



**CONSULTING  
GROUP**

Mr. Jason Bing, RA, LEED AP  
Director, Capitol Programs  
Ann Arbor Public Schools  
2555 South State Street  
Ann Arbor, Michigan 48104

Re: Report of Infiltration Evaluation  
Ann Arbor Public Schools  
Slauson Middle School  
1019 West Washington Street  
City of Ann Arbor, Washtenaw County, Michigan  
G2 Project No. 233474I

Dear Mr. Bing:

We have completed the infiltration evaluation associated with the proposed site improvements to the existing Slauson Middle School located in Ann Arbor, Michigan. This report presents the results of our field investigation, observations, analyses, and test results.

The proposed project includes site improvements to the existing campus including building additions, pavement improvements, and stormwater management structures. We understand consideration is being given to constructing a gymnasium addition to the south end of the existing building and to constructing a below grade parking structure to the north of the existing structure. The reconfiguration of the buildings and pavements at the site will result in new impervious areas and ultimately increase the required stormwater management storage volume. We understand the designers of the site improvements intend to implement infiltration structures designed to direct collected stormwater into the natural groundwater cycle.

This infiltration evaluation was conducted in general accordance with Washtenaw County Water Resource (WCWRC) "Rules and Guidelines - Procedures & Design Criteria for Stormwater Management Systems" revised October 17, 2016. Due to site limitations, we performed downhole infiltration testing within soil borings IN-B-01A, IN-B-02A, and IN-B-03A. We performed test pit excavations for IN-TP-04 and IN-TP-05. This report presents a summary of the prior results from the test pits and the new results from the soil borings.

## FIELD OPERATIONS

Beckett & Raeder, Inc. in conjunction with G2 Consulting Group, LLC (G2), selected the number, depth, and location of the infiltration tests. The infiltration testing locations were located in the field using GPS assisted mobile technology and conventional taping methods by measuring from known surface features. Existing ground surface elevations at the soil boring locations were estimated by interpolating between the elevation contour lines presented on the provided topographical survey. The resulting elevations are presented on the Soil Boring Logs, Figure Nos. 1 through 8.

The soil borings were performed by Strata Drilling, Inc. using a track-mounted rotary drilling rig. Continuous 4-inch outside diameter solid-stem augers were used to advance the borehole to explored depths at IN-B-01/IN-B-01A, while continuous 2-1/4 inch inside diameter hollow-stem augers were used to advance the boreholes to the explored depths for IN-B-02/IN-B-02A and IN-B-03/IN-B-03A. Soil samples were collected at 2-1/2-foot intervals for the entire explored depths. The samples were obtained by the Standard Penetration Test method (ASTM D 1586), which involves driving a 2-inch

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diameter split-spoon sampler into the soil with a 140-pounds weight falling 30-inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12-inches is termed the Standard Penetration Resistance (N). The blow counts for each 6-inch increment and the resulting N-value are presented on the Soil Boring Logs.

The test pits (IN-TP-04 and IN-TP-05) were performed by Local Life Maintenance Group using a CAT excavator with a 36-inch bucket as part of our investigation presented in the report titled "Report of Geotechnical Investigation – Ann Arbor Public Schools – Slauson Middle School – G2 Project No. 233474" dated February 11, 2024. Please refer to our prior report for detailed information about the field operations related to the test pit excavation operations.

During drilling operations for this phase of the project, Patrick Guisinger maintained logs of the encountered subsurface conditions including changes in stratigraphy and observed groundwater levels. The soil samples were placed in sealed containers and brought to our laboratory for testing and classification. The final boring logs are based on the field boring logs supplemented by laboratory soil classification and test results. The boreholes were backfilled with auger cuttings upon completion of the drilling operations.

## FIELD AND LABORATORY TESTING

We performed the infiltration tests associated with this phase of the project within soil boring excavations. At first, we drilled a soil boring at the test location extending to a depth beyond the target test elevation. Following the initial soil boring operations, we offset from the initially drilled location and drilled without sampling to a depth corresponding to 1-1/2 feet above the test interval. We obtained one SPT soil sample at this depth to confirm the soil conditions at the target test depth. Following the confirmation of the soil layer, we installed an encased falling head permeameter adapted to the performance of the test within a soil boring.

After the initial pre-soak of the tested soil plug, a head of approximately 24-inches was poured into the casing and the drop in the head of water was monitored over time. Several readings are conducted during the infiltration test until a consistent rate-of-drop has been established. Once testing was completed, the boreholes were backfilled with the excavated soils.

Representative soil samples were subjected to laboratory testing to determine soil parameters pertinent to site preparation and infiltration evaluation. An experienced geotechnical engineer classified the samples in general conformance with the G2 General Notes Terminology and applications of the Unified Soil Classification System (Visual-Manual Method) (USCS) (ASTM D2488). Laboratory testing was performed in accordance with the following ASTM Test Methods:

- ASTM D2216 – Moisture Content
- ASTM D422 – Sieve Analysis of Soil (Coarse Fraction Only)

The results of the field and laboratory testing are indicated on the Soil Boring Logs, Figure Nos. 1 through 8, at the depths the samples were obtained. The results of the grain-size distribution determined in accordance with ASTM D422 are presented in the Appendix graphically as Figure No. 9.

We will hold the samples for 60 days from the date of this report, after which time they will be discarded. If you would like the samples, please let us know.

## SITE DESCRIPTION

The Slauson Middle School is located within a residential community located to the west of downtown Ann Arbor. The site is bounded by W. Washinton Street to the north, 8<sup>th</sup> Street to the east, W. Liberty Street to the south, and Buena Vista Avenue to the west. The school campus can be accessed via two access drives, with one leading southward into the site from W. Washington Street, and one leading

westward into the site from 8<sup>th</sup> Street.

The Slauson Middle School was originally constructed in 1937. We have reviewed historical aerial imagery at the site available on the Washtenaw County MapWashtenaw website extending back to 1940. In the aerial imagery, we observe building additions to the original building in the 1960 aerial imagery. Based on the drawing titled "Addition to Slauson Junior High School" dated September 15, 1953 by Kasurin and Kasurin, we understand a music department, cafeteria, and swimming pool were added to the north of the original building and a classroom was added to the south of the building. In the aerial imagery from 1966, we observe that an addition was added to the building in the area between the original building footprint and the classroom addition to the south. Based on the existing site grades compared with grades presented on the 1953 drawings, we estimate approximately 13 feet of fill was placed to the southeast of the 1966 building addition. In the 1997 imagery, we observe the building was extended further southward from the 1953 classroom addition. Based on the existing site grades compared with the grades presented on the 1953 drawings, we estimate approximately 10 feet of fill was placed to the southeast of the 1997 addition.

The existing site grades are relatively flat to the north of the school with elevations ranging from 852 feet at the northwest corner of the property to an elevation of approximately 845 feet in the southeast corner of the north parking lot. A loading dock ramp extends from the north parking lot into the central portion of the building with the ramp having a low elevation of approximately 840 feet adjacent to the building. Site grades abruptly slope downward from the area to the north of the existing school to the area to the east of the school near elevations of approximately 825 feet. The original building footprint has a lower-level slab at an elevation of approximately 830 feet. The 1953 classroom addition appears to have a slab elevation of approximately 840 feet and the 1999 addition appears to have a lower-level slab elevation of approximately 832-1/2 feet. Site grades appear to slope downward from an elevation of approximately 843 feet to a relatively flat grassy area to the south and southeast of the school. Site grades in the grassy area are relatively consistent extending from 8<sup>th</sup> Street to the southwest corner of the grassy area with elevations ranging from 827 to 830 feet.

## SOIL AND GROUNDWATER CONDITIONS

Approximately 2 to 13 inches of topsoil were present at ground surface of the test pits and soil borings. Fill soils consisting of a range of granular soils underlie the topsoil extending to depths ranging from 1-3/4 to 6-1/2 feet. Native granular soils consisting of gravelly sand, sand, and clayey sand generally underlie the fill soils and extend to the explored depths of 2 to 4 feet for the test pits and 10 to 15 feet for the soil borings.

The sand fill present within soil borings IN-B-01 and IN-B-03 is loose in compactness with Standard Penetration Test (SPT) N-values ranging from 5 to 9 blows per foot (bpf). The clayey sand fill present within soil boring IN-B-02 is loose to medium compact having SPT N-values ranging from 8 to 15 bpf. The native granular soils are generally loose to medium compact, with SPT N-values ranging between 7 and 29 bpf.

The stratification depths shown on the soil boring logs represent the soil conditions at the specified locations. Variations may occur between and away from the soil boring locations. Additionally, the stratigraphic lines represent the approximate boundaries between soil types. The transition may be more gradual than indicated. We have prepared the soil boring logs on the basis of the field logs of the soil conditions encountered supplemented by laboratory classification and testing.

The Soil Boring Location Plan, Plate No. 1, and Soil Boring Logs, Figure Nos. 1 through 8, are presented in the Appendix. We present the graphical results of the grain size distribution determinations on Figure No. 9 in the Appendix. The soil profiles described above are generalized descriptions of the conditions encountered at the soil boring locations. General Notes Terminology defining the nomenclature used on the soil boring logs and elsewhere in this report are presented on Figure No. 10.



No measurable groundwater was present within the test pit or soil boring excavations during or upon completion of the drilling operations.

**INFILTRATION CONSIDERATIONS**

We present the results of our infiltration testing program in the following table:

Infiltration Location No.	Ground Surface Elevation (ft) <sup>1</sup>	Groundwater Elevation (ft) <sup>2</sup>	Test Elevation (ft)	Soil Type (USCS <sup>3</sup> )	Observed Infiltration Rate (iph) <sup>4</sup>
IN-B-01A	847	823	840.5	Gravelly Sand (SW-SM)	2.8
IN-B-02A	838.5	---	830.5	Sand (SW-SC)	0.8
IN-B-03A	839	---	829	Clayey Sand (SC)	0.8
IN-TP-04 <sup>5</sup>	831	825	827	Gravelly Sand (SW-SM)	74.2
IN-TP-05 <sup>5</sup>	830	825	828	Sand (SP)	18.5

- Notes:
1. Estimated based on supplied topographical information.
  2. Determined from adjacent borings if available.
  3. Description in general accordance with Visual-Manual Unified Soil Classification System (ASTM D2488).
  4. Represents infiltration rate for duration of final trial.
  5. Performed in association with our initial infiltration evaluation (January 2024).

Discrepancies between the design infiltration rate and the observed soil types can be attributed to the percentage of material passing the No. 200 sieve, the mineralogy of the material passing the No. 200 sieve, in addition to the in-situ relative density of the encountered soil types.

Please note, the observed infiltration rates presented in the above table have not been reduced using a factor-of-safety. The stormwater system engineer-of-record should use an appropriate factor of safety based on their experience with the design, construction, and performance of similar systems. In general, it is recommended that the observed infiltration rates be reduced by a factor of safety equal to 2.0 for use in design.

We recommend that a qualified geotechnical engineer or technician be present on-site during the excavation of the stormwater management structures to verify that soils at the base of the proposed structures are consistent with soil conditions identified within this report.

**GENERAL COMMENTS**

If changes occur in the design, location, or concept of the project, conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm any assumptions regarding the project scope presented herein or make changes in writing. The scope of the present investigation was limited to evaluation of subsurface conditions at the proposed boring locations. No chemical or environmental testing or analyses were included in the scope of this investigation.

We base the analyses and recommendations submitted in this report upon the data from the soil borings performed at the approximate locations shown on the Soil Boring Location Plan, Plate No. 1. This report does not reflect variations that may occur between the actual soil boring locations and the actual stormwater management structure location. The nature and extent of any such variations may not

become clear until the time of construction. We recommend G2 Consulting Group, LLC observe all geotechnical related work, including subgrade preparation and engineered fill placement.

We appreciate the opportunity to be of service to you on this project and look forward to discussing the results presented. In the meantime, if you have any questions regarding this report or any other matter pertaining to the project, please call us.

Sincerely,

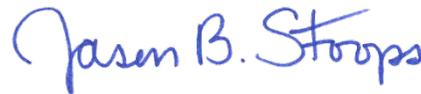
**G2 Consulting Group, LLC**



Patrick J. Guisinger  
Geotechnical Technician

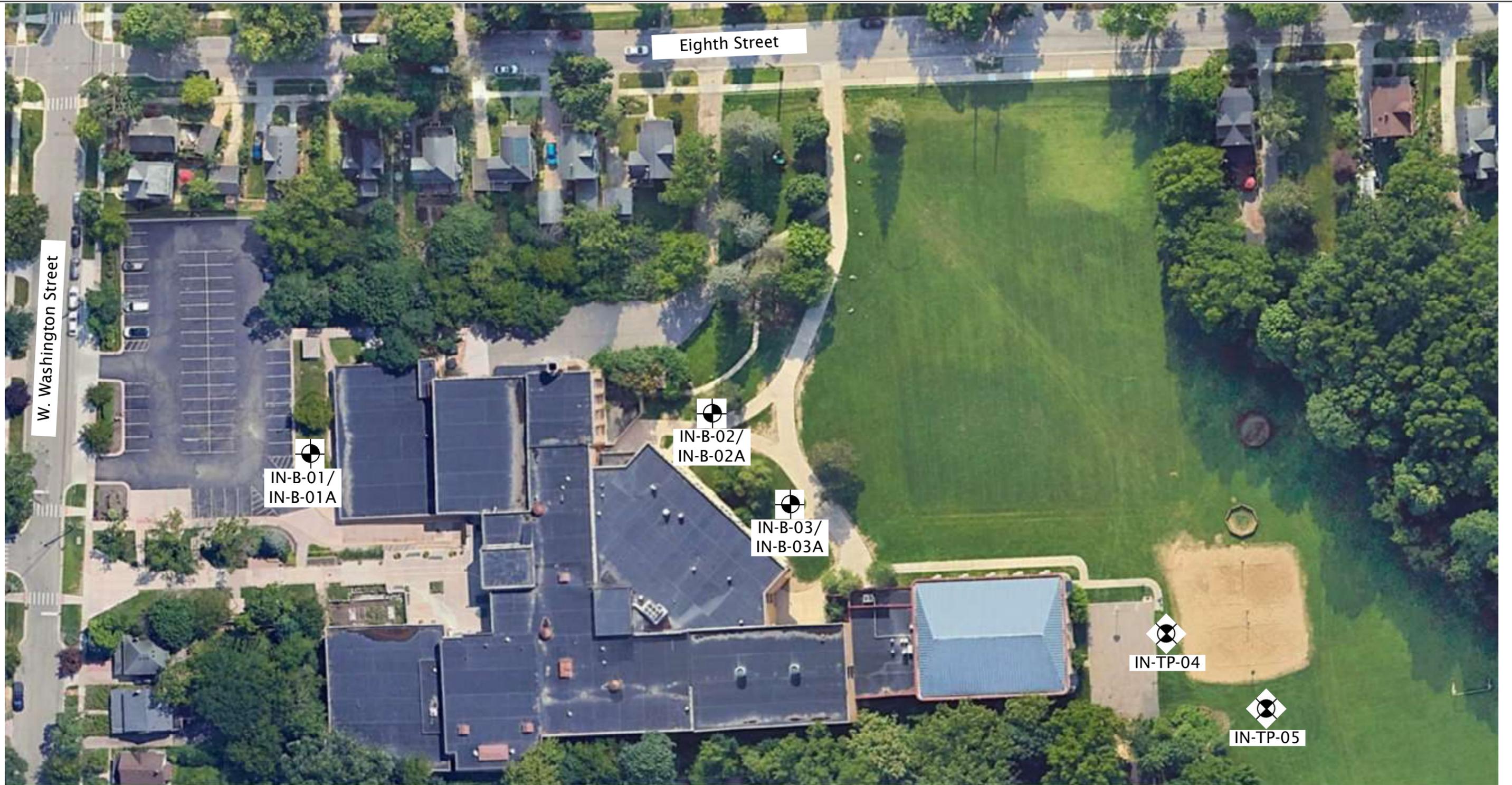
PJG/JBS/jbs

- Encl: Plate No. 1 - Soil Boring Location Plan  
Figure Nos. 1 through 8 - Soil Boring Logs  
Figure No. 9 - Grain-Size Distribution Test Results  
Figure No. 10 - General Notes Terminology  
Figure Nos. 11 through 15 - Infiltration Test Results



Jason B. Stoops, P.E.  
Associate / Project Manager





**Legend**

- 
 Soil borings drilled by Strata Drilling, Inc. on April 13, 2024.
- 
 Test pits excavated by Local Life Maintenance Group on January 3, 2024.



<b>Test Pit Location Plan</b>	
Slauson Middle School 1019 W. Washington Street City of Ann Arbor, Washtenaw County, Michigan	
	Project No.: 233474
	Drawn by: PJG
	Date: 4/15/24
Scale: NTS	Plate No. 1

Project Name: Ann Arbor Public Schools - Slauson Middle School

Project Location: 1019 West Washington Street  
Ann Arbor, Michigan

G2 Project No. 233474

Latitude: 42.280400° Longitude: -83.760802°



Soil Boring No. IN-B-01

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SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 847.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Sand (13 inches)	1.1						
		Fill: Loose Brown Sand with trace gravel	3.0	S-01	3 3 2	5			
842.0		Medium Compact Brown Gravelly Sand with trace silt (Passing No. 200 Sieve = 9.9%)	5	S-02	3 6 8	14			
				S-03	11 15 14	29			
837.0			10.0	S-04	10 11 14	25			
		End of Boring @ 10 ft							
832.0			15						

Total Depth: 10 ft  
 Drilling Date: April 13, 2024  
 Inspector: P. Guisinger  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion

Excavation Backfilling Procedure:  
 Auger cuttings

Drilling Method:  
 4 inch flight solid stem auger

Figure No. 1

SOIL / PAVEMENT BORING - 233474.CPJ - 20150116 G2 CONSULTING DATA TEMPLATE.GDT - 4/19/24

Project Name: Ann Arbor Public Schools - Slauson Middle School

Project Location: 1019 West Washington Street  
Ann Arbor, Michigan

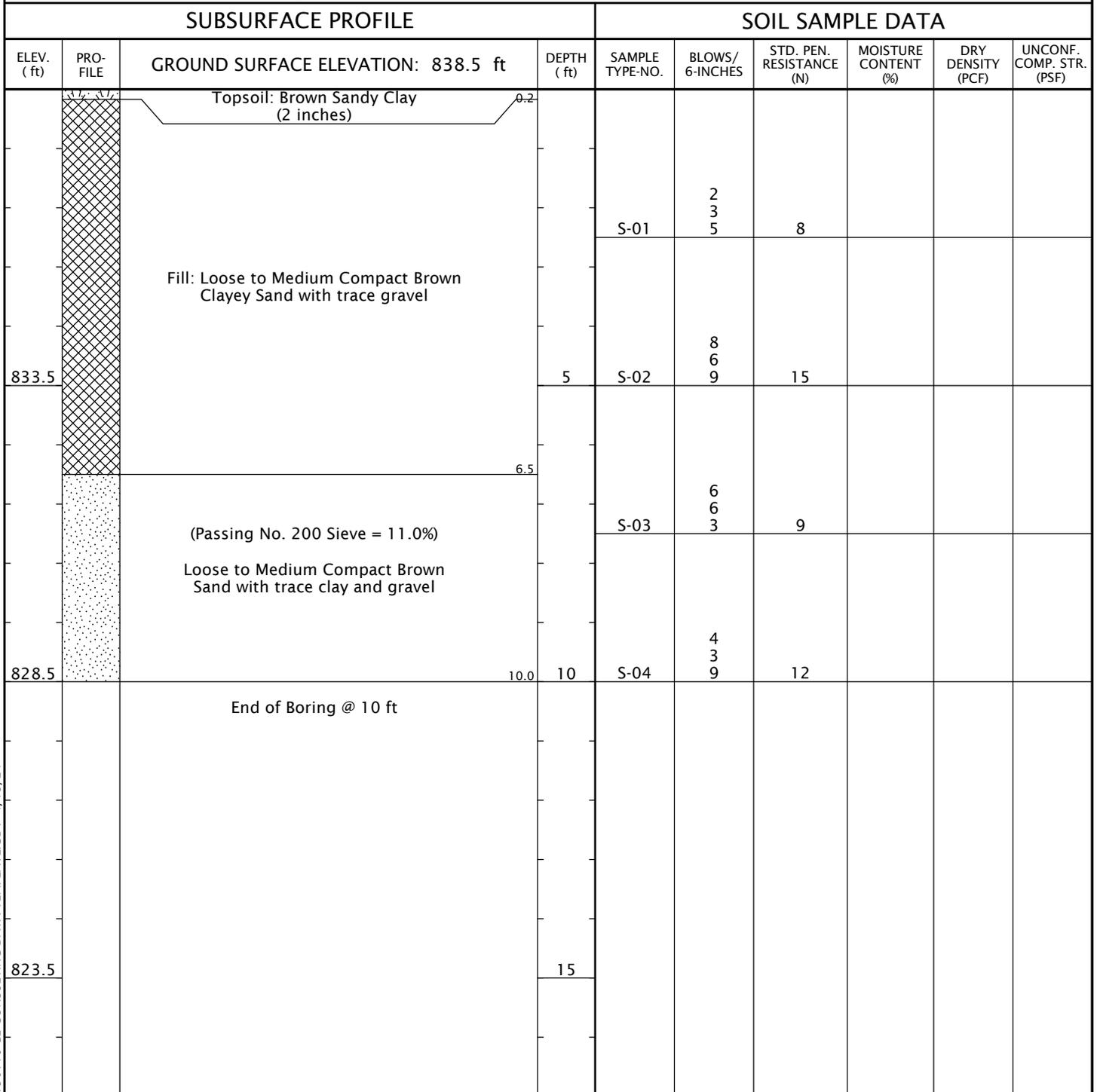
G2 Project No. 233474

Latitude: 42.279661° Longitude: -83.760732°



Soil Boring No. IN-B-02

CONSULTING GROUP



Total Depth: 10 ft  
 Drilling Date: April 13, 2024  
 Inspector: P. Guisinger  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion

Excavation Backfilling Procedure:  
 Auger cuttings

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

SOIL / PAVEMENT BORING - 233474.CPJ - 20150116 G2 CONSULTING DATA TEMPLATE.GDT - 4/19/24

Figure No. 2

Project Name: Ann Arbor Public Schools - Slauson Middle School

Project Location: 1019 West Washington Street  
Ann Arbor, Michigan

G2 Project No. 233474

Latitude: 42.279518° Longitude: -83.760951°



Soil Boring No. IN-B-03

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 839.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Sandy Clay (8 inches)	0.7						
		Fill: Loose Brown Sand with trace clay and gravel		S-01	4 5 4	9			
834.0			5	S-02	1 3 2	5			
		Fill: Very Loose Clayey Sand with trace gravel; occasional organic material		S-03	2 1 1	2			
			6.0						
		(Passing No. 200 Sieve = 14.4%) Loose Brown Clayey Sand with trace gravel		S-04	1 3 5	8			
829.0			9.0						
		Loose to Medium Compact Brown Clayey Sand with trace gravel		S-05	6 4 3	7			
			11.5						
824.0			15.0	S-06	7 6 6	12			
		End of Boring @ 15 ft							

Total Depth: 15 ft  
 Drilling Date: April 13, 2024  
 Inspector: P. Guisinger  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion

Excavation Backfilling Procedure:  
 Auger cuttings

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

SOIL / PAVEMENT BORING - 233474.CPJ - 20150116 G2 CONSULTING DATA TEMPLATE.GDT - 4/19/24

Figure No. 3

Project Name: Ann Arbor Public Schools - Slauson Middle School

Soil Boring No. IN-B-01A

Project Location: 1019 West Washington Street  
Ann Arbor, Michigan



G2 Project No. 233474

Latitude: 42.280380° Longitude: -83.760802°

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 847.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		(Profile Drilled to 5 feet)							
842.0			5.0						
		Medium Compact Brown Sand with trace gravel (Observed Infiltration Rate = 2.8 iph)	6.5	S-01	6 10 15	25			
		End of Boring @ 6.5 ft							
837.0			10						
832.0			15						

Total Depth: 6.5 ft  
 Drilling Date: April 13, 2024  
 Inspector: P. Guisinger  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion

Notes:  
 Profile drilled to 5 feet, sample taken from 5 to 6-1/2 feet, casing set at 6 feet

Drilling Method:  
 4 inch flight solid stem auger

Excavation Backfilling Procedure:  
 Auger cuttings

SOIL / PAVEMENT BORING 233474.CPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 4/19/24

Figure No. 4

Project Name: Ann Arbor Public Schools - Slauson Middle School

Soil Boring No. IN-B-02A

Project Location: 1019 West Washington Street  
Ann Arbor, Michigan



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G2 Project No. 233474

Latitude: 42.279644° Longitude: -83.760723°

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 838.5 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
833.5		(Profile Drilled to 6-1/2 feet)	5						
			6.5						
		Loose Brown Clayey Sand with trace gravel (Observed Infiltration Rate = 0.8 iph)	8.0	S-01	12 6 4	10			
828.5		End of Boring @ 8 ft	10						
823.5			15						

Total Depth: 8 ft  
 Drilling Date: April 13, 2024  
 Inspector: P. Guisinger  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion

Notes:  
 Profile drilled to 6-1/2 feet, sample taken from 6-1/2 to 8 feet, casing set at 8 feet

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Auger cuttings

SOIL / PAVEMENT BORING\_233474.CPJ\_20150116 G2 CONSULTING DATA TEMPLATE.GDT\_4/19/24

Figure No. 5

Project Name: Ann Arbor Public Schools - Slauson Middle School

Soil Boring No. IN-B-03A

Project Location: 1019 West Washington Street  
Ann Arbor, Michigan



G2 Project No. 233474

Latitude: 42.279500° Longitude: -83.760942°

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 839.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
834.0		(Profile Drilled to 8-1/2 feet)	5						
829.0		Medium Compact Clayey Sand with trace gravel (Observed Infiltration Rate = 0.8 iph)	10	S-01	3 3 9	12			
824.0		End of Boring @ 10 ft	15						

SOIL / PAVEMENT BORING 233474.CPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 4/19/24

Total Depth: 10 ft  
 Drilling Date: April 13, 2024  
 Inspector: P. Guisinger  
 Contractor: Strata Drilling, Inc.  
 Driller: B. Sienkiewicz

Water Level Observation:  
 Dry during and upon completion

Notes:  
 Profile drilled to 8-1/2 feet, sample taken from 8-1/2 to 10 feet, casing set at 10 feet

Drilling Method:  
 2-1/4 inch inside diameter hollow-stem augers

Excavation Backfilling Procedure:  
 Auger cuttings

Figure No. 6

Project Name: Ann Arbor Public Schools - Slauson Middle School

Soil Boring No. IN-TP-04

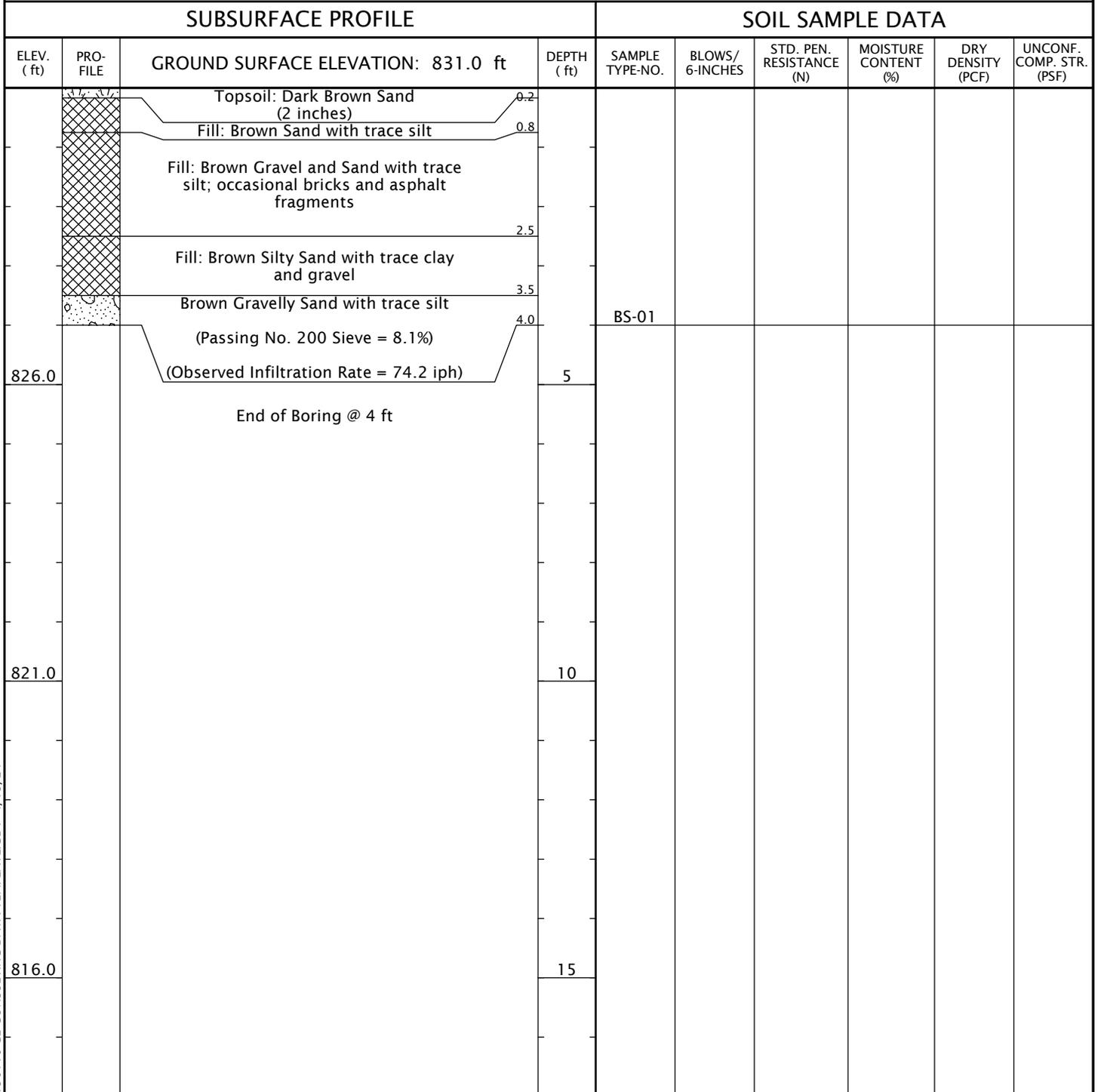
Project Location: 1019 West Washington Street  
Ann Arbor, Michigan



CONSULTING GROUP

G2 Project No. 233474

Latitude: 42.278822° Longitude: -83.761305°



Total Depth: 4 ft  
 Drilling Date: January 3, 2024  
 Inspector: Z. Lilly  
 Contractor: Local Life Maintenance Group  
 Driller:

Water Level Observation:  
 Dry during and upon completion

Notes:  
 Excavated near soil boring P-15

Drilling Method:  
 Cat Excavator with 36-inch bucket

Excavation Backfilling Procedure:  
 Excavated soils

SOIL / PAVEMENT BORING - 233474.CPJ - 20150116 G2 CONSULTING DATA TEMPLATE.GDT - 4/19/24

Figure No. 7

Project Name: Ann Arbor Public Schools - Slauson Middle School

Soil Boring No. IN-TP-05

Project Location: 1019 West Washington Street  
Ann Arbor, Michigan



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G2 Project No. 233474

Latitude: 42.278678° Longitude: -83.761495°

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 830.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (11 inches)	0.9						
		Fill: Dark Brown Gravelly Sand with trace clay and silt	1.8						
		Brown Sand with trace silt	2.0	BS-01					
		(Passing No. 200 Sieve = 2.9%) (Observed Infiltration Rate = 18.5 iph)							
		End of Boring @ 2 ft							
825.0			5						
820.0			10						
815.0			15						

Total Depth: 2 ft  
 Drilling Date: January 3, 2024  
 Inspector: Z. Lilly  
 Contractor: Local Life Maintenance Group  
 Driller:

Water Level Observation:  
 Dry during and upon completion

Notes:  
 Excavated near soil boring P-20

Excavation Backfilling Procedure:  
 Excavated soils

Drilling Method:  
 Cat Excavator with 36-inch bucket

SOIL / PAVEMENT BORING 233474.CPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 4/19/24

Figure No. 8



## GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

### PARTICLE SIZE

Boulders	- greater than 12 inches
Cobbles	- 3 inches to 12 inches
Gravel - Coarse	- 3/4 inches to 3 inches
- Fine	- No. 4 to 3/4 inches
Sand - Coarse	- No. 10 to No. 4
- Medium	- No. 40 to No. 10
- Fine	- No. 200 to No. 40
Silt	- 0.005mm to 0.074mm
Clay	- Less than 0.005mm

### CLASSIFICATION

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

<b>Second Major Constituent (percent by weight)</b>	<b>Minor Constituent (percent by weight)</b>
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

### COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

<b>Consistency</b>	<b>Unconfined Compressive Strength (psf)</b>	<b>Approximate Range of (N)</b>
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

<b>COHESIONLESS SOILS</b>		
<b>Density Classification</b>	<b>Relative Density %</b>	<b>Approximate Range of (N)</b>
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

### SAMPLE DESIGNATIONS

- AS - Auger Sample - Cuttings directly from auger flight
- BS - Bottle or Bag Samples
- S - Split Spoon Sample - ASTM D 1586
- LS - Liner Sample with liner insert 3 inches in length
- ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
- PS - Piston Sample - 3 inch diameter unless otherwise noted
- RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

# G2 Consulting Group, LLC

## Encased Falling Head Infiltration Test (WCWRC 2016)



Project: Slauson Middle School Job No.: 233474  
 Location of Project: Ann Arbor, MI Borehole No. IN-B-01A Depth (in) 66  
 Description of Soil: Gravelly Sand Depth of Test (in): 66  
 Tested By: Patrick Guisinger Date of Testing: 4/13/2024  
 Casing Diameter (in): 4 Casing Embedment (in): 6  
 Initial Head of Water (in): 24 Pre-Soak Time (min): 240

Reading No.	Trial 1		Trial 2		Trial 3	
	Elapsed Time (min)	Depth Reading (in)	Elapsed Time (min)	Depth Reading (in)	Elapsed Time (min)	Depth Reading (in)
1	0	24	0	24	0	24
2	10	23 6/16	10	23 8/16	10	23 6/16
3	20	22 15/16	20	22 14/16	20	22 14/16
4	30	22 9/16	30	22 8/16	30	22 8/16
5	40	22 1/16	40	22 2/16	40	22 1/16
6	50	21 12/16	50	21 13/16	50	21 12/16
7	60	21 4/16	60	21 5/16	60	21 4/16
8						
9						
10						
11						
12						
13						

Reading No.	Trial 1	Trial 2	Trial 3
	Infiltration Rate (in/hr)	Infiltration Rate (in/hr)	Infiltration Rate (in/hr)
1	---	---	---
2	3.60	3.00	3.60
3	2.88	3.60	3.00
4	2.16	2.40	2.40
5	2.88	2.40	2.70
6	2.16	1.80	1.98
7	2.88	3.00	2.88
8	---	---	---
9	---	---	---
10	---	---	---
11	---	---	---
12	---	---	---
13	---	---	---

Elapsed Time (min)	Head Drop (in)	Observed Infiltration Rate (iph)
60	2 12/16	2.76

- Notes:
1. Refer to "Rules and Guidelines - Procedures & Design Criteria for Stormwater Management Systems", WCWRC, Rev. Oct. 2016.
  2. ← = Used in Calculating Infiltration Rate

# G2 Consulting Group, LLC

## Encased Falling Head Infiltration Test (WCWRC 2016)



Project: Slauson Middle School Job No.: 233474  
 Location of Project: Ann Arbor, MI Borehole No. IN-B-02A Depth (in) 80  
 Description of Soil: Clayey Sand Depth of Test (in): 80  
 Tested By: Patrick Guisinger Date of Testing: 4/13/2024  
 Casing Diameter (in): 4 Casing Embedment (in): 6  
 Initial Head of Water (in): 24 Pre-Soak Time (min): 240

Reading No.	Trial 1		Trial 2		Trial 3	
	Elapsed Time (min)	Depth Reading (in)	Elapsed Time (min)	Depth Reading (in)	Elapsed Time (min)	Depth Reading (in)
1	0	24	0	24	0	24
2	10	23 14/16	10	23 14/16	10	23 14/16
3	20	23 12/16	20	23 12/16	20	23 12/16
4	30	23 8/16	30	23 8/16	30	23 10/16
5	40	23 6/16	40	23 6/16	40	23 7/16
6	50	23 4/16	50	23 4/16	50	23 4/16
7	60	23 3/16	60	23 2/16	60	23 3/16
8						
9						
10						
11						
12						
13						

Reading No.	Trial 1	Trial 2	Trial 3
	Infiltration Rate (in/hr)	Infiltration Rate (in/hr)	Infiltration Rate (in/hr)
1	---	---	---
2	0.72	0.90	0.72
3	0.72	0.60	0.78
4	1.44	1.50	0.90
5	0.72	0.60	1.02
6	0.72	0.72	0.90
7	0.72	0.78	0.72
8	---	---	---
9	---	---	---
10	---	---	---
11	---	---	---
12	---	---	---
13	---	---	---

Elapsed Time (min)	Head Drop (in)	Observed Infiltration Rate (iph)
60	13/16	0.84

- Notes:
1. Refer to "Rules and Guidelines - Procedures & Design Criteria for Stormwater Management Systems", WCWRC, Rev. Oct. 2016.
  2. ← = Used in Calculating Infiltration Rate





# G2 Consulting Group, LLC

## Encased Falling Head Infiltration Test (WCWRC 2016)



Project: Slauson Middle School Job No.: 233474  
 Location of Project: Ann Arbor, MI Test Pit No. TP-05 Depth (in) 24  
 Description of Soil: Sand Depth of Test (in): 24  
 Tested By: Z. Lilly Date of Testing: 1/3/2024  
 Casing Diameter (in): 6 Casing Embedment (in): 6  
 Initial Head of Water (in): 12 Pre-Soak Time (min): 59

Reading No.	Trial 1		Trial 2		Trial 3	
	Elapsed Time (min)	Depth Reading (in)	Elapsed Time (min)	Depth Reading (in)	Elapsed Time (min)	Depth Reading (in)
1	0	12	0	12	0	12
2	5	9 4/8	5	9 5/8	5	9 5/8
3	10	7 2/8	10	7 6/8	10	7 6/8
4	15	5 2/8	15	6 2/8	15	6 2/8
5	20	3 2/8	20	4 7/8	20	4 6/8
6	25	1 2/8	25	3 4/8	25	3 6/8
7			30	2 1/8	30	2 6/8
8						
9						
10						
11						
12						
13						

Reading No.	Trial 1	Trial 2	Trial 3
	Infiltration Rate (in/hr)	Infiltration Rate (in/hr)	Infiltration Rate (in/hr)
1	---	---	---
2	30.00	28.50	28.50
3	27.00	22.50	22.50
4	24.00	18.00	18.00
5	24.00	16.50	18.00
6	24.00	16.50	12.00
7	---	16.50	12.00
8	---	---	---
9	---	---	---
10	---	---	---
11	---	---	---
12	---	---	---
13	---	---	---

Elapsed Time (min)	Head Drop (in)	Observed Infiltration Rate (iph)
30	9 2/8	18.50

- Notes:
1. Refer to "Rules and Guidelines - Procedures & Design Criteria for Stormwater Management Systems", WCWRC, Rev. Oct. 2016.
  2. ← = Used in Calculating Infiltration Rate