

March 21, 2025  
Project No. 25001

RECEIVED  
06/20/2025  
CITY OF MONROE

App #11458

Mr. Eric Cavanaugh  
Northern Star Construction  
24220 Florence Acres Road  
Monroe, WA 98272

Re: Soil Infiltration Rate Evaluation  
Parcel #00517404101502  
134 S. Ferry Avenue  
Monroe, WA

This report summarizes the results of our soil infiltration rate evaluation that was conducted at the above noted property in Monroe, Washington. This study has been completed and this report prepared for the exclusive use of Northern Star Construction, and their agents, for specific application to this project. Within the limitations of scope and schedule, our services have been performed in accordance with generally accepted engineering geology practices in effect in this area at the time of our study. No other warranty, express or implied, is made.

The site is currently undeveloped. It is our understanding that a new, drive through coffee stand is planned for the parcel.

### **Existing Conditions**

A professional survey of the site was not provided for this study. However, based on a site plan provided by HWL Architects, the property is rectangular in shape and measures approximately 90 feet in the east-west direction by 72 feet in the north-south direction with an area slightly less than 6500 square feet. The site topography is relatively flat. The site is relatively clear of vegetation with only field grass and some blackberry vines.

There was no indication of any standing or flowing water on the parcel at the time of our field work on February 14, 2025. No hydrophilic vegetation was observed on the site.

The property is bounded on the north and west single family residences, on the east by S. Ferry Avenue and on the south by Fremont Street.

## **Subsurface Exploration**

A geotechnical study was previously performed on the site in 2019 by others. At that time four exploration pits were excavated on the parcel for construction and foundation design purposes. All four pits encountered 2 to 3 feet of topsoil/fill intermixture consisting of loose, moist, silty fine sand with trace to some organics, roots and gravel overlying gravelly sand and sandy gravel (recessional outwash). No ground water was observed within the exploration pits to a maximum depth of 7 feet. In addition, the report presented three exploration borings drilled nearby in Fremont Street. The borings also encountered fill overlying recessional outwash to a maximum drilled depth of 41 feet. Ground water was observed within the borings at a depth of about 28 feet.

For this soil infiltration rate study an additional two exploration pits were excavated on the site (see attached Figure 1, Site and Exploration Plan). Our pits also encountered 2 to 3 feet of topsoil and old fill materials overlying recessional outwash (gravelly sand and sandy gravel). No ground water was observed to a maximum depth of 9 feet below existing grade.

Soil samples were collected at depths of 1.5 feet in EP-1 and 1.5 and 4.0 feet in EP-2. The samples were taken to approved soils laboratories for grain size analysis, cation exchange capacity and organic content testing. Laboratory test results are attached with this report.

## **Ground Water**

Ground water seepage was not encountered in any of the previous or current exploration pits excavated on the site to a maximum depth of 9 feet. Ground water was observed within a previous test boring in Fremont Street about 200 feet from the subject parcel, at a depth of 28 feet below grade. Although the depth and occurrence of ground water can vary in response to such factors as changes in season, amount of precipitation and site use, it is unlikely that ground water seepage will ever be observed on the subject parcel at a depth that could impact a shallow infiltration facility.

## **Infiltration**

We understand that the on-site infiltration of site generated storm water is the preferred method for the disposal of storm water. Because the soils underlying the site consist of unconsolidated recessional outwash or unconsolidated fill materials, the methods outlined in the 2019 Surface Water Management Manual for Western Washington, Volume 5, V5.4,  $K_{sat}$  Determination Option 3: Soil Grain Size Analysis were used to determine the soil infiltration rate. The recommended uncorrected infiltration rates based upon grain size analyses of soil samples collected at each proposed infiltration location and performed in accordance with ASTM Method D422 are presented in Table 1 below:

**Table 1. Soil Infiltration Rate, CEC & Organic Content**

Sample No.	Depth (ft)	Ksat (cm/sec)	Uncorrected Infiltration Rate (in/hr)	Cation Exchange Capacity (meq/100 g)	Organic Content (%)
EP-1	1.5	$1.486 \times 10^{-2}$	21	10.0	5.12
EP-2	1.5			11.1	5.19
EP-2	4.0	$4.31 \times 10^{-2}$	30		

As per the 2019 SWMMWW correction factors are applied to the uncorrected infiltration rate to account for site variability (CF<sub>v</sub>), test method (CF<sub>t</sub>) and siltation and bio-buildup (CF<sub>m</sub>). For this site, the following correction factors should be applied. The site variability factor is high because in addition to our 2 exploration pits, there were 4 other explorations by others on the site and 4 explorations in the street – all of which identified the same material.

- CF<sub>v</sub> = 0.9
- CF<sub>t</sub> = 0.4
- CF<sub>m</sub> = 0.9

Applying these correction factors to the uncorrected infiltration rates determined above results in recommended, long term design infiltration rates as follows:

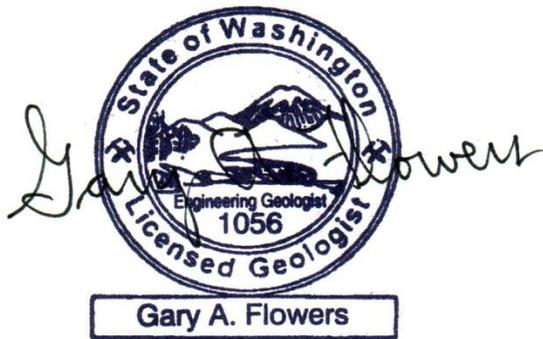
- Overlying granular fill = 6.8 in/hr
- Underlying native granular recessional outwash = 9.7 in/hr

### **Cation Exchange Capacity and Organic Content Soil Properties**

As required by the city, the site soils were also evaluated for their potential to provide certain protection to underlying groundwater sources. As such, both the fill soil and the native soil were evaluated for Cation Exchange Capacity (CEC) and Organic Content. Generally, the required parameters useful for such protection is > 5 meq/100 gm CEC and > 1% organic content. As can be seen in Table 1 above, the onsite fill soil meets these requirements, but the underlying native soil does not.

Our findings and recommendations provided in this report were prepared in accordance with generally accepted principles of engineering geology and geotechnical engineering as practiced in the Puget Sound area at the time this report was submitted. We make no other warranty, either express or implied.

Respectfully submitted,



Gary A. Flowers, P.G., P.E.G.  
Principal Engineering Geologist

Attachments: Exploration Pit Logs  
Site & Exploration Plan  
Sieve Analysis – EP-1 @ 1.5 feet  
Sieve Analysis – EP-2 @ 4.0 feet  
CEC & Organic Content Test results

## Exploration Pit Logs 134 S. Ferry Avenue Monroe, WA

**EP-1** Located in approximate area of planned drive through lane

0.0' – 0.2' Grass sod/ minor topsoil

0.2' – 2.0' Loose, moist, brown to dark brown, silty fine SAND, some crushed rock, roots, and organics

2.0' – 4.5' Medium dense, gray, sandy GRAVEL to gravelly coarse SAND with cobbles

BOH @ 4.5' on February 14, 2025. No ground water. Minor sloughing.

**EP-2** Located on southern portion of site, south of planned drive through lane

0.0' – 0.2' Grass sod/ minor topsoil

0.2' – 2.5' Loose, moist, brown to dark brown, silty fine SAND, minor crushed rock, roots, and organics

2.5' – 8.5' Medium dense, gray, sandy GRAVEL to gravelly coarse SAND with cobbles

BOH @ 8.5' on February 14, 2025. No ground water. Minor sloughing.

CONSULTANT NAME / CONSULTANT LOGO

PROJECT TITLE / PROJECT ADDRESS

New Building  
for  
DRIVE-THRU  
COFFEE &  
ACAI BOWL  
STAND

134 S. FERRY AVENUE  
MONROE, WA. 98272

REVISIONS

PERMIT DOCUMENTS 1-15-2025

BID DOCUMENTS

CONSTRUCTION DOCUMENTS

PROJECT NUMBER

DRAWN BY HL

CHECKED BY HWL

DATE 15 JAN 2025

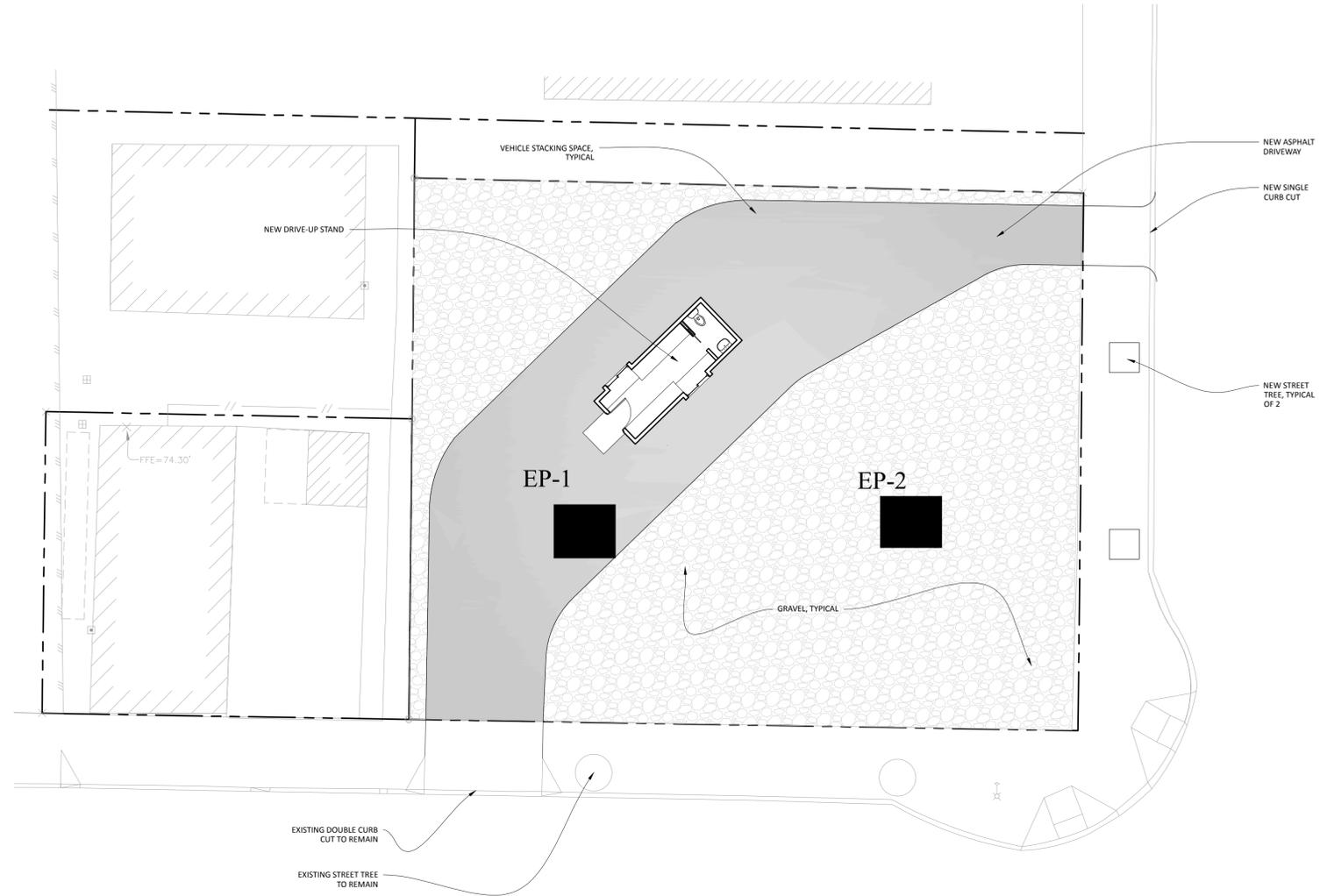
ARCHITECT / ENGINEER SEAL

SHEET TITLE

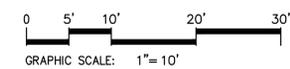
SITE PLAN

SHEET NUMBER

A10



1 SITE PLAN  
1" = 10'-0"





**SIEVE ANALYSIS REPORT**

**Report Number:** M7251140.0001  
**Service Date:** 02/20/25  
**Report Date:** 02/25/25  
**Task:**

**Client**

Gary Flowers, PLLC  
Attn: Gary Flowers  
5205 23rd Ave W  
Everett, WA 98203

**Project**

QC Monroe Coffee Stand  
20225 Cedar Valley Road  
Suite 110  
Lynnwood, WA 98036  
Project No. M7251140

Laboratory Reference # **649**

**Sample Description:** Reddish brown silty gravel with sand  
**Sample Location:** EP-1 @ 1.5' - fill  
**Delivered By:** Gary Flowers  
**Date Delivered:** 2/20/2025  
**Sampled By:** Gary Flowers

**Silty gravel with sand, GM**

**Test Results:**

Sieve Analysis (ASTM C136, C117, D422)  
See attached analysis sheet

**Services:** Special Inspections / Materials Testing  
**Tested By:** Kelsey Roberts

**Report Distribution**

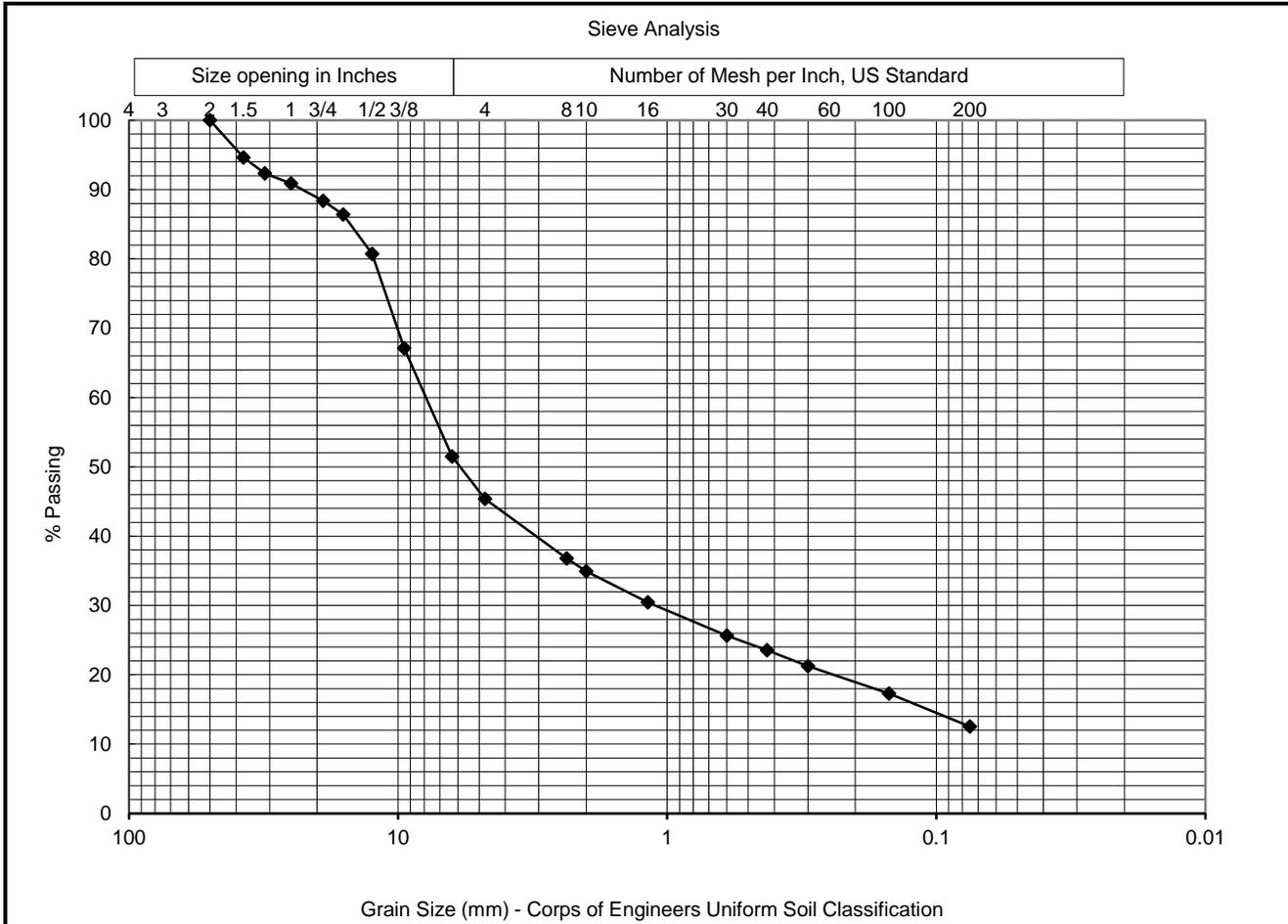
- (1) Gary Flowers, PLLC, Gary Flowers
- (1) Terracon Consultants, Inc., Keith Bellows
- (1) Terracon Consultants, Inc., Melinda Ferguson
- (1) Terracon Consultants, Inc., Zen Revilla

**Reviewed By:** \_\_\_\_\_  
Zenaida Revilla  
Laboratory Manager

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.



20225 Cedar Valley Road, Suite 110 Ph 425-742-9360  
 Lynnwood, WA 98036 Fax 425-745-1737



Sieve Analysis			
ASTM C136 / C117			
Sieve Size	% Passing	Specs *	
		min	max
2.00"	100		
1.50"	95		
1.25"	92		
1.0"	91		
3/4"	88		
5/8"	86		
1/2"	81		
3/8"	67		
1/4"	51		
#4	45		
#8	37		
#10	35		
#16	30		
#30	26		
#40	24		
#50	21		
#100	17		
#200	12.5		
Material: Reddish brown silty gravel with sand			
Source: EP-1 @ 1.5' - fill			
Project: Monroe Coffee Stand			
Project #: M7251140 (25-001)			
Date Rec'd: 2/20/2025			

Sample Number	Depth (ft)	Classification
649		Silty gravel with sand, GM

Tested By: K. Roberts/Z. Revilla

Date Tested: 2/20/25 - 2/25/25

Information in this report applies only to the actual samples tested and shall not be reproduced except in full, without the approval of Terracon

**SIEVE ANALYSIS REPORT**

**Report Number:** M7251140.0002  
**Service Date:** 02/20/25  
**Report Date:** 02/25/25  
**Task:**

**Client**

Gary Flowers, PLLC  
Attn: Gary Flowers  
5205 23rd Ave W  
Everett, WA 98203

**Project**

QC Monroe Coffee Stand  
20225 Cedar Valley Road  
Suite 110  
Lynnwood, WA 98036  
Project No. M7251140

Laboratory Reference # **650**

Sample Description: **Brown gravel with sand**

Delivered By: **Gary Flowers**

Sample Location: **EP-2 @ 4.0' - Native**

Date Delivered: **2/20/2025**

Sampled By: **Gary Flowers**

**Poorly graded gravel with sand, GP**

**Test Results:**

Sieve Analysis (ASTM C136, C117, D422)

See attached analysis sheet

**Services:** Special Inspections / Materials Testing

**Tested By:** Kelsey Roberts

**Report Distribution**

(1) Gary Flowers, PLLC, Gary Flowers

(1) Terracon Consultants, Inc., Keith Bellows

(1) Terracon Consultants, Inc., Melinda Ferguson

(1) Terracon Consultants, Inc., Zen Revilla

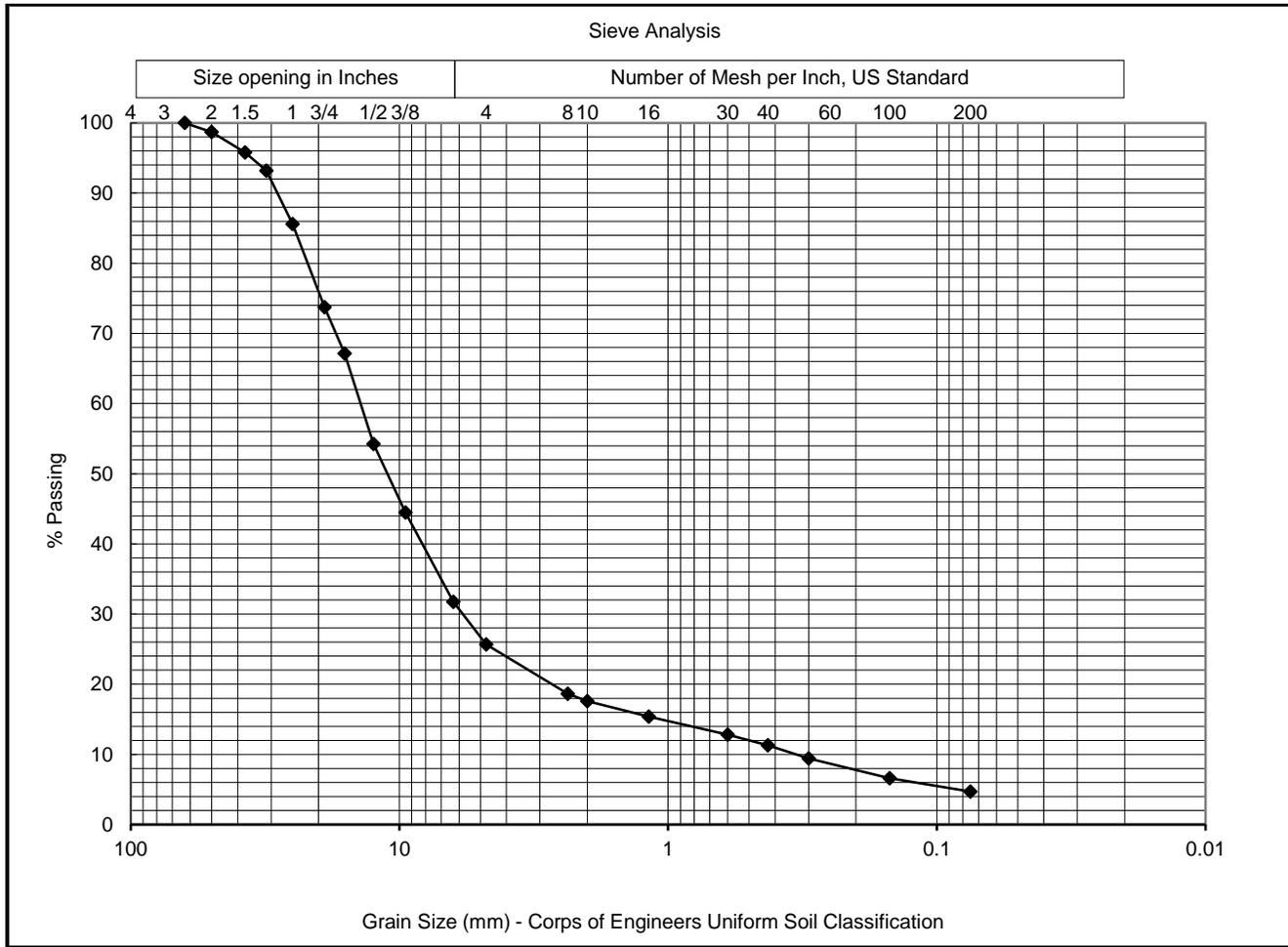
Reviewed By: \_\_\_\_\_

Zenaida Revilla  
Laboratory Manager

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.



20225 Cedar Valley Road, Suite 110 Ph 425-742-9360  
 Lynnwood, WA 98036 Fax 425-745-1737



Sieve Analysis			
ASTM C136 / C117			
Sieve Size	% Passing	Specs *	
		min	max
2.50"	100		
2.00"	99		
1.50"	96		
1.25"	93		
1.0"	86		
3/4"	74		
5/8"	67		
1/2"	54		
3/8"	44		
1/4"	32		
#4	26		
#8	19		
#10	18		
#16	15		
#30	13		
#40	11		
#50	9		
#100	7		
#200	4.7		
Material: Brown gravel with sand			
Source: EP-2 @ 4.0' - Native			
Project: Monroe Coffee Stand			
Project #: M7251140 (25-001)			
Date Rec'd: 2/2/025			

Sample Number	Depth (ft)	Classification
650		Poorly graded gravel with sand, GP

Tested By: K. Robert/Z. Revilla

Date Tested: 2/20/25-2/25/25

Information in this report applies only to the actual samples tested and shall not be reproduced except in full, without the approval of Terracon

**Am Test Inc.**  
13600 NE 126th Place Suite C  
Kirkland, WA  
(425) 885-1664  
www.amtestlab.com



**Professional  
Analytical  
Services**

February 28, 2025

Gary Flowers, PLLC  
5205 23rd Ave W  
Everett, WA 98203  
Attention: Gary Flowers

**Project:** Monroe Coffee Stand  
**Project Number:** 25001  
**COC Number:** A25B0301

Gary Flowers:

Enclosed please find the analytical data for your Monroe Coffee Stand project.

Your sample(s) were received on Wednesday, February 19, 2025 and properly maintained prior to the subsequent analysis. The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA, Standard Methods or the Army Corps of Engineers.

Following the analytical results you will find the Quality Control (QA/QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Aaron Young". The signature is written in a cursive style with a long horizontal stroke at the end.

**ElementStationManager For Aaron Young**

**President**

aarony@amtestlab.com

**Am Test Inc.**  
13600 NE 126th Place Suite C  
Kirkland, WA  
(425) 885-1664  
www.amtestlab.com



**Professional  
Analytical  
Services**

## ANALYSIS REPORT

**Date Received:** 02/19/25

**Date Reported:** 02/28/25

**Gary Flowers, PLLC**

5205 23rd Ave W  
Everett, WA 98203  
Attention: Gary Flowers  
Project Name: Monroe Coffee Stand  
Project #: 25001

### Reported Samples

Lab ID	Sample	Matrix	Qualifiers	Date Sampled	Date Received
A25B0301-01	EP-1 @ 1.5'	Solid		02/19/2025	02/19/2025
A25B0301-02	EP-2 @ 1.5'	Solid		02/19/2025	02/19/2025
A25B0301-03	EP-2 @ 4.0'	Solid		02/19/2025	02/19/2025

**ANALYSIS REPORT**

Date Received: 02/19/25

Date Reported: 02/28/25

**Gary Flowers, PLLC**

5205 23rd Ave W  
 Everett, WA 98203  
 Attention: Gary Flowers  
 Project Name: Monroe Coffee Stand  
 Project #: 25001

**AMTEST Identification Number: A25B0301-01**

**Client Identification: EP-1 @ 1.5'**

**Sampling Date: 02/19/25 07:00**

**Metals Extraction**

PARAMETER	RESULT	UNITS	Q	R.L.	METHOD	ANALYST	DATE
CEC (Cation Exchange Capacity)	10.0	meq/100 g		0.500	EPA 9081	AE	02/24/2025

**Conventional Chemistry Parameters by APHA/EPA Methods**

PARAMETER	RESULT	UNITS	Q	R.L.	METHOD	ANALYST	DATE
Total Organic Matter	5.12	%			SM 2540G_2011	HV	02/28/2025

**AMTEST Identification Number: A25B0301-02**

**Client Identification: EP-2 @ 1.5'**

**Sampling Date: 02/19/25 07:00**

**Metals Extraction**

PARAMETER	RESULT	UNITS	Q	R.L.	METHOD	ANALYST	DATE
CEC (Cation Exchange Capacity)	11.1	meq/100 g		0.500	EPA 9081	AE	02/24/2025

**Conventional Chemistry Parameters by APHA/EPA Methods**

PARAMETER	RESULT	UNITS	Q	R.L.	METHOD	ANALYST	DATE
Total Organic Matter	5.19	%			SM 2540G_2011	HV	02/28/2025

**AMTEST Identification Number: A25B0301-03**

**Client Identification: EP-2 @ 4.0'**

**Sampling Date: 02/19/25 07:00**

**Metals Extraction**

PARAMETER	RESULT	UNITS	Q	R.L.	METHOD	ANALYST	DATE
CEC (Cation Exchange Capacity)	2.40	meq/100 g		0.500	EPA 9081	AE	02/24/2025

**Conventional Chemistry Parameters by APHA/EPA Methods**

PARAMETER	RESULT	UNITS	Q	R.L.	METHOD	ANALYST	DATE
Total Organic Matter	1.54	%			SM 2540G_2011	HV	02/28/2025



**ANALYSIS REPORT**

Date Received: 02/19/25

Date Reported: 02/28/25

**Gary Flowers, PLLC**

5205 23rd Ave W  
 Everett, WA 98203  
 Attention: Gary Flowers  
 Project Name: Monroe Coffee Stand  
 Project #: 25001

**Quality Control**

**Metals Extraction**

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch: BCB0260 - EPA 9081 (CEC)</b>										
<b>Calibration Blank (BCB0260-CCB1)</b>										
CEC (Cation Exchange Capacity)	0.0169			meq/100 g						
					Prepared & Analyzed: 02/24/25					
<b>Calibration Blank (BCB0260-CCB2)</b>										
CEC (Cation Exchange Capacity)	0.0144			meq/100 g						
					Prepared & Analyzed: 02/24/25					
<b>Calibration Check (BCB0260-CCV1)</b>										
CEC (Cation Exchange Capacity)	2.06		0.500	meq/100 g	2.000		103%	85-115%		
					Prepared & Analyzed: 02/24/25					
<b>Calibration Check (BCB0260-CCV2)</b>										
CEC (Cation Exchange Capacity)	2.06		0.500	meq/100 g	2.000		103%	85-115%		
					Prepared & Analyzed: 02/24/25					
<b>Duplicate (BCB0260-DUP1)</b>										
			<b>Source: A25B0301-03</b>		Prepared & Analyzed: 02/24/25					
CEC (Cation Exchange Capacity)	2.01		0.500	meq/100 g		2.40			17	20
<b>Duplicate (BCB0260-DUP2)</b>										
			<b>Source: A25B0350-02</b>		Prepared & Analyzed: 02/24/25					
CEC (Cation Exchange Capacity)	7.15		0.500	meq/100 g		7.39			3	20

**Quality Control**

**Conventional Chemistry Parameters by APHA/EPA Methods**

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch: BCB0315 - No Prep - WC Soil</b>										
<b>Duplicate (BCB0315-DUP1)</b>										
			<b>Source: A25B0301-03</b>		Prepared: 02/25/25 Analyzed: 02/28/25					
Organic Matter	1.84			%		1.54			18	25.9
<b>Duplicate (BCB0315-DUP3)</b>										
			<b>Source: A25B0350-02</b>		Prepared: 02/25/25 Analyzed: 02/28/25					
Organic Matter	4.04			%		3.98			1	25.9

**Am Test Inc.**  
13600 NE 126th Place Suite C  
Kirkland, WA  
(425) 885-1664  
www.amtestlab.com



*Professional  
Analytical  
Services*

**ANALYSIS REPORT**

**Date Received:** 02/19/25

**Date Reported:** 02/28/25

**Gary Flowers, PLLC**

5205 23rd Ave W  
Everett, WA 98203  
Attention: Gary Flowers  
Project Name: Monroe Coffee Stand  
Project #: 25001

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**Notes and Definitions**

<b>Item</b>	<b>Definition</b>
<b>Dry</b>	Sample results reported on a dry weight basis.
<b>ND</b>	Analyte NOT DETECTED at or above the reporting limit.
<b>RPD</b>	Relative Percent Difference
<b>%REC</b>	Percent Recovery
<b>Source</b>	Sample that was matrix spiked or duplicated.

A25B0301

Chain of Custody No.         

Client Name & Address: Gary Flowers, PLLC 5205 23 <sup>RD</sup> Ave W Everett, WA 98203	Invoice To: SAME
Contact Person: Gary Flowers	Invoice Contact: Gary Flowers
Phone No: 206-819-4304	PO Number: Proj # 25-001
Fax No:	Invoice Ph/Fax: same
E-mail: gflowers01@comcast.net	Invoice E-mail: same
Report Delivery: (Choose all that apply) Mail / Fax / <u>Email</u> / Posted Online	Data posted to online account: YES / <u>NO</u> Web Login ID:
Special Instructions:	

Requested TAT: (Rush must be pre-approved by lab)  
Standard RUSH ( 5 Day / 3 Day / 48 HR / 24 HR )  
Temperature upon Receipt: 21.9°C

Project Name:	Project Number:	Date Sampled	Time Sampled	Matrix	No. of containers	Analysis Requested										QA/QC			
						Organic Content													
Monica Coffee Stand	25801																		
AmTest ID	Client ID (35 characters max)																		
01	EP-1 @ 1.5'					X	X												
02	EP-2 @ 1.5'					X	X												
03	EP-2 @ 4.0'					X	X												

Collected/Relinquished By: JOF	Date 2/19/24	Time 12:35 pm	Received By: SF	Date 2/19/24	Time 12:35
Relinquished By:	Date	Time	Received By:	Date	Time
Relinquished By:	Date	Time	Received By:	Date	Time

COMMENTS: