N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC Surface Elev.: 730.5 ft	RIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD TES] Moisture STREN	PENETRA DATA O 25 GTH, tsf nac) *	ATION PL LL 50 Qp	Additiona Remarks	al s
730-				1	18	Approximately 12 inches of TOF brown silty clay, with roots and o Very stiff to hard, brown silty CL and gravel	PSOIL: dark organic matter AY, trace sand		4-6-9 N=15	15	Ø		4.0	Qp=>4.5 tsf	
725—	- 5 -		M	2	18			CL	8-8-12 N=20	14				Qp=>4.5 tsf	
	 			3	17			UL	9-8-11 N=19	12	×			Qp=>4.5 tsf	
720—	 - 10 - 		X	4	0	Stiff to very stiff, gray silty CLAY	/, trace sand and		17-17-18 N=35	15	×				
	 			5	16	Increase in gravel at approxima below existing grade	ntely 13 ½ feet		4-7-8 N=15 6-7-10 N=17	18	×		>>>	Qp=>4.5 tsf	
715—	- 15 - 							CL						-	
	- 20 -			7	10	End of boring at approximately 2 existing grade	20 feet below		4-5-8 N=13	12	×		*	Qp=3.3 tsf	
Comple Date Bo Date Bo Logged Drilling	tion D pring S pring (By: <u>Contr</u>	Depth: Started Comple actor:	: es re		20.0 1/4/2 1/4/2 P.P. Rubir	ft Sample Ty 2 2 no Engineering, Inc.	/pes: P F Cutting S poon P F Core O N	Pressur Shelby ⁻ Hand Ai No Reco	emeter Tube uger overy	Latitu Longit Drill R Rema	de: 41.763586 tude: -88.2630 tig: Geoprobe rks:	3 099 7822DT			

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Rubino Project: Locatio City, St Client:	Job N : n: ate:	lo.:	G2 Aur Libe Aur City	1.037 ora F erty S ora, I v of A	Public N Street Illinois Jurora	Works Facility	Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ H Shelb Auton Mid E	lollow Sterr y Tube/Spli natic ast Office	n Auge it Spoo	r n	WA ∑ Whi ∑ Upo ∑ Dela	ATER L le Drilling n Comple ay	EVELS***	* N/A N/A N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC Surface Elev.: 730.4 ft	CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD F TEST Moisture	DENETRA DATA © 25 CTH, tsf nac) #	ATION PL LL 50 Qp	Additiona Remarks	ul 3
730-	- 0 - 		M	1	15	Approximately 12 inches of TOF brown silty clay, with roots and Stiff to very stiff, brown silty CL and gravel	PSOIL: dark organic matter AY, trace sand		3-4-8 N=12	26	@ *	×	Q 4' C	p=1.8 tsf % Organic ontent	
725-			M	2	18				7-9-13 N=22	15			Q	p=>4.5 tsf	
			X	3	16			CL	6-9-10 N=19	16	×ø		Q	p=>4.5 tsf	
720-	 - 10 -		X	4	17				4-8-13 N=21	15	× ©		Q	p=>4.5 tsf	
			X	5	16	Increase of sand and gravel at \feet below existing grade Medium stiff to stiff, gray silty C and gravel	approximately 11 LAY, trace sand		7-9-9 N=18	18			Q	p=>4.5 tsf	
715-	 - 15 - 		X	6	16			CL	4-4-6 N=10	15	©×			p=>4.5 tsf	
			M	7	18	End of boring at approximately 2 existing grade	20 feet below		2-3-5 N=8	13	● ×	*	Q	p=2.3 tsf	
Comple Date Bo Date Bo Logged Drilling The stra	etion D pring S pring C By: <u>Contra</u> atificat	epth: Started: Comple actor: ion line	: eted: es re	pres	20.0 1/4/2 1/4/2 P.P. Rubir ent ap	ft Sample Ty 2 2 no Engineering, Inc. Rock C proximate boundaries. The transit	ypes: P F Cutting S poon [®] H Core O N tion may be gradual.	Pressur Shelby ⁻ Iand Au Io Reco	emeter Fube uger overy	Latitud Longit Drill R Rema	de: 41.763579 ude: -88.2628 ig: Geoprobe rks:	 322 7822DT			

E	NGI	NEEI		G I	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931 Fax: 847-931-1560	Inc. -1555	L	OG () F	BOR	RING	B-1	1 Sheet 1 of 1
Rubino Project: Location City, Sta Client:	Job N n: ate:	lo.:	G2 ⁷ Aur Libe Aur City	1.037 ora F erty S ora, I ⁄ of A	Public ' Street Illinois Jurora	Works Facility	Drilling Method: Sampling Method Hammer Type: Boring Location:	3 ¼ H : Shelb Auton SW c	Hollow Sterr by Tube/Spli natic corner of Ga	i Auge t Spoo irage	r m	W ∑ Wr ∑ Up ∑ De	ATER hile Drillin on Comp	LEVELS*** ng 18.5 ft pletion N/A N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC	CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDAF TI × Mois STR	RD PENETR EST DATA © ture 4 ENGTH, tsf Rimac) #	PL LL 50	Additional Remarks
720-	- 0 - 			1	15	Approximately 12 inches of TOF with roots and organic matter Medium stiff, brown silty CLAY, gravel	PSOIL: silty clay, trace sand and	CL	3-3-4 N=7	15	• • •	2.0	4.0	Qp=2.5 tsf
715—				2	17	Stiff to very stiff, brown silty CL/ and gravel	AY, trace sand		3-5-9 N=14	12			>>>	€Qp=4.5 tsf
				3	0 18			CL	8-7-8 N=15 5-6-10	16	Ø		>>>	€Qp=4.5 tsf
710-	- 10 - 			5	16	Very stiff, gray silty CLAY, trace	e sand and gravel	-	N=16 6-7-9 N=16	15	×		>>>	Qp=4.5 tsf
705—	 - 15 - 			6	0	Rock chips observed in 13½ ft	spoon	CL	5-7-9 N=16	18		<		
	 - 20 -		X	7	9	End of boring at approximately 2 existing grade.	20 feet below		7-12-10 N=22	13	×	0	к	€Qp=4.0 tsf
Comple Date Bo Date Bo Logged Drilling	tion D oring S oring (By: Contra atificat	Depth: Started Comple <u>actor:</u> tion line	: eted:	pres	20.0 1/11/ 1/11/ H.G. Rubin ent ap	ft Sample Ty 22 22 no Engineering, Inc. Rock C	/pes: P r Cutting S poon B Core O N	Pressur Shelby ⁻ Hand A No Reco	remeter Tube uger overy	Latituo Longit Drill R Rema	de: 41.763 ude: -88.2 lig: Geopro rks:	244 64588 bbe 7822D1	<u>г</u>	

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Rubino Project Locatio City, St	Rubino Job No.: G Project: A Location: L Dity, State: A Dient: C			1.037 ora F erty S ora, I	Public ' Street Ilinois	Works Facility	Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ H Shelb Auton South	Hollow Stem y Tube/Split natic n side of Gar	Auge t Spoc	er on	W/ ∑ Wh ∑ Upo	ATER ile Drilli on Com	IEVELS*** ng N// pletion 16 f
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC	RIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD TES Moisture STREN	PENETRA DATA O 25 GTH, tsf nac) *	ATION PL LL 50	Additional Remarks
720-	Juint Line Line MATERIAL DESCR Matterial Matterial Matterial Matterial Matterial Matterial Matterial Material Ma			SOIL: dark ty CLAY, trace	CL	2-2-3 N=5	27	© 	*	4.0	Qp=2.0 tsf			
	- 5 -	-		2	18	Medium stiff, brown and gray cla sand and gravel	ayey SILT, trace	ML	1-2-3 N=5	21				Qp=1.3 tsf
715			M	3	18	Stiff, brown silty CLAY, trace sa	nd and gravel		2-4-7 N=11	14			*	€Qp=4.0 tsf
715	 - 10 -			4	10	Large rock observed at approxin below existing grade, N-values i	mately 9 feet may be skewed	CL	16-52-23 N=75	12	×		>>	€Qp=4.5 tsf
710-				5					6-5-7 N=12	21	×			
	 - 15 -		X	6	16	Stiff, gray silty CLAY, trace sand	l and gravel		5-6-8 N=14	17	@X		*	Qp=3.5 tsf
705—					-	*		CL						
	- 20 -			7	18	End of boring at approximately 2 existing grade.	0 feet below		4-5-7 N=12	18	★ ×		*	Qp=3.5 tsf
Comple Date Bo Date Bo Logged Drilling	tion D oring S oring C By: Contra)epth: Started: Comple	: eted:		20.0 3/4/2 3/4/2 J.W. Rubii	ft Sample Ty 2 2 2 Split-Sp no Engineering, Inc	pes: P F Cutting S poon [®] F ore O N	Pressur Shelby ⁻ Hand Au No Reco	emeter Tube uger overy	Latitu Longit Drill R Rema	de: 41.76322 tude: -88.264 Rig: Geoprobe arks:	9 085 7822DT	-	

Rubino Job No.: G Project: A Location: Li City, State: A Client: C				1.037 ora F erty S ora, I v of A	Public N Street Illinois Jurora	Fax: 847-931-1560 Works Facility	Drilling Method: Sampling Method Hammer Type: Boring Location:	3 ¼ H : Shelb Auton Mid E	Hollow Stem by Tube/Spli natic cast South C	Auge t Spoc	er on e	WA [™] ⊻ While ⊻ Upon ⊻ Delay	TER L Drilling Comple	Sheet 1 of EVELS*** () N/ etion N/
Straphic Log				Sample No.	covery (inches)	Station: N/A Offset: N/A MATERIAL DESC	CRIPTION	CS Classification	- Blows per 6-inch	Moisture, %	STANDARD TES Moisture	PENETRAT	TION PL L 50	Additional Remarks
Ξ					Rec	Surface Elev.: 727.6 ft		n	LdS		STREN	GTH, tsf nac) 米 C	λb	
725-	0 Marcine 0 Marcine 1 10 1 10 2 13 Surface Elev.: 727.6 ft Approximately 8 inches of silty clay, with roots and Medium stiff, brown silty gravel Stiff to very stiff, gray silt gravel				10	Approximately 8 inches of TOPS silty clay, with roots and organic Medium stiff, brown silty CLAY gravel	SOIL: dark brown matter with sand, trace	CL	2-2-4 N=6	21	@* ×	2.0	4.0 C	Ωp=0.8 tsf
			2 13 Stiff to very stiff, gray silty CL gravel			Y, trace sand and		5-5-9 N=14	15			c	Qp=>4.5 tsf	
720—			M	3	17				5-8-10 N=18	16			C	Qp=>4.5 tsf
	 - 10 -			4	0				12-13-14 N=27	15	×			
715—	 		X	5	13			CL	4-6-7 N=13	16	₿×		*	Qp=4.0 tsf
	 - 15 -			6	13				5-6-8 N=14	16				
710—														
	- 20 -	- 20 End of boring at approximately existing grade		End of boring at approximately 2 existing grade	20 feet below		10-21-8 N=29	12	*	*0		Qp=2.3 tsf		
Comple Date Bo Date Bo Logged	etion D pring S pring (By:)epth: Started Comple	: eted:		20.0 1/5/2 1/5/2 P.P.	ft Sample Ty 2 2 2 2 3 5 9 1 5 9 1 5 9 1 5 9 1 5 9 1 5 9 1 5 9 1 5 9 1 5 9 1 5 9 1 5 1 9 1 9	/pes: Pr Cutting S poon 🍄 R	Pressur Shelby ⁻ Hand A	remeter Tube uger	Latitud Longit Drill R Rema	de: 41.76323 tude: -88.263 Rig: Geoprobe rrks:	9 654 7822DT		

E	NGI	NEEF		G II	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931 Eav: 847-931-1560	Inc. -1555	L	OG (DF	BORI	NG	B-1	4 Shoot 1 of 1
Rubino Job No.: (Project: / Location: I City, State: / Client: (G2 Aur Libe Aur City	1.037 ora F erty S ora, I	Public V Street Ilinois urora	Works Facility	Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ ⊢ Shelb Auton SE Ga	lollow Sten y Tube/Spl natic arage Corn	n Auge it Spoo	r n	W/ ∑ Whi ∑ Upo ∑ Dela	ATER ile Drillin on Comp ay	LEVELS*** ng 20 ft pletion N/A N/A
Elevation (feet)	on: Liberty Street State: Aurora, Illinois City of Aurora				CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD I TEST Moisture STREN	PENETR/ DATA © 25 GTH, tsf nac) %	ATION PL LL 50 Qp	Additional Remarks		
	O Absolution 0 Absolution 1 14 1 14 2 15 Surface Elev.: 730.1 ft Approximately 12 inches of 1 brown silty clay, with roots a Stiff to very stiff, brown silty				Approximately 12 inches of TOF brown silty clay, with roots and o Stiff to very stiff, brown silty CL/ and gravel	PSOIL: dark organic matter AY, trace sand		4-6-8 N=14	17			4.0	Qp=>4.5 tsf	
725-			X	2	15				5-7-11 N=18	15	ש			Qp=>4.5 tsf
			X	3	18			CL	8-7-10 N=17	16	×			Qp=>4.5 tsf
720-	 - 10 -		X	4	18				6-7-12 N=19	19	Ø		>>>	Qp=4.5 tsf
			X	5	14	Stiff to very stiff, gray silty CLAN gravel	Y, trace sand and		7-8-11 N=19	16	×ø		>>>	€Qp=4.5 tsf
715—	 - 15 - 		M	6	17			CL	3-4-4 N=8	16	¢ ×*			Qp=1.5 tsf
			X	7	18 <u>\</u>	End of boring at approximately 2 existing grade	20 feet below		9-7-9 N=16	12	×®#			Qp=1.5 tsf
Comple Date Bo Date Bo Logged Drilling The stra	completion Depth: 20.0 ft ate Boring Started: 1/4/22 ate Boring Completed: 1/4/22 ogged By: P.P. rilling Contractor: Rubino Engineering, Inc. Rock Core Rock Core Completion lines represent approximate boundaries. The transition may be gradue				/pes: P F Cutting S poon 🖗 H Core O N tion may be gradual.	Pressur Shelby ⁻ Iand Au Io Reco	emeter Tube uger overy	Latitud Longit Drill R Rema	de: 41.763233 rude: -88.2631 rig: Geoprobe rks:	5 089 7822DT				

E	NGI	NEEI		G II	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931 Fay: 847-931-1560	Inc. -1555	L	OG ()F	BORI	NG B-	- 15
Rubino Project Locatio City, St Client:	Rubino Job No.: G Project: A Location: Li City, State: A Client: C			1.037 ora F erty S ora, I	Public V Street Illinois	Works Facility	Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ H : Shelb Auton SE O	Iollow Stem y Tube/Spli natic ffice Corner	Auge t Spoc	r m	WATE ∑ While Dr ∑ Upon Co ∑ Delay	Illing N/A mpletion N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC Surface Elev.: 728.7 ft	CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD TEST Moisture STREN	PENETRATIOI Γ DATA © PL 25 ↓ GTH, tsf mac) ★ Qp 20	Additional Remarks
	- 0 - 			1	18	Approximately 12 inches of TOF brown silty clay, with roots and Very stiff to hard, brown silty CL and gravel	PSOIL: dark organic matter .AY, trace sand		4-7-9 N=16	16			Qp=>4.5 tsf
725—	- 5 -		X	2	14				8-9-11 N=20	15	× @		Qp=>4.5 tsf
			X	3	18			CL	4-6-9 N=15	16			Qp=>4.5 tsf
720-	 - 10 - 			4	15				6-17-18 N=35	17	×		Qp=>4.5 tsf
715-			X	5	16	Very stiff, gray silty CLAY, trace	e sand and gravel		9-12-15 N=27	17		ø	Qp=>4.5 tsf
	- 15 - 		Ň	6	18			CL	4-6-9 N=15	14			#Qp=4.0 tsf
710-	 - 20 -			7	4	Very stiff, gray silty CLAY, with End of boring at approximately 2 existing grade.	sand and gravel 20 feet below	CL	17-18-10 N=28	12	×		
Comple Date Bo Date Bo Logged Drilling The stra	etion D pring S pring (By: Contra atificat	Depth: Started Comple <u>actor:</u> tion line	: es re	pres	20.0 1/4/2 1/4/2 P.P. Rubii ent ap	ft Sample Ty 2 2 no Engineering, Inc. Rock C proximate boundaries. The transit	/pes: P F Cutting S poon % F Core O N	Pressur Shelby ⁻ Hand Au No Reco	emeter Tube uger overy	Latitud Longit Drill R Rema	de: 41.763153 tude: -88.2623 tig: Geoprobe rks:	3 830 7822DT	

and generating report tort for specific groundwater / dewatching recommendations.

 Laben J, KNA: 221.037 Laberty Street Laberty Street Laberty Street Laberty Street Laberty Street City of Auron Sufface Elay: 723.3 ft Sufface Elay: 723.3 f							Fax: 847-931-1560	1000								Sheet 1	of 1
reject: Aurora Fuliciti Works Facility Hone Self Space Automatic Hammer Speces Automatic Hammer Speces Automatic Music Speces Automatic Music Speces Automatic Music Music Speces Automatic Music Music Speces Automatic Music Musi	Rubino	Job N	lo.:	G2′	1.037	,		Drilling Method:	3 ¼ ⊦	Iollow Sten	ו Auge	r		W	ATER	LEVELS*	**
Opcode Liberty of sets Particle	Project:			Aur	ora F	Public	Works Facility	Sampling Method	: Shelb	y Tube/Spl	it Spoo	n		∑ Wh	ile Drilli	ng	N/A
Name Output Description Status Number of the state of	ocatio City, St	c: Aurora Public Works Facility Sampling on: Liberty Street Hammer state: Aurora, Illinois Boring Lo					Boring Location:	West	Mid Vehicl	e Main			I Upo I Del	on Comp av	oletion	N/A N/A	
Image: Section of the section of t	nont.					uioia	Station: N/A			_		STAN	DARD	PENETR			
agg agg bit	it)	~	_	0		es)	Offset: N/A		ation	-inch			TES				
Bit of the construction Bit of the construction <td>) (fee</td> <td>(feet</td> <td>, Loç</td> <td>Typ</td> <td>No</td> <td>(inch</td> <td></td> <td></td> <td>sifice</td> <td>per 6</td> <td>e, %</td> <td>×</td> <td><i>l</i>oisture</td> <td>, Z</td> <td>PL</td> <td>A 1 191</td> <td></td>) (fee	(feet	, Loç	Typ	No	(inch			sifice	per 6	e, %	×	<i>l</i> oisture	, Z	PL	A 1 191	
B B C B C B Surface Elev: 723.3 ft 1 1 17 Surface Elev: 723.3 ft A StreENATTH, lef 1 1 17 A A Operation of the form and gravel CL 3.3.4 28 Image: StreENATTH, lef 720 - <td>atior</td> <td>pth,</td> <td>aphic</td> <td>nple</td> <td>mple</td> <td>/ery</td> <td></td> <td>RIPTION</td> <td>Clas</td> <td>swo</td> <td>oistur</td> <td>0</td> <td></td> <td>25</td> <td>LL 50</td> <td>Remark</td> <td>ai (s</td>	atior	pth,	aphic	nple	mple	/ery		RIPTION	Clas	swo	oistur	0		25	LL 50	Remark	ai (s
P D <thd< th=""> D D D D<td>Elev</td><td>De</td><td>Ű</td><td>Sar</td><td>Sa</td><td>eco</td><td></td><td></td><td>SCS</td><td>DT B</td><td>ž</td><td></td><td>STREN</td><td>GTH. tsf</td><td></td><td></td><td></td></thd<>	Elev	De	Ű	Sar	Sa	eco			SCS	DT B	ž		STREN	GTH. tsf			
0 25 Approximately 10 inches of COPSOL: dark boros silv council matter boros silves and and gravel 0 28 0 # # # # # # # # # # # # # # # # # # #						Ŕ	Surface Elev.: 723 3 ft			S.			Qu (Rir	nac) ₩	Qp		
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720 - 5 + 17 + 17 + 17 + 18 + 17 + 17 + 18 + 17 + 18 + 17 + 18 + 17 + 18 + 17 + 18 + 18							Medium stiff, brown and gray si	Ity CLAY, trace									
720 - 5 $720 - 5$ $710 5$ 710					1	17	sand and gravel			3-3-4	28	Ŷ	*	×		Qp=1.5 tsf	
720 5 18 Stiff to very stiff, brown silty CLAY, trace sand 715 5 16 Stiff, gray silty CLAY, trace sand and gravel 4.4.6 18 XOp=4.0 tsf 715 10 4 18 XOp=4.5 tsf									CL	N=7						4% Organic Content	
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-5 -5 10 -7 <td< td=""><td></td><td></td><td></td><td></td><td>2</td><td>18</td><td>Stiff to very stiff, brown silty CL/ and gravel</td><td>AY, trace sand</td><td></td><td>4-4-6</td><td>18</td><td></td><td></td><td></td><td></td><td>fOn=4.0 tof</td><td></td></td<>					2	18	Stiff to very stiff, brown silty CL/ and gravel	AY, trace sand		4-4-6	18					fOn=4.0 tof	
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ate Boring Completed: 1/11/22 Difficult Auger August Status August Augus	ate Bo	e Boring Started: 1/11/22 e Boring Completed: 1/11/22 m Auger Cutting X Split-Spoon						Cutting	-ressur Shelbv ⁻	emeter	Longit	ude: -	38.264	251 782207	r		
	ate Bo							poon 🕅 I	Hand A	uger	Rema	ig. Ge rks:	ohiope	102201	I		

E	NGI	NEEF		G I	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931	Inc.	L	OG C)F	BORI	NG	B-1	7	
Rubino Project Locatio City, St Client:	Fax: 847-931-1560 Fax: 847-931-1560 Fax: 847-931-1560 Fax: 847-931-1560 Fax: 847-931-1560 Drilling M Sampling Hammer Boring Lo Drilling M Sampling Hammer Boring Lo Drilling M Sampling Hammer Boring Lo MATERIAL DESCRIPTION				7 Public ' Street Illinois Jurora	Fax: 847-931-1560 Works Facility	Drilling Method: Sampling Method Hammer Type: Boring Location:	3 ¼ F Shelb Auton East I	Hollow Stem by Tube/Split natic Mid Vehicle	Auge Spoc Main	r n	W ⊻ Wh ⊻ Up ⊻ Del	ATER ile Drillir on Comp ay	Sheet 1 LEVELS* ng oletion	of 1 ** N/A N/A N/A
Elevation (feet)					CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD TES Moisture	PENETR T DATA © 25 GTH, tsf mac) ¥	ATION PL LL 50	Additior Remarl	nal Ks		
725-	<mark>- 0 -</mark> 		X	1	Image: Surface Elev.: 728.2 ft Surface Elev.: 728.2 ft Approximately 6 inches of TOPSOIL: dark brown to black silty clay Medium stiff, brown silty CLAY, trace sand and gravel Medium stiff, light brown sandy, silty CLAY, trace gravel Stiff to very stiff, brown silty CLAY, trace sand and gravel			CL	1-2-3 N=5	22	<u>₀</u> @ * ×	2.0	4.0	Qp=0.5 tsf	
	- 5 -		X	2	18	Stiff to very stiff, brown silty CL and gravel	AY, trace sand		4-3-7 N=10	15					
720-	 		X	3	18				3-6-7 N=13	17	Ø×		×<<	Qp=4.5 tsf	
	 - 10 -			4					7-8-11 N=19	18					
715—				5	18	Increase in gravel observed be approximately 11 to 11½ feet b grade	tween below existing	CL	13-14-10 N=24	16 10		9	Ж	Qp=4.0 tsf	
	 - 15 - 		M	6	6	Color transitions to gray at apple feet below existing grade	roximately 13½		7-8-8 N=16	14			*	Qp=3.5 tsf	
710—	 - 20 -			7	18	End of boring at approximately 2 existing grade.	20 feet below		5-5-7 N=12	12		*		Qp=2.5 tsf	
Comple Date Bo Date Bo Logged Drilling The stra	tion D oring S oring C By: <u>Contra</u> atificat	epth: Started Comple actor: ion line	: eted: es re	epres	20.0 3/4/2 3/4/2 J.W. Rubii ent ap	ft Sample Ty 2 2 no Engineering, Inc. Rock C proximate boundaries. The transit	ypes: P r Cutting S poon P r Core O t tion may be gradual	Pressur Shelby ⁻ Hand Ar No Reco	remeter Tube uger overy	Latituo Longit Drill R Rema	de: 41.76304 .ude: -88.263 .ig: Geoprobe rks:	3 525 7822D1	 r		

						Fax: 847-931-1560	-1555							Sheet 1 d	of 1
Rubino	Job N	lo.:	G21	.037	,		Drilling Method:	3 ¼ H	Iollow Stem	n Auge	r	W	ATER	LEVELS**	**
Project	ject: Aurora Public Works Facility Sampi ation: Liberty Street Hamme						Sampling Method	Shelb	y Tube/Spli	t Spoc	n	∏ Wh	ile Drilli	ng	N/A
Lity, St	tion: Liberty Street Hammer State: Aurora. Illinois Boring Lo					Boring Location:	SW c	orner of Ve	hicle N	<i>l</i> lain	T Upc	on Com	pletion	N/A	
Client:			City	of A	urora							${ar \Psi}$ Dela	ау		N/A
						Station: N/A Offset: N/A		۲	ч		STANDARD		ATION		
set)	et)	D	be	ö	ches			catio	.e-in	~	IESI	©			
on (fe	, (fee	lic Lo	e Ty	le N	/ (ind	MATERIAL DESC	RIPTION	assifi	s per	re,	× Moisture	, ⊿	PL I I	Additiona	al
vatio	epth	raph	ampl	amp	over			S CI	Blow	Aoist	0	25	50	Remark	S
Ele		U U	ŝ	S	Seco			nsc	PT I	2	STREN	GTH, tsf			
					-	Surface Elev.: 724.2 ft			05		▲ Qu (Rin	nac) 米 2.0	Qp 4.0		
	-0-	<u></u>				Approximately 8 inches of TOPS	SOIL: dark brown								
						Medium stiff to stiff, brown silty	CLAY, trace								
			X	1	14	sand and gravel			2-3-3	25	Q	**		Qp=2.3 tsf	
			Ц						N=6					4% Organic Content	
		¥////													
700			Μ		40				407						
720-	_		\mathbb{N}	2	18				4-6-7 N=13	14				Qp=3.5 tsf	
	- 5 -													+	
								CL							
			X	3	18				3-3-5	13	¢×	*		Qp=2.0 tsf	
			Υ						N=8						
			M												
715—			Ň	4	18				4-5-8 N=13	14	l 🕅)	K	Qp=3.0 tsf	
	- 10 -													+	
						Medium stiff to stiff, grav silty C	I AV trace sand								
			X	5	18	and gravel			7-7-7	13	*			Qp=1.0 tsf	
			Δ						N=14						
740			Μ	_											
/10-			Ň	6	18				3-4-5 N=9	13		*		Qp=2.0 tsf	
	- 15 -							CI						-	
								OL							
			$\overline{\mathbf{M}}$												
705—			Ň	7	18				3-2-4 N=6	12				Qp=1.5 tsf	
	- 20 -		V N			End of boring at approximately 2	20 feet below							+	
						existing grade.									
omple	tion D	epth:			20.0	ft Sample Ty	/pes: P r	Pressure	emeter	Latitu	de: 41.762884	4	1	ł	
ate Bo	e Boring Started: 1/11/22						Cutting	Shelby 1	Tube	Longit	tude: -88.264 Rig: Geoprope	486 דח7822			
ate Bo	oring (Bv [.]	omple	ted:		1/11/2 H C	22 Split-S	poon 🖏 🕅	, Hand Au	uger	Rema	irks:				
- yy cu	<u> </u>				Dukis	Rock (Core 01	No Reco	overv						

E	NGI	NEEF		G I	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931 Fax: 847-931-1560	Inc. 1-1555	L	OG (DF	BO	RING	3 B-1	19 Sheet 1 o	of 1
Rubino Project: Location City, Sta Client:	Fax: 847-931-1560 ino Job No.: G21.037 ect: Aurora Public Works Facility ation: Liberty Street State: Aurora, Illinois ht: City of Aurora						Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ ⊢ Shelb Auton South	lollow Stem y Tube/Spli natic Vehicle Ma	i Auge t Spoc	r on	\ ∑ \ ∑ (∑ [WATER While Drill Jpon Com Delay	R LEVELS**'	* N/A N/A N/A
vation (feet)	(t)					CRIPTION	S Classification	slows per 6-inch	loisture, %	STAND	ARD PENE TEST DAT © bisture 25	TRATION A I PL ● LL 5	Additiona Remarks	al S	
Ele	Image: Strate Elev.: 727.1 ft Image: Strate Elev.: 727.1 ft					nsc	SPT E	2	S ⁻ ₀ ▲ C	TRENGTH, (Rimac) 3	tsf ₭ Qp ₄.(
725			M	1	12	Approximately 6 inches of TOP: to black silty clay Soft, brown to light brown silty (and gravel	SOIL: dark brown	CL	0-1-2 N=3	24	⊚ *	×		Qp=0.8 tsf	
				2	18	Medium stiff, light brown clayey	/ SILT		1-2-2 N=4	24	Ø#	×		Qp=0.5 tsf	
720-			X	3	18			ML	2-2-3 N=5	23	Ø	*		Qp=1.8 tsf	
	 - 10 -		M	4	18	Medium stiff, brown silty CLAY, gravel	, trace sand and	CL	2-2-3 N=5	24		* ×		Qp=1.5 tsf	
715-			X	5	18	Stiff, brown silty sandy CLAY, t gravel Stiff, brown to gray silty CLAY, gravel	race sand and trace sand and	CL	14-10-9 N=19	10 17	×	×			
	 - 15 -		M	6	4			C	7-7-10 N=17	13	×		*	Qp=3.5 tsf	
710								UL							
	- 20 -			7	16	End of boring at approximately a existing grade.	20 feet below		4-6-8 N=14	17	@	»×	*	Qp=3.5 tsf	
Comple Date Bo Date Bo Logged Drilling	tion D oring S oring C By: Contra	epth: Started: Comple	ted:		20.0 3/4/2 3/4/2 J.W. Rubir	ft Sample T 2 2 2 Split-S no Engineering, Inc.	ypes: P F Cutting S ipoon & H Core O N	Pressur Shelby ⁻ Hand Au No Reco	emeter Fube uger overy	Latitu Longi Drill F Rema	de: 41.7 tude: -88 tig: Geop irks:	62881 3.263881 probe 7822	DT		

E	NGI	NEEF		G II	NC.	Rubino Engineering, 425 Shepard Drive Elgin, IL 60123 Telephone: 847-931	Inc. -1555	L	OG (DF	BC	RI	NG	B-2	2 0	- 5 - 4
Rubino Project Locatio City, St Client:	Rubino Job No.: Project: Location: City, State: Client:				Public V Street Illinois Jurora	Works Facility	Drilling Method: Sampling Method Hammer Type: Boring Location:	3 ¼ H : Shelb Auton SE co	lollow Sten y Tube/Spl natic orner of Vel	n Auge it Spoc nicle M	r on lain		WA ∑ Whil ∑ Upor ∑ Dela	ATER e Drillir n Comp y	LEVELS*	<u>ot 1</u> ** N/A N/A N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC	CRIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STAN × I	IDARD	PENETRA © DATA © 25 CTH, tsf pac) ¥	TION PL LL 50	Addition Remark	ial (s
725–	0 			1	14	Surface Elev.: 726.5 ft Approximately 8 inches of TOPS silty clay, with roots and organic Stiff to very stiff, brown silty CL and gravel	MATERIAL DESCRIPTION e Elev.: 726.5 ft imately 8 inches of TOPSOIL: dark brown ay, with roots and organic matter very stiff, brown silty CLAY, trace sand avel				<u> </u>	×	×	<u>4.0</u>	Qp=2.0 tsf	
	- 5			2	9			C	5-11-10 N=21	15		×ø		>>>	€Qp=4.5 tsf	
720—	 		M	3	18			CL	5-10-12 N=22	18		×¢)	>>¥	Qp=4.5 tsf	
			M	4	17				3-5-7 N=12	18		⇒×		K	Qp=4.0 tsf	
715—	 		M	5	17	Medium stiff to stiff, brown silty gravel, trace sand	CLAY, with		3-3-3 N=6	15		*			Qp=1.3 tsf	
710-	- ·			6	0			CL	6-6-7 N=13	14		×				
, 10-	 			7	9	Very stiff, gray silty CLAY, with sand End of boring at approximately 2 existing grade.	gravel, trace 20 feet below	CL	9-7-8 N=15	14		×				
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.						ypes: P Cutting S poon 🖗 Core O	Pressur Shelby Hand A No Reco	emeter Tube uger overy	Latitu Longit Drill R Rema	de: 41. tude: - Rig: Ge rks:	76289 88.263 oprobe	1 293 7822DT				

geologinition report toxt for specific groundwater / dewatering recommendations.

E	NGIN	NEEF	RIN	GI	NC.	Telephone: 847-931-1 Fax: 847-931-1560	555	-				1 11	10	2- ف	sheet 1 c	of 1
Rubino Project: Locatio City, St	ibino Job No.: G oject: A cation: L :y, State: A ent: C			1.037 ora F erty S ora, I	, Public V Street Illinois	Works Facility	Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ H Shelby Autom Fuel S	lollow Sten y Tube/Spl natic Station	n Augei lit Spoo	r n		W/ ∑ Wh ∑ Upc	ATER ile Drillin on Comp ay	LEVELS** ng pletion	/* N/A N/A N/A
Elevation (feet)	State: Aurora, Illinois t: City of Aurora City of Aurora City of Aurora Station: N/A Offset: N/A Offset: N/A MATERIAL DESC MATERIAL DESC Surface Elev.: 721.5 ft Approximately 12 inches of TOP					Station: N/A Offset: N/A MATERIAL DESCF Surface Elev.: 721.5 ft	RIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %		DARD F TEST loisture	PENETR DATA © 25 CTH, tsf mac) %	ATION PL LL 50 Qp	Additiona Remarks	al s
720-	- 0 - 			1	16	Approximately 12 inches of TOPS brown silty clay, with roots and or Stiff, light brown SILT, trace sand	OIL: dark ganic matter and gravel		3-3-5 N=8	21	®	×	2.0	4.0		
		-	Ø	2	11			IVIL	4-3-7 N=10	21		×	*		Qp=2.0 tsf	
715—	 		M	3	18	Stiff to very stiff, brown to gray sil sand and gravel	ty CLAY, trace		3-4-5 N=9	17		×		*	Qp=3.5 tsf	
	 - 10 -		M	4	0	Color transitions to gray at approx below existing grade	ximately 9 feet		7-8-9 N=17	18		×			-	
710—	 		M	5	18				4-6-8 N=14	15		¢	*		Qp=2.3 tsf	
	 - 15 -		M	6	18				3-6-6 N=12	16		×		>>>	Qp=4.5 tsf	
705—	 - 20 - 		X	7	18			CL	6-7-8 N=15	13				>>>	Qp=4.5 tsf -	
695-	 - 25 - 		M	8	0				8-8-10 N=18	17		*			-	
	 - 30 -		X	9	18	End of boring at approximately 30 existing grade	feet below		4-7-9 N=16	18				*	Qp=3.3 tsf	
Comple Date Bo Date Bo Logged Drilling	tion D oring S oring C By: Contra	 epth: Started: Comple actor:	ted:		30.0 3/30/ 3/30/ P.P. Rubir	ft Sample Typ 22 22 22 no Engineering, Inc.	es: P P utting S pon 🖑 H re O N	ressure helby T land Au lo Recc	emeter Fube uger overy	Latitud Longit Drill R Rema	de: 41.7 ude: -8 ig: Geo rks:	762466 8.2641 pprobe	 30 7822DT		<u> </u>	

e georeonnical report text for specific groundwater / dewatering recommendations.

E	NGI	NEEF	(IN	GI	NC.	Telephone: 847-93 [·] Fax: 847-931-1560	1-1555								Sheet 1 of
Rubino	Job N	lo.:	G21	1.037			Drilling Method:	3 ¼ H	ollow Stem	Auge	r		W	ATER	LEVELS***
Project: .ocatior	า:		Aur	ora P erty S	ublic \ treet	Works Facility	Sampling Method: Hammer Type:	Shelb Auton	y Tube/Spli natic	t Spoo	n		∑ Wh ▼	ile Drilli	ng 6.5
City, Sta	:y, State: // ent:				llinois		Boring Location:	Deten	tion Basin				⊥ Upo V Del	on Comj av	pletion 5 N/
					uiora	Station: N/A					STANE) ARD P	ENETR	ATION	
et)	st)	D	e	ö	thes)	Offset: N/A		cation	6-incl	` 0		TEST (DATA ୭		
on (fe	л, (fee	hic Lo	le Ty	ple N	y (inc	MATERIAL DESC	CRIPTION	lassifi	/s per	ture, 9	ХМ	oisture	. ⊿ . ♦	PL LL	Additional
levati	Dept	Grap	Samp	Sam	cover			cs c	[Blow	Mois	0	2	5	50	Remarks
ш					Re	Surface Flow 740 6 ft		SN	SPT		S A	TRENG Qu (Rim	6TH, tsf ac) ₩	Qp	
	0	<u></u>				Approximately 10 inches of TO	PSOIL: dark				0	2.	.0	4.0	
710-						Medium stiff, brown silty CLAY	, trace sand and								
-			X	1	18	gravel			2-4-3 N=7	29	© *	ž	×		Qp=1.0 tsf 2% Organic Content
Ī								CL							
-			X	2	18 	*			3-3-4 N=7	25	©	>	<₩		Qp=2.3 tsf 2% Organic Content
705-															
-			M	3	16 16	 Stiff, brown SILT, trace sand an Sand seam observed at approble below existing grade 	nd gravel ximately 6 ½ feet	SM	4-5-4 N=9	18 15	٢	××		*	Qp=3.3 tsf
-	 - 10 -			4	18	Stiff to very stiff, brown to gray sand and gravel	silty CLAY, trace		3-5-6 N=11	17	0	×		*	Qp=3.5 tsf
700-				5	13			CL	7-7-9 N=16	19		ØX		>>>	€Qp=4.5 tsf
-				6	12				6-5-6 N=11	15	0	/ ×		>>>	Qp=4.5 tsf
-	- 61 -					End of boring at approximately existing grade	15 feet below								
omplei	tion D	epth:	. ·		15.0	ft Sample T	ypes:	Pressur	emeter	Latitud Lonait	de: 41.7 ude: -8	61656 8.2639	68		
ate Bo	ring C	Comple	ted [.]		3/30/	Auger	Cutting	Shelby 7	Tube	Drill R	ig: Geo	probe 7	7822DT	-	

E	101	NEEL	CI N			Fax: 847-931-1560	- 1000						1	S	heet 1 c	of 1
Rubino Project: Locatio City, Sta Client:	Ibino Job No.: (oject: / cation: L y, State: / ent: (1.037 ora F erty S ora, I	, Public \ Street Ilinois	Works Facility	Drilling Method: Sampling Method: Hammer Type: Boring Location:	3 ¼ H Shelby Autom Deten	ollow Sten y Tube/Spl natic tion Basin	n Auge lit Spoc	r n		WA [™] ∑ While ∑ Upon ∑ Delay	Drilling Complet	EVELS**	* N/A N/A N/A
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC	RIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STAN × 1	IDARD I TEST Moisture STREN	PENETRAT T DATA © 25 GTH, tsf	'ION PL L 50	Additiona Remarks	al s
	(1) (SOIL: black silty trace sand and	CL	3-4-3 N=7	14	<u> </u>	Qu (Rir	nac) * (2p 4.0 >>*Qt	p=4.5 tsf			
710-			M	2	17	Medium stiff to stiff, brown and or CLAY, trace sand and gravel	gray mottled silty		0-4-3 N=7	22	0	×	<	>>¥q;	5=4.5 tsf	
				3	13	Increase in sand and gravel at a feet below existing grade	approximately 6	CL	4-3-5 N=8	16	Ø	×		>>¥Qţ	5=4.5 tsf	
705—				4	17	Stiff, gray silty CLAY, trace sand	and gravel		3-4-5 N=9	17	©	×		>>¥q	5=4.3 tsf	
				5	16			CL	4-7-6 N=13	16		¢×		>>¥Qţ	5=4.5 tsf	
700-				6	18	End of boring at approximately 2 existing grade.	0 feet below		4-6-7 N=13	16		●×		* Qt	5=3.8 tsf	
Comple Date Bo Date Bo	tion E pring (pring ()epth: Started Comple	: eted:		15.0 3/30/ 3/30/	ft Sample Ty 22 22 22 X Split-Sp	'pes: P F Cutting S Doon	Pressure Shelby 7 Jand Au	emeter Tube Iger	Latitud Longit Drill R Rema	de: 41. ude: - lig: Ge rks:	762203 88.2663 oprobe	3 301 7822DT			

						Fax: 847-931-1560		0.1/ 1		A				Sheet 1 of	
Rubino Project	Project: Aurora P				, Public \	Works Facility	Sampling Method:	3 ¼ P Shelt	Hollow Stem	Auge Spoo	r n	∇		ing N	
ocation: Li Dity, State: A Client: C			Libe Aur City	erty S ora, I	Street Illinois		Hammer Type: Boring Location:	Autor Salt S	natic Storage				⊻ Upon Completion		
nont.					aioia	Station: N/A		_	-F		STANDA	RD PENE	ETRATION		
in (feet) (feet)		nic Log	e Type	ole No.	y (inches)	MATERIAL DES	CRIPTION	assificatior	s per 6-inc	ure, %	× Moi	rEST DA ⊚ sture	TA ☑ PL ● LL	Additional	
Elevatio	Depth	Graph	Sampl	Sampl		scs cl	T Blow	Moist	0	25	5	^⁰ Remarks			
ш					Re	Surface Elev.: 718.0 ft		S)	SP		SI ▲ Qi	RENGTH (Rimac)	,tsf ₩ Qp		
745	- 0 			1	11	Approximately 6 inches of TOF silty clay, with roots and organi Stiff to very stiff, brown silty CI and gravel	PSOIL: dark brown ic matter LAY, trace sand	-	1-3-5 N=8	16	© >	<	*	Qp=3.0 tsf	
715-			M	2	17				6-7-9 N=16	16		<u> </u>		Qp=>4.5 tsf	
710-				3	14			CL	4-6-8 N=14	18	٥	×		Qp=>4.5 tsf	
			M	4	18				4-6-10 N=16	18		*		Qp=>4.5 tsf	
705			M	5	10	Large rock encountered at ap below existing grade, N-value	proximately 11 feet s may be skewed		5-35-50/5	17	:	~		Qp=>4.5 tsf	
703-				6	15	Very stiff, brown and gray silty gravel, trace sand End of boring approximately 15 existing grade	CLAY, with	CL	19-9-12 N=21	15	×		>>>	₩Qp=4.5 tsf	
omple ate Bo	etion D pring S pring (Depth: Started: Comple	: eted:		15.0 1/12/ 1/12/	ft Sample T 22 22 Auger	Types:	Pressu	remeter	Latitud Longit	de: 41.76 ude: -88. iig: Geop	3292 266578 obe 782	2DT		

						Fax: 847-931-1560								Sheet 1 d
Rubino	Job N	lo.:	G21	.037			Drilling Method:	3 ¼ ⊢	lollow Sten	n Auge	r	WA	ATER	LEVELS**
Project:	oject: Aurora Public bocation: Liberty Street			ora P	Public \	Norks Facility	Sampling Method:	Shelb	y Tube/Spl	it Spoo	n	∑ Whi	ile Drillii	ng
City, Sta	i. ate:		Auro	ora, I	llinois		Boring Location:	Mulch	Relocated	ł		The The Tensor Upo	n Com	oletion
lient:			City	of A	urora			1 1				$\mathbf{\Psi}$ Dela	ау	
					_	Station: N/A		c	÷		STANDARD		ATION	
set)	et)	b	be		shes			catio	6-ine	<i>\</i> 0	TE	©		
n (fé	ic Lo	e Ty	e N	/ (inc	MATERIAL DESC	RIPTION	assifi	s per	ure, 9	× Moistu	re 🗖	PL 11	Additiona	
vatio	epth	raph	ldmg	amp	ver			s Cl	Blow	Aoist	0	25	50	Remark
Ele	Δ	U U	Š	S	Reco			nsc	SPT I	2	STRE	NGTH, tsf		
					-	Surface Elev.: 721.0 ft			0)		▲ Qu (R	imac) 米 2.0	Qp 4.0	
	-0-	<u>v, 1</u> <u>.</u>				Approximately 6 inches of TOPS	SOIL: dark brown							
720-						Stiff to very stiff, brown silty CL	AY, trace sand							
				4	10	and gravel			0.4.7	10				
-				1	16				2-4-7 N=11	18	* ۲			Qp=1.5 tsf
											Ν			
-														
			\mathbf{M}											
				2	12				5-8-10 N=18	15	X¢			Qp=>4.5 tsf
	- 5 -		Ш						11 10			_		-
715						Large rock encountered at app	roximately 6 feet							
			XII	3	0	below existing grade, N-values	may be skewed		8-9-12	16	\times	>		
			\square						N=21					
								CL						
			¥.	4	15				5-8-13	17	×			On=>4.5 tsf
									N=21					ap
ĺ	- 10 -													Ť
710-														
			M	_	45					10				
-				5	15				3-6-9 N=15	16				Qp=>4.5 tsf
			$\overline{\mathbb{M}}$			Color changes to brownish gray	/ at approximately							
			X	6	16				4-6-10 N=16	16			>>>	Qp=4.3 tsf
-	- 15 -					End of boring at approximately	15 feet below		N=10					-
						existing grade								
omple	tion D	epth:	·		15.0	ft Sample T	/pes: Pr	Pressur	emeter	Latitud	de: 41.7640	53		ł
ate Bo	ring S	Started:	ted		1/12/2	22 Auger	Cutting	Shelby ⁻	Tube	Longit Drill R	ude: -88.26 ig: Geoprob	5598 e 7822DT		
ale DC	ning C	winhie	ieu.		1/12/	<u>~~</u>	000			-	-			

Rubino Project:	Job N	lo.:	G2´ Aur	1.037 ora F	, Public \	Fax: 847-931-1560 Works Facility	Drilling Method: Sampling Method	3 ¼ H Shelb	lollow Sten y Tube/Spl	n Auge lit Spoc	r n	WATE ∑ While Dr	Sheet 1 of R LEVELS*** illing N
ocation: Libe City, State: Auro Client: City			erty S ora, I ⁄ of A	Street Illinois Jurora		Hammer Type: Boring Location:	Auton Brine	natic Bldg Reloc	cated		⊥ Upon Co ⊥ Delay	mpletion N N	
ation (feet)		aphic Log	nple Type	mple No.	/ery (inches)	Station: N/A Offset: N/A MATERIAL DES(N/A N/A MATERIAL DESCRIPTION		lows per 6-inch	oisture, %	STANDAF TI X Mois	RD PENETRATION EST DATA © ture PL ± LL	Additional Remarks
Elev	De	Gr				nscs	SPT E	Σ	STRENGTH, tsf ▲ Qu (Rimac) 米 QD				
720-	- 0 - 			1	12	Approximately 6 inches of TOP silty clay, with roots and organi Stiff to very stiff, brown silty CL and gravel	SOIL: dark brown c matter AY, trace sand		2-3-6 N=9	17	• • •	20	4.0 Qp=3.0 tsf
			M	2	18				6-8-10 N=18	15		>	Qp=>4.5 tsf
′15—				3	15			CL	6-8-11 N=19	16	×	9	Qp=>4.5 tsf
				4	14				5-7-9 N=16	17			Qp=>4.5 tsf
710—	 		M	5	18				4-6-10 N=16	18	0	<	Qp=>4.5 tsf
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Depth, (fe	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A MATERIAL DESC Surface Elev.: 730.4 ft	RIPTION	USCS Classification	SPT Blows per 6-inch	Moisture, %	STANDARD TES Moisture STREN	PENETRATION T DATA P P P P P P P P P P P P	Additional Remarks	
30			1	14	Approximately 12 inches of TOP brown silty clay, with roots and c Stiff, brown silty CLAY, trace sa	SOIL: dark rganic matter nd and gravel	CL	3-4-4 N=8	30	• *	×	Qp=1.5 tsf 3% Organic Content	
			2	15	Very stiff to hard, brown silty CL and gravel	AY, trace sand	CL	4-17-15 N=32	13	×		Qp=>4.5 tsf	
			3	8	End of boring at approximately 7 existing grade	1/2 feet below		7-9-11 N=20	17	×ø			

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Rubino	Job N	lo.:	G2′	1.037	,			Drilling Method:	3 ¼ H	Iollow Ster	n Auge	r		WATER LEVELS***				
Project			Aur	ora F	Public	Works Facility		Sampling Method	Shelb	y Tube/Sp	lit Spoc	n		∇ While Drilling				
.ocalio City, St	ty, State: Aurora, Illinois						Boring Location:	Paver	nent - Sou	th Entr	ance		T Upo	on Com	pletion N//			
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						Surface Elev.: 711.8 ft						0	Qu (Rin	nac)	Qp 4.0			
	U	<u></u>				Approximately 8 inches silty clay, with roots and	of TOPS I organic	SOIL: dark brown matter										
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						Medium stiff to stiff, dar trace sand and gravel	'k brown	silty CLAY,										
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710-				1	14					3-4-4 N=8	22	P	×	(*		Qp=2.8 tsf		
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705—				3	13					3-4-4 N=8	28	Ó		*×		Qp=2.0 tsf 3% Organic		
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						existing grade.	-											
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ate Bo	oring (Comple	ted:		3/30/	22 🕅	Split-St	boon 🕅	Hand Au	uger	Rema	ig: Ge rks:	oprobe	782201				
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		11. 11.				brown silty clay, with roots and	organic matter								
		<u>12</u> <u>1</u> <u>1</u>													
						Medium stiff, brown silty CLAY	, trace sand and								
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				1	13				2-1-3 N=4	24			× *		Qp=2.5 tsf
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Appendix L – Laboratory Results



G21.037 Aurora Public Works Facility – Aurora, Illinois







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

FUDINEERING INC.

Strain rate (%/min): 2

Specimen type: Intact Moisture source: Trimmings

Depth (ft):	5	Remarks:	Shear failure	9		
		Height:	5.67	inches	Weight (Ib):	2.604
		Diameter:	2.87	inches	Volume (ft ³):	0.02124
		Moisture Con	tent:	27.1%	Saturation (%):	97.0
		HtDiameter	Ratio:	1.97	Specific Gravity:	2.72
		Unit Weight (pcf):	122.6	Dry Unit Weight (pcf):	96.4
					CORRECTED	AXIAL
READING	READING	DEFORM.	LOAD	STRAIN	AREA	STRESS
NUMBER	TIME	(in.)	(lbs)	(%)	(in ²)	(tsf)
0	00:00:00		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%	





