

July 19, 2022

Anchor QEA, LLC. 1201 3rd Avenue, Suite 2600 Seattle, WA 98101

To Whom It May Concern,

MTC approves and authorizes the release and publication of statements, conclusions, and extracts from or regarding our reports to Anchor QEA, LLC.

If you have any other questions, feel free to call us at (360) 755-1990, or email me at <u>alex.eifrig@mtc-inc.net</u>.

Thank you,

MATERIALS TESTING & CONSULTING, INC.

Alex Eifrig

NW Region Laboratory Manager

Alex Eifrig

WABO Supervising Laboratory Technician



Client:	Anchor QEA	Date:	September 23, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-1427 - 1446
Revised on:		Date sampled:	7-7-21 & 7-8-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: August 23, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1427	LDW21-GT10-GB-0-1.5 ft	233.1	600.7	434.9	165.8	201.8	82.2%
B21-1428	LDW21-GT10-GB-0-9 ft	233.1	804.9	583.3	221.6	350.2	63.3%
B21-1429	LDW21-GT10-GB-9-14 ft	221.7	1019.4	669.5	349.9	447.8	78.1%
B21-1430	LDW21-GT10-GB-14-19 ft	224.1	475.2	368.0	107.2	143.9	74.5%
B21-1431	LDW21-GT10-GB-19-24 ft	217.2	895.4	719.1	176.3	501.9	35.1%
B21-1432	LDW21-GT10-GB-24-25.5 ft	233.7	639.9	567.2	72.7	333.5	21.8%
B21-1433	LDW21-GT28-GB-0-1.5 ft	208.6	1012.3	678.5	333.8	469.9	71.0%
B21-1434	LDW21-GT28-GB-0-10 ft	222.9	1087.3	729.8	357.5	506.9	70.5%
B21-1435	LDW21-GT28-GB-10-11.5 ft	302.0	1045.9	721.9	324.0	419.9	77.2%
B21-1436	LDW21-GT28-GB-10-15 ft	303.4	1236.5	827.0	409.5	523.6	78.2%
B21-1437	LDW21-GT28-GB-15-16.8 ft	311.0	880.9	647.2	233.7	336.2	69.5%
B21-1438	LDW21-GT28-GB-16.8-20 ft	223.0	1069.1	875.2	193.9	652.2	29.7%
B21-1439	LDW21-GT28-GB-20-21.5 ft	221.8	951.4	801.9	149.5	580.1	25.8%
B21-1440	LDW21-GT21-GB-0-1.5 ft	222.7	653.9	446.8	207.1	224.1	92.4%
B21-1441	LDW21-GT21-GB-0-13 ft	234.6	1463.8	860.0	603.8	625.4	96.5%
B21-1442	LDW21-GT21-GB-13-16 ft	225.2	1059.7	808.7	251.0	583.5	43.0%
B21-1443	LDW21-GT21-GB-16-17.5 ft	233.1	805.2	661.3	143.9	428.2	33.6%
B21-1444	LDW21-GT21-GB-16-21 ft	215.7	1239.6	953.1	286.5	737.4	38.9%
B21-1445	LDW21-GT21-GB-21-25.7 ft	225.1	772.5	628.4	144.1	403.3	35.7%
B21-1446	LDW21-GT21-GB-26-31 ft	108.4	1248.4	956.1	292.3	847.7	34.5%
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: August 25, 2021	Tested by: A. Eifrig

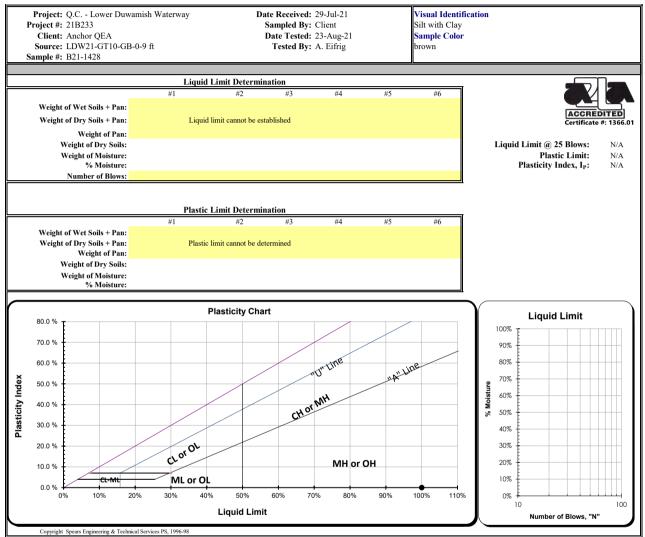
Sample # B21-1428	Location LDW21-GT10-GB-0-9 ft	Tare 584.04	Dry Soil + Tare 660.85	Mass of Dry Soil 76.8	Pycno ID TSA-011	Mass of Pycno 190.3	Volume of Pycno 499.5	Density of Water @ Tx 0.99754	Mass of Pyeno filled w/ water & soils 734.30				Temp. Correction Factor 0.99933	Corrected SpG 2.464069
B21-1431	LDW21-GT10-GB-19-24 ft	501.90	602.67	100.8	TSA-021	183.4	499.4	0.99754	742.98	681.60	23.0	2.5581693	0.99933	2.5564553
B21-1442	LDW21-GT21-GB-13-16 ft	510.13	611.47	101.3	TSA-020	195.0	499.5	0.99754	755.39	693.29	23.0	2.5824927	0.99933	2.5807624
B21-1445	LDW21-GT21-GB-21-25.7 ft	500.61	577.32	76.7	TSA-022	198.0	499.5	0.99754	742.91	696.21	23.0	2.5560327	0.99933	2.5543202
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Reviewed by:

Meghan Blodgett-Carrillo





All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Visual Identification Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Sampled By: Client Silt with Clay **Project #:** 21B233 Date Tested: 23-Aug-21 Client: Anchor QEA Sample Color Source: LDW21-GT10-GB-9-14 ft Tested By: A. Eifrig Sample #: B21-1429 **Liquid Limit Determination** Weight of Wet Soils + Pan: 40.29 42.71 29.23 Weight of Dry Soils + Pan: 37.17 38.71 25.20 Weight of Pan: 28 61 28 25 15.04 Liquid Limit @ 25 Blows: Weight of Dry Soils: 8.56 10.46 10.16 Weight of Moisture: 3 12 4.00 4.03 Plastic Limit: N/A % Moisture: Plasticity Index, I_P: 36.5 % 38.2 % 39.7 % N/A Number of Blows: **Plastic Limit Determination** #2 Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Plastic limit cannot be determined Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% Un Line 60.0 % A" Line Plasticity Index 50.0 % 60% 40.0 % 50% 30.0 % Cro, Or MH or OH 20% 10.0 % 10% ML or O 100% 0% 10 100 **Liquid Limit** right Spears Engineering & Technical Services PS, 1996-98

teriors approach to account necessaria. As a manual protection or circles, the punic and observes, an reports are summed as the commentant property or circles, and annotation to punication or suscentials, concessors or extracts from or regarding our persons.

Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT10-GB-14-19 ft Sample#: B21-1430

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 23-Aug-21 Tested By: A. Eifrig

Visual Identification

mm

Clayey Silt Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Dust Ratio = 90/97

Specifications No Specs

Sample Meets Specs? N/A

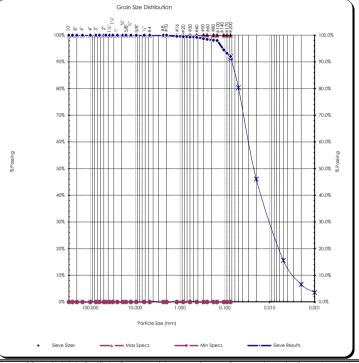
 $\begin{array}{c} D_{(5)} = 0.001 \\ D_{(10)} = 0.003 \\ D_{(15)} = 0.005 \\ D_{(30)} = 0.009 \end{array}$ mm % Gravel = 0.0% % Sand = 8.0% mm % Silt & Clay = 92.0% mm mm Liquid Limit = n/a $D_{(50)} = 0.024$ Plasticity Index = n/a $D_{(60)} = 0.031$ mm $D_{(90)} = 0.072$

Sand Equivalent = n/a Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a Coeff. of Curvature, $C_C = 0.79$ Coeff. of Uniformity, $C_U = 9.14$ Fineness Modulus = 0.04

Plastic Limit = n/a Moisture %, as sampled = 74.5% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

S	TM C136, AST	M D6913, ASTM C117
		Grain Size Distribution
	Specs Min	그 5 년 5 년 5 년 5 년 5 년 7 년 7 년 7 년 7 년 7 년
	0.0%	905
	0.0%	70%

				AS	TM C136, AS
		Actual	Interpolated		
		Cumulativ	e Cumulative		
Sieve	Size	Percent	Percent	Specs	Specs
US	Metric	Passing	Passing	Max	Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		100%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		99%	100.0%	0.0%
#60	0.250		98%	100.0%	0.0%
#80	0.180		98%	100.0%	0.0%
#100	0.150	98%	98%	100.0%	0.0%
#140	0.106		95%	100.0%	0.0%
#170	0.090		93%	100.0%	0.0%
#200	0.075	92.0%	92.0%	100.0%	0.0%
Convright	Spears Engineering & Tec	hnical Carriose DC 1006	98		



Comments:			
	M. 1001 D. M.		

Reviewed by: Meghan Blodgett-Carrillo



Hydrometer Report

Project: Q.C Lower Duwamish Waterway Date Received: 29-Jul-21 Sampled By: Client Client Anchor QEA	Duoicata	O.C. Lavvan	Durramiah Wata	Doto Dogo	rode 20 Jul 21	Visual Identifie	ation	
Client: Anchor QEA Sample Color	•	-	Duwaiiisii wate				ation	
Sample ## B21-1430	,							
Assumed Sp Gr : 2.65 Sample Weight: 48.47 grams Forested Percent Soils Particle Sieve Passing Diameter 1.5" 1.00% 5.000 mm 1.5" 1.00% 3.1500 mm 3.4" 1.00% 3.1500 mm 3.4" 1.00% 3.1500 mm 3.4" 1.00% 3.1500 mm 3.4" 1.00% 3.1500 mm 3.5" 1.00% 3.1500 mm 3.4" 1.00% 3.1500 mm 3.5"		•						
ASTM D7928, HYDROMETER ANALYSIS Assumed Sp Gr : 2.65 Sample Weight: 91.378% Adj. Sample Weight: 92.378% Adj. Sample Weight: 93.78% Adj. Sample Weight: 94.47 grams Hydrometer Reading Corrected Percent Soils Particle Minutes Reading Passing Diameter 1.25° 100% 50.000 mm 1 35 77.29% 0.0044 mm 2 30.5 62.99% 0.00326 mm 3 4 24.5 50.59% 0.0026 mm 4 24.5 50.59% 0.0026 mm 1 18.5 38.29% 0.0129 mm 1 18.5 30.99% 0.0093 mm 3 15 30.99% 0.0093 mm 4 24.5 5 50.59% 0.0093 mm 1 2 100% 15.000 mm 6 0 10.5 21.79% 0.0068 mm 1 4 4 0.5 5 10.33% 0.0055 mm 4 4 2.5 5 5.29% 0.0014 mm 5 8" 100% 12.500 mm 6 0 10.5 22.79% 0.0035 mm 1 14" 100% 5.000 mm 1 4 140 2.5 5 5.29% 0.0014 mm 9 4 Gravel: 0.0% Liquid Limit: n/a 100% 2.0000 mm 9 4 Sand: 8.0% Plastic Limit: n/a 100% 2.0000 mm 9 4 Sand: 8.0% Plastic Limit: n/a 100% 9.500 mm 9 4 Sand: 8.0% Plastic Limit: n/a 100 99% 0.425 mm 9 4 Sand: 8.0% Plastic Limit: n/a 100 99% 0.425 mm 9 4 Sand: 8.0% Plastic Limit: n/a 100 99% 0.425 mm 9 5 Silt 9 0.000 mm Clays 15.6% 0.000 mm Colloids 3.6% 0.001 mm Clays 15.6% 0.000 mm Clays 15.6% 0.000 mm Colloids 3.6% 0.001 mm Clays 15.6% 0.000 mm Colloids 3.6% 0.001 mm Clays 15.6% 0.000 mm Colloids 3.6% 0.001 mm			0-GB-14-19 ft	Tested	l By: A. Eifrig	brown		
Sample Weight: 2.65 Sample Weight: 50.30 grams	Sample#:	B21-1430						
Sample Weight:		ASTM D79	28, HYDROM	ETER ANALYSIS			ASTM 1	D6913
Hydroscopic Moist. 3,78%	Assumed Sp Gr :	2.65					Sieve Ar	nalysis
Adj. Sample Wgt	Sample Weight:	50.30	grams				Grain Size D	istribution
Adj. Sample Wgt 48.47 grams Cacrebite Certificate #: 1366.01 Size Passing Diameter 2.0" 100% 55.000 mm 100% 33.0" 100% 37.500 mm	Hydroscopic Moist.:	3.78%	-			Sieve	Percent	Soils Particle
Hydrometer Reading Corrected Percent Soils Particle 1.5" 100% 50.000 mm 1.2" 100% 37.500 mm 1.2" 100% 10.000 mm 1.2" 10.000 mm 10.	Adi. Sample Wgt :	48.47	grams		ACCREDITED	Size	Passing	Diameter
Reading	., r		8		Certificate #: 1366.01			75.000 mm
Reading	Hydrometer					2.0"	100%	50.000 mm
1 35	Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
2 30.5 62.9% 0.0326 mm 4 24.5 50.5% 0.0240 mm 15 18.5 38.2% 0.0129 mm 16 18.5 38.2% 0.0129 mm 17.2° 100% 12.500 mm 18 30 15 30.9% 0.0093 mm 18 378° 100% 9.500 mm 18 40 10.5 21.7% 0.0068 mm 18 100% 9.500 mm 19 100% 1.500 mm 10 100% 1.500 mm 10 100% 1.500 mm 11 10 100% 1.500 mm 12 10 100% 1.500 mm 11 10 100% 1.500 mm 12 10 100% 1.500 mm 11 10 100% 1.500 mm 12 10 100% 1.500 mm 13 18° 100% 1.500 mm 14 10 100% 1.500 mm 14 10 100% 1.500 mm 15 10 100% 1.500 mm 16 10 100% 1.500 mm 17 10 100% 1.500 mm 18 10 100% 1.500 mm 19 10 100% 1.500 mm 19 10 100% 1.500 mm	Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
4	1	35	72.2%	0.0444 mm		1.0"	100%	25.000 mm
15	2	30.5	62.9%	0.0326 mm		3/4"	100%	19.000 mm
30	4	24.5	50.5%	0.0240 mm		5/8"	100%	16.000 mm
1/4" 100% 6.300 mm 240 5	15	18.5	38.2%	0.0129 mm		1/2"	100%	12.500 mm
1440 2.5 5.2% 0.0014 mm	30	15	30.9%	0.0093 mm		3/8"	100%	9.500 mm
1440 2.5 5.2% 0.0014 mm #10 100% 2.000 mm #20 99% 0.850 mm #40 99% 0.425 mm #40 99% 0.425 mm #40 99% 0.150 mm #20 99% 0.150 mm #20 99% 0.150 mm #20 99.0% 0.150 mm #200 92.0% 0.075 mm #200 92.0% 0.005 mm 46.1% 0.020 mm 46.1% 0.005 mm 46.0% 0.005 mm 46.0% 0.000 mm 46.0% 0.001 mm 46.0% 0.002 mm 46.0% 0	60	10.5	21.7%	0.0068 mm		1/4"	100%	6.300 mm
% Gravel: 0.0% Liquid Limit: n/a #40 99% 0.850 mm % Sand: 8.0% Plastic Limit: n/a #100 98% 0.125 mm % Silt: 76.4% Plasticity Index: n/a #200 92.0% 0.075 mm % Clay: 15.6% Plasticity Index: n/a #200 92.0% 0.075 mm % Clay: 15.6% 0.002 mm Clays 15.6% 0.002 mm Clays 15.6% 0.002 mm Colloids 3.6% 0.001 mm Clays 15.6% 0.002 mm Colloids 3.6% 0.001 mm USDA Soil Textural Classification #200 99% 0.850 mm #40 99% 0.425 mm #200 92.0% 0.075 mm 80.4% 0.050 mm 46.1% 0.020 mm Clays 15.6% 0.002 mm Clays 15.6% 0.002 mm Colloids 3.6% 0.001 mm USDA Soil Textural Classification #200 92.0% 0.075 mm 80.4% 0.050 mm 90.000 mm Clays 15.6% 0.002 mm Colloids 3.6% 0.001 mm Clays 15.6% 0.002 mm Colloids 3.6% 0.001 mm #200 92.0% 0.075 mm 90.4% 0.050 mm 90.4% 0.050 mm 90.000 mm Clays 15.6% 0.002 mm Colloids 3.6% 0.001 mm WSDA Soil Textural Classification Silt: 0.05 - 0.002 mm 90.501 Textural Classification Silt Loam #200 92.0% 0.075 mm 90.4% 0.050 mm 90.	240	5	10.3%	0.0035 mm		#4	100%	4.750 mm
We Gravel: 0.0% Liquid Limit: n/a	1440	2.5	5.2%	0.0014 mm		#10	100%	2.000 mm
% Sand: 8.0% Plastic Limit: n/a #100 98% 0.150 mm % Silt: 76.4% Plasticity Index: n/a #200 92.0% 0.075 mm % Clay: 15.6% Plasticity Index: n/a #200 92.0% 0.075 mm 80.4% 0.050 mm 46.1% 0.020 mm Clays 15.6% 0.005 mm 6.6% 0.002 mm Colloids 3.6% 0.001 mm Colloids 3.6% 0.001 mm **Colloids 3.6% 0.001 mm **Colloids 3.6% 0.001 mm **Colloids 3.6% 0.002 mm **Colloids 3.6% 0.001 mm **Colloids 3.6% 0.002 mm **Colloids 3.6% 0.001 mm **Colloids 3.6% 0.001 mm **Colloids 3.6% 0.001 mm **Colloids 3.6% 0.002 mm **Colloids 3.6% 0.001 mm **Co						#20	99%	0.850 mm
We Silt: 76.4% Plasticity Index: n/a #200 92.0% 0.075 mm	% Gravel:	0.0%		Liquid Limit: n/a		#40	99%	0.425 mm
% Clay: 15.6% % Clay: 15.6% Silts 91.4% 0.074 mm 80.4% 0.050 mm 46.1% 0.020 mm Clays 15.6% 0.005 mm 6.6% 0.002 mm Clays 15.6% 0.001 mm Clays 15.6% 0.002 mm Colloids 3.6% 0.001 mm Colloids 3.6% 0.001 mm WSDA Soil Textural Classification Particle Size 2.0 - 0.05 mm 9% Silt: 0.05 - 0.002 mm 9% Clay: < 0.002 mm WSDA Soil Textural Classification Silt Loam WSDA Soil Textural Classification Silt Loam	% Sand:	8.0%		Plastic Limit: n/a		#100	98%	0.150 mm
Solit Soli	% Silt:	76.4%		Plasticity Index: n/a		#200	92.0%	0.075 mm
USDA Soil Textural Classification Particle Size 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: (0.005 mm 0.000 mm 0.	% Clay:	15.6%				Silts	91.4%	0.074 mm
Clays 15.6% 0.005 mm 6.6% 0.002 mm Colloids 3.6% 0.001 mm USDA Soil Textural Classification Particle Size 9. Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.								
USDA Soil Textural Classification Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification USDA Soil Textural Classification USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.							46.1%	
USDA Soil Textural Classification Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.						Clays		
USDA Soil Textural Classification Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.								
Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.						Colloids	3.6%	0.001 mm
Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.								
Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.								
% Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.		USDA	Soil Textural	Classification				
% Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.			Doutiele Cire					
% Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.	% Sand.							
% Clay: < 0.002 mm USDA Soil Textural Classification Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.								
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Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.	70 Clay.		(0.002 mm					
Silt Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.		HEDA	Soil Textural	Classification				
All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.		USDA		Classification				
regarding our reports is reserved pending our written approval.			on Loan					
regarding our reports is reserved pending our written approval.	All results apply only to actual location	ons and materials tested	As a mutual protection to	clients, the public and ourselves, all reno	orts are submitted as the confidentia	I property of clients, and out	horization for publication of	statements, conclusions or extracts from or
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Environmental • Geotechnical Engineering • Special Inspection • Non-Destructive Testing • Materials Testing

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Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1430
Sample Date:	7/7/2021
Test Date:	9/20/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT10-GB-14-19 ft

 Visual Soil Description:
 brown clayey silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

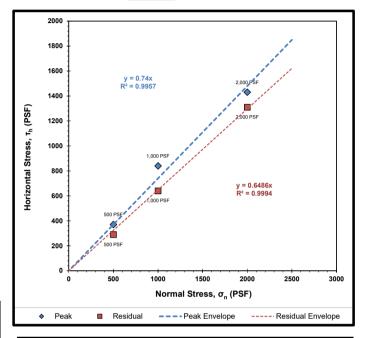
 Specimen Diameter (in):
 2.5

Summary of Sample	σ _n =500 PSF	
Initial Moisture Content (%):	45.3	
	Initial	Post-Consolidation
Dry Density (PCF):	91.7	95.2
Void Ratio:	0.837	0.770
Porosity (%):	45.6	43.5
Degree of Saturation (%):	saturated	saturated

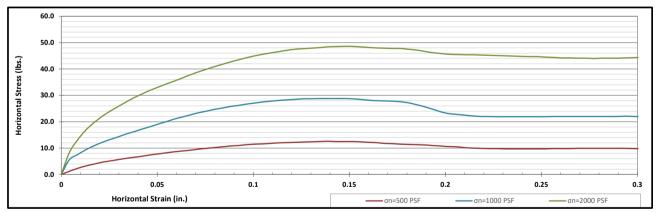
Summary of Sampl	e Data:	σ _n =1000 PSF
Initial Moisture Content (%):	40.4	
	Initial	Post-Consolidation
Dry Density (PCF):	95.4	102.4
Void Ratio:	0.765	0.646
Porosity (%):	43.4	39.3
Degree of Saturation (%):	saturated	saturated

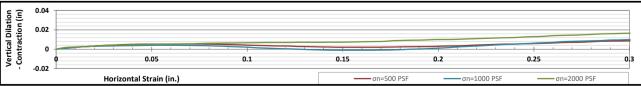
Summary of Sample	e Data:	σ _n =2000 PSF
Initial Moisture Content (%):	37.0	
	Initial	Post-Consolidation
Dry Density (PCF):	97.7	106.6
Void Ratio:	0.725	0.581
Porosity (%):	42.0	36.7
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS									
	PEAK	RESIDUAL							
Angle of Internal Friction, φ (°):	37	33							
Cohesion (PSF):	0	0							



Failure Envelope Test Values:										
Normal Stress, σ _n (PSF):	500	1000	2000							
Peak Horizontal Stress, τ _h (PSF):	370	840	1430							
Residual Horizontal Stress, τ _h (PSF):	290	640	1310							





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT10-GB-19-24 ft

Sample#: B21-1431

#80

#100

#140

#170

#200

Reviewed by:

0.180

0.150

0.106

0.090

0.075

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 23-Aug-21 Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color: grayish-brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.014 \\ D_{(10)} = 0.027 \\ D_{(15)} = 0.041 \\ D_{(30)} = 0.079 \end{array}$ mm % Gravel = 0.0% % Sand = 72.5% mm % Silt & Clay = 27.5% mm mm Liquid Limit = n/a $D_{(50)} = 0.108$ $D_{(60)} = 0.122$ mm Plasticity Index = n/amm

Sand Equivalent = n/a Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.85$ Coeff. of Uniformity, $C_U = 4.47$ Fineness Modulus = 0.32

Plastic Limit = n/a Moisture %, as sampled = 35.1% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(60)} = 0.122$	mm		Sand Equi				
						$D_{(90)} = 0.298$	mm		racture %,				
						ust Ratio = 13/47		Frac	cture %, 2+	Faces	= n/a		
			T . 1 . 1	AS	STM C136, AST	FM D6913, ASTM	M C117						
		Actual	Interpolated			ľ			Grain Size Dist	ribution			
			Cumulative	_		4		Ę.,					
Sieve		Percent	Percent	Specs	Specs		6 66 G	49 93	3/8"	e02 :	288	5 5 5	3 :
US	Metric	Passing	Passing	Max 100.0%	Min	4	100%	• • • • •			****	•	-
12.00"	300.00		100%		0.0%		H					١	
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6.00"	150.00		100%	100.0%	0.0%							1	١
4.00"	100.00		100%	100.0%	0.0%		80%			 		₩.	
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5/8"	16.00		100%	100.0%	0.0%	94	- E						ı
1/2"	12.50	100%	100%	100.0%	0.0%								ı
3/8"	9.50	100%	100%	100.0%	0.0%		40%			H - H -		+	4
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#4	4.75	100%	100%	100.0%	0.0%								
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#10	2.00	100%	100%	100.0%	0.0%								
#16	1.18		100%	100.0%	0.0%		20%				ЩШ	Ш	
#20	0.850		99%	100.0%	0.0%		20/0						1
#30	0.600		99%	100.0%	0.0%								
#40	0.425	99%	99%	100.0%	0.0%		10%					#	4
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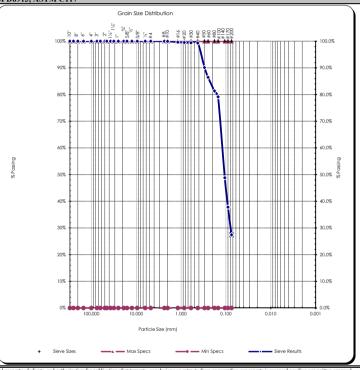
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Comments:



Visual Identification Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Clay with Silt Sampled By: Client **Project #:** 21B233 Date Tested: 25-Aug-21 Client: Anchor QEA Sample Color Source: LDW21-GT28-GB-0-10 ft Tested By: A. Eifrig dark brown Sample #: B21-1434 **Liquid Limit Determination** Weight of Wet Soils + Pan: 33.52 24.84 28.54 Weight of Dry Soils + Pan: 28.91 21.54 25.61 Weight of Pan: 19 45 14 96 19 90 Liquid Limit @ 25 Blows: Weight of Dry Soils: 9.46 6.58 5.71 Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: 4.61 3 30 2 93 N/A 48.7 % 50.2 % 51.3 % N/A Number of Blows: **Plastic Limit Determination** #2 Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Plastic limit cannot be determined Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 60% 40.0 % 50% 30.0 % CL or OL MH or OH 20% 10.0 % ML or OL 10% 100% 10 100 **Liquid Limit** Copyright Spears Engineering & Technical Services PS, 1996-98

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Sampled By: Client **Project #:** 21B233 Silty Clay Sample Color Date Tested: 25-Aug-21 Client: Anchor QEA Source: LDW21-GT28-GB-10-15 ft Tested By: A. Eifrig dark brown Sample #: B21-1436 **Liquid Limit Determination** Weight of Wet Soils + Pan: 30.19 32.21 Weight of Dry Soils + Pan: 26.52 27.44 27.75 Weight of Pan: 19 62 19 54 19.84 Liquid Limit @ 25 Blows: Weight of Dry Soils: 6.90 7.90 7.91 Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: 3 67 4 24 4 46 N/A 56.4 % 53.2 % 53.7 % N/A Number of Blows: **Plastic Limit Determination** #2 Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Plastic limit cannot be determined Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 60% 40.0 % 50% 30.0 % CL or OL MH or OH 20% 10.0 % ML or OL 10% 100% 10 100 **Liquid Limit** Copyright Spears Engineering & Technical Services PS, 1996-98

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Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Visual Identification Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Sampled By: Client Clay and Silt **Project #:** 21B233 Date Tested: 25-Aug-21 Client: Anchor QEA Sample Color Source: LDW21-GT28-GB-15-16.8 ft Tested By: A. Eifrig dark brown Sample #: B21-1437 **Liquid Limit Determination** Weight of Wet Soils + Pan: 31.73 40.08 39.56 Weight of Dry Soils + Pan: 28.13 36.32 36.04 Weight of Pan: 28 17 28 53 19.86 Liquid Limit @ 25 Blows: Weight of Dry Soils: 8.27 8.15 7.51 Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: 3.60 3.76 3 52 N/A 46.9 % 43.5 % 46.1 % N/A Number of Blows: **Plastic Limit Determination** #2 Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Plastic limit cannot be determined Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 60% 40.0 % 50% 30.0 % CL or OL MH or OH 20% 10.0 % ML or OL 10% 100% 10 100 **Liquid Limit** Copyright Spears Engineering & Technical Services PS, 1996-98

variesturs apply only to extent notations and materials existed. As a material resisted in the control of the c

Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT28-GB-16.8-20 ft

Sample#: B21-1438

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 23-Aug-21

Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SP, Poorly graded Sand

Sample Color:

gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications	
No Specs	

Meghan Blodgett-Carrillo

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.085 \\ \textbf{D}_{(10)} = 0.125 \\ \textbf{D}_{(15)} = 0.157 \\ \textbf{D}_{(30)} = 0.213 \\ \textbf{D}_{(50)} = 0.288 \\ \textbf{D}_{(60)} = 0.325 \\ \textbf{D}_{(90)} = 0.827 \\ \textbf{Partice} = 1/23 \end{array}$ mm % Gravel = 0.0% % Sand = 96.2% mm % Silt & Clay = 3.8% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.12$ Coeff. of Uniformity, $C_U = 2.60$ Fineness Modulus = 1.53

Plastic Limit = n/a Moisture %, as sampled = 29.7% Req'd Sand Equivalent =
Req'd Fracture %, 1 Face =

Reald Fracture % 2+ Faces =	recquire 70, 1 race	- 1
recquiracture 70, 2+ races -	Req'd Fracture %, 2+ Faces =	Req

							1/23		Frac	ture %	, 2+ Fa	ices =	n/a		K	eq'a F	ractui	re %, 1	2+ Fac	es =
		Actual	Interpolated	AS	TM C136, AS	IM D6913, A	STM C11													
			Cumulative			ľ			(Grain Size	Distribu	tion								
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3/8"	9.50	100%	100%	100.0%	0.0%		40%		+++		++++		\mathbb{H}							40.0%
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#4	4.75	100%	100%	100.0%	0.0%		1							1						1
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#100	0.150	13%	13%	100.0%	0.0%			100.000		10.000	,	1.0	100		0.100		0.01			
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Copyright	Spears Engineering & Tecl		ļ																	

Comments: Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1438
Sample Date:	7/7/2021
Test Date:	8/25/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT28-GB-16.8-20 ft

 Visual Soil Description:
 gray sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

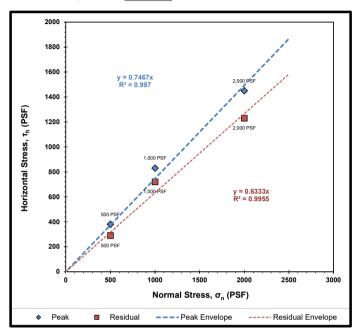
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	31.3	
	Initial	Post-Consolidation
Dry Density (PCF):	105.4	106.7
Void Ratio:	0.598	0.579
Porosity (%):	37.4	36.7
Degree of Saturation (%):	saturated	saturated

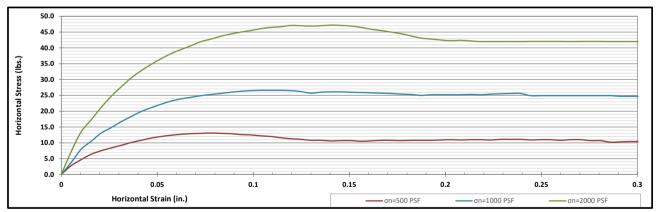
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	31.0	
	Initial	Post-Consolidation
Dry Density (PCF):	105.6	107.2
Void Ratio:	0.595	0.572
Porosity (%):	37.3	36.4
Degree of Saturation (%):	saturated	saturated

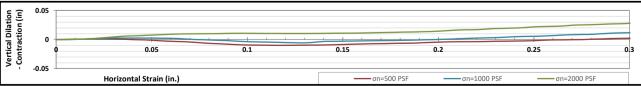
Summary of Samp	le Data:	σ _n =2000 PSF
Initial Moisture Content (%):	32.9	
	Initial	Post-Consolidation
Dry Density (PCF):	104.0	107.8
Void Ratio:	0.619	0.562
Porosity (%):	38.2	36.0
Degree of Saturation (%):	saturated	saturated

ESTIMATED STR	ENGTH PARA	METERS
	PEAK	RESIDUAL
Angle of Internal Friction, φ (°):	37	32
Cohesion (PSF):	0	0



Failure Envelope Test	Values:		
Normal Stress, σ _n (PSF):	500	1000	2000
Peak Horizontal Stress, τ _h (PSF):	380	830	1450
Residual Horizontal Stress, τ _h (PSF):	290	720	1230





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Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Sampled By: Client **Project #:** 21B233 Silty Clay Sample Color Date Tested: 25-Aug-21 Client: Anchor QEA Source: LDW21-GT21-GB-0-13 ft Tested By: A. Eifrig dark brown Sample #: B21-1441 **Liquid Limit Determination** Weight of Wet Soils + Pan: 28.39 31.98 25.34 Weight of Dry Soils + Pan: 23 97 27.63 21.68 Weight of Pan: 15.01 19 45 14 80 Liquid Limit @ 25 Blows: Weight of Dry Soils: 8.96 8.18 6.88 52 % Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: 4 42 435 3 66 N/A 53.2 % 49.3 % 53.2 % N/A Number of Blows: **Plastic Limit Determination** #2 Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Plastic limit cannot be determined Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 60% 40.0 % 50% 30.0 % CL or OL MH or OH 20% 10.0 % ML or OL 10% 100% 10 100 **Liquid Limit** Copyright Spears Engineering & Technical Services PS, 1996-98

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Comments: Plastic Limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT21-GB-13-16 ft Sample#: B21-1442

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 23-Aug-21 Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.017 \\ \textbf{D}_{(10)} = 0.034 \\ \textbf{D}_{(15)} = 0.051 \\ \textbf{D}_{(30)} = 0.096 \\ \textbf{D}_{(50)} = 0.150 \\ \textbf{D}_{(60)} = 0.239 \\ \textbf{D}_{(90)} = 1.216 \end{array}$ mm % Gravel = 0.2% % Sand = 77.9% mm % Silt & Clay = 22.0% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm Sand Equivalent = n/a mm

Fracture %. 1 Face = n/a

Coeff. of Curvature, $C_C = 1.14$ Coeff. of Uniformity, $C_U = 7.00$ Fineness Modulus = 1.12

Plastic Limit = n/a Moisture %, as sampled = 96.5% Req'd Sand Equivalent = Rea'd Fracture %, 1 Face =

					D	$D_{(90)} = 1.216$ ust Ratio = 3/11	mm		Fractur	ure %, 1 2 %, 2+						Fractu		%, 1 F . 2+ Fa	
				AS		FM D6913, ASTM	C117			, -									
			Interpolated						Grain	Size Distr	ibution								
		Cumulative																	
Sieve S		Percent	Percent	Specs	Specs		b in	h wh	7. 1.7. 1.7. 5.8.7.	g 56 :* 4	œ2 9	88	£ 25 25 25	8888	8				
US	Metric	Passing	Passing	Max	Min	10	0%				-	# # T	# # # :		<u> </u>		шпт	ттт	T 100.0%
12.00"	300.00		100%	100.0%	0.0%						 \								1
10.00"	250.00		100%	100.0%	0.0%						\								1
8.00"	200.00		100%	100.0%	0.0%	9	0%				++ *	WIII	111				mm	m	90.0%
6.00"	150.00		100%	100.0%	0.0%							N							1
4.00"	100.00		100%	100.0%	0.0%		0%					ШЪ					ШШ		80.0%
3.00"	75.00		100%	100.0%	0.0%		· []						11						1
2.50"	63.00		100%	100.0%	0.0%								\						1
2.00"	50.00		100%	100.0%	0.0%	7	0%		+			₩₩							70.0%
1.75"	45.00		100%	100.0%	0.0%														1
1.50"	37.50		100%	100.0%	0.0%								1						1
1.25"	31.50		100%	100.0%	0.0%	6	0%				++-		ΗÌ			-	###		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	E							111						i e
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	0%							١Ш					50.0%
5/8"	16.00		100%	100.0%	0.0%	P6 2	~ F							Ì					30.0,0 80
1/2"	12.50	100%	100%	100.0%	0.0%		- []												1
3/8"	9.50	100%	100%	100.0%	0.0%	4	0%		+			₩₩		$-\!$					40.0%
1/4"	6.30		100%	100.0%	0.0%									- 1					1
#4	4.75	100%	100%	100.0%	0.0%									ì					1
#8	2.36		99%	100.0%	0.0%	3	0%				-	*****	+++				###		30.0%
#10	2.00	99%	99%	100.0%	0.0%									Ì					1
#16	1.18		90%	100.0%	0.0%		0%												20.0%
#20	0.850		86%	100.0%	0.0%		° -												20.0%
#30	0.600		83%	100.0%	0.0%		- []												1
#40	0.425	81%	81%	100.0%	0.0%	1	0%		++-+										10.0%
#50	0.300		67%	100.0%	0.0%														1
#60	0.250		61%	100.0%	0.0%														1
#80	0.180		53%	100.0%	0.0%		0%	100,000	4000000	0.000		000	0 00 	0.100	, 111	nr	010		0.0%
#100	0.150	50%	50%	100.0%	0.0%			.00.000						5.70		0.0			
#140	0.106		34%	100.0%	0.0%					Particle	Size (mm)								
#170	0.090		28%	100.0%	0.0%														
#200	0.075	22.0%	22.0%	100.0%	0.0%	+ Sie	ve Sizes		^_ N	ax Specs	_	_	– Min S	pecs			- Sieve	Results	
		hnical Services PS, 1996-9				N.													

Comments: Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT21-GB-16-21 ft

Sample#: B21-1444

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 23-Aug-21 Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color: dark gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ D_{(5)} = 0.019 \\ D_{(10)} = 0.039 \\ D_{(15)} = 0.058 \\ D_{(30)} = 0.104 \\ D_{(50)} = 0.177 \\ D_{(60)} = 0.256 \\ D_{(90)} = 1.188 \\ D_{(50)} = 0.256 \\ D_{(90)} =$ mm % Gravel = 0.1% % Sand = 80.5% mm % Silt & Clay = 19.4% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.10$ Coeff. of Uniformity, $C_U = 6.61$ Fineness Modulus = 1.15

Plastic Limit = n/a Moisture %, as sampled = 38.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

2.00" 300.00 100% 100.0% 0.0% 0.0% 0.0% 0.0% 0.00" 250.00 100% 100.0% 0.0% 0.0% 0.0% 0.00" 150.00 100% 100.0% 0.0% 0.0% 0.0% 0.00" 150.00 100% 100.0% 0.0% 0.0% 0.0% 0.0% 0.00"						Du	1.100 ast Ratio = $5/21$	Fracture %, 2+ Faces = n/a Req'd Fracture %, 2+ Fac	
Sieve Size Percent Percent Passing Passing Max Min					AS	TM C136, AST	M D6913, ASTM	117	
Sieve Size Sieve Sieve Sieve Percent Percent Passing								Grain Size Distribution	
100									
100								print 1/2 1/2 1/2 1/2 4 45 78 8 48 8 8 2 2 8 8 8 8 8 8 8 8 8 8 8 8 8	
0.00" 250.00 100% 100.0% 0.0% 0.0% 0.0% 0.0% 0.00% 100.0% 100.0% 0.0%	US		Passing				10	**************************************	T 100.0%
100° 200.00 100% 100.0% 0.0% 0.0% 0.0% 0.0% 0.00° 150.00 100% 100.0% 0.0% 0.0% 0.0° 150.00 100% 100.0% 0.0% 0.0% 0.0° 150.00 100% 100.0% 0.0% 0.0°	12.00"								1
150.00° 150.00° 150.00° 160.	10.00"								1
1.00" 100.00 100% 100% 100.0% 0.0%	8.00"							· - - 	90.0%
100° 75.00 100% 100% 100.0% 0.0% 0.0% 0.0% 0.0% 0.00° 100% 100.0% 0	6.00"								1
100% 100% 100.0% 0.0%	4.00"								1 00 007
2.00° 50.00 100% 100.0% 0.0% 100.0%	3.00"							`	00.070
1.75" 45.00 100% 100.0% 0.0%	2.50"								1
1.50" 37.50	2.00"	50.00		100%	100.0%	0.0%			70.0%
1.25" 31.50	1.75"								1
100	1.50"								1
10.00	1.25"								1
10.00	1.00"	25.00	100%	100%	100.0%	0.0%	D.		ju Bu
10.00	3/4"	19.00	100%	100%	100.0%	0.0%	8		1 50 000 18
3/8" 9.50 100% 100% 100.0% 0.0% 100.0	5/8"	16.00		100%	100.0%	0.0%	96		7 30.00,0 Be
1/4" 6.30	1/2"	12.50	100%	100%	100.0%	0.0%			1
#4 4.75 100% 100.0% 0.0% 0.0% 100.0% 0.0% 100.0% 0.0% 100.0% 0.0% 100.0% 0.0% 100.0% 0.0% 100.0% 0.0% 100.0% 100.0% 0.0% 100.	3/8"	9.50	100%	100%	100.0%	0.0%		,	40.0%
#8 2.36	1/4"	6.30		100%	100.0%	0.0%			1
#8	#4	4.75	100%	100%	100.0%	0.0%			1
#16	#8	2.36		99%	100.0%	0.0%	;	· 	30.0%
#20 0.850 86% 100.0% 0.0% #30 0.600 83% 100.0% 0.0% #40 0.425 81% 81% 100.0% 0.0% 0.0% #50 0.300 66% 100.0% 0.0% #60 0.250 59% 100.0% 0.0% #80 0.180 50% 100.0% 0.0% #100 0.150 47% 47% 100.0% 0.0% #140 0.106 31% 100.0% 0.0% #170 0.090 25% 100.0% 0.0%	#10	2.00	99%	99%	100.0%	0.0%			1
#20	#16	1.18		90%	100.0%	0.0%		<u> </u>	20.0%
#40 0.425 81% 81% 100.0% 0.0% #50 0.300 66% 100.0% 0.0% #60 0.250 59% 100.0% 0.0% #80 0.180 50% 100.0% 0.0% #100 0.150 47% 47% 100.0% 0.0% #140 0.106 31% 100.0% 0.0% #170 0.090 25% 100.0% 0.0%	#20	0.850		86%	100.0%	0.0%			10.0%
#50 0.300 66% 100.0% 0.0%	#30	0.600		83%	100.0%	0.0%			1
#60	#40	0.425	81%	81%	100.0%	0.0%			10.0%
#80 0.180 50% 100.0% 0.0% 100.000 10.000 10.000 1.000 0.100 0.001 0.001 1.000 1.000 1.000 0.100 0.001 0.001 0.001 1.000 0.100 0.001	#50	0.300		66%	100.0%	0.0%			1
#80 0.180 50% 100.0% 0.0% 100.000 10.000 1.000 0.100 0.010 0.001	#60	0.250		59%	100.0%	0.0%			1
#100	#80	0.180		50%	100.0%	0.0%			
\$170 0.090 25% 100.0% 0.0%	#100	0.150	47%	47%	100.0%	0.0%			
	#140	0.106			100.0%	0.0%		Particle Size (mm)	
7000 0.075 10.407 10.407 10.007 0.007	#170	0.090		25%	100.0%	0.0%			
#200 0.075 19.4% 19.4% 100.0% 0.0% + Sieve Sizes → Mox Specs → Min Specs → Sieve Results	#200	0.075	19.4%	19.4%	100.0%	0.0%	+ Sie	Sizes — Max Specs — Min Specs — Sieve Results	
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Reviewed by: _

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1444
Sample Date:	7/8/2021
Test Date:	9/13/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT21-GB-16-21 ft

 Visual Soil Description:
 dark gray sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

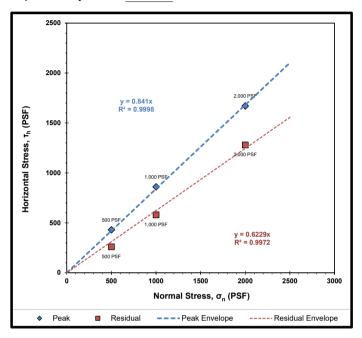
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	26.8	
	Initial	Post-Consolidation
Dry Density (PCF):	107.5	109.1
Void Ratio:	0.568	0.545
Porosity (%):	36.2	35.3
Degree of Saturation (%):	saturated	saturated

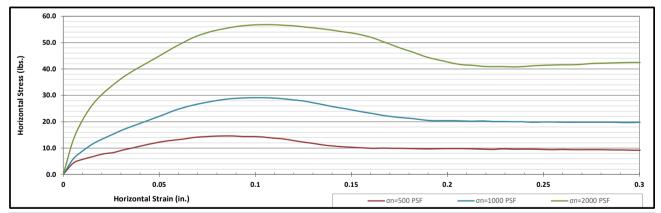
Summary of Sampl	e Data:	σ _n =1000 PSF
Initial Moisture Content (%):	26.2	
	Initial	Post-Consolidation
Dry Density (PCF):	107.6	110.8
Void Ratio:	0.566	0.521
Porosity (%):	36.1	34.3
Degree of Saturation (%):	saturated	saturated

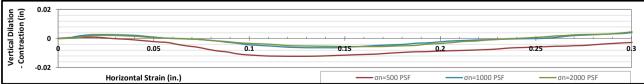
Summary of Samp	le Data:	σ _n =2000 PSF
Initial Moisture Content (%):	24.9	
	Initial	Post-Consolidation
Dry Density (PCF):	108.8	113.7
Void Ratio:	0.549	0.481
Porosity (%):	35.4	32.5
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRI	ENGTH PARA	METERS
	PEAK	RESIDUAL
Angle of Internal Friction, φ (°):	40	32
Cohesion (PSF):	0	0



Failure Envelope Test	Values:		
Normal Stress, σ _n (PSF):	500	1000	2000
Peak Horizontal Stress, τ _h (PSF):	430	860	1670
Residual Horizontal Stress, τ _h (PSF):	260	580	1280





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT21-GB-21-25.7 ft

Sample#: B21-1445

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 23-Aug-21

Tested By: A. Eifrig

Visual Identification Sandy Silt Sample Color: grayish-brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431:} \\ D_{(5)} = 0.005 \\ D_{(10)} = 0.010 \\ D_{(15)} = 0.015 \\ D_{(30)} = 0.040 \\ D_{(50)} = 0.060 \\ D_{(60)} = 0.068 \\ D_{(90)} = 0.130 \\ \end{array}$ mm % Gravel = 0.0% % Sand = 30.5% mm % Silt & Clay = 69.5% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 2.30$ Coeff. of Uniformity, $C_U = 6.70$ Fineness Modulus = 0.04

Plastic Limit = n/a Moisture %, as sampled = 35.7% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face =

						ust Ratio = 16/23				acture '	%, 2+	Face	s = n	/a		Re	q'a F	ractu	re %,	2+ Fa	ices =
		Antual	Interpolated		ASTM C1	36, ASTM D6913,	ASTN	1 C11	17												
		Actual				ľ				Grain S	Size Dist	ributior	1								
G.	G.	1	Cumulative	6		4			5												
Sieve		Percent	Percent	Specs	Specs		6 ⊆		. i. z	5,8%	3/8	∞ <u>Q</u>	8 5	8 4 8	3883	228					
US	Metric	Passing	Passing	Max	Min	1	00% 👯				11111	-	-		111	Hin.	ПТ	т	ППП		T 100.0%
12.00"	300.00		100%	100.0%	0.0%		-								11						1
10.00"	250.00		100%	100.0%	0.0%										1						1
8.00"	200.00		100%	100.0%	0.0%		0%				mm						H			77	90.0%
6.00"	150.00		100%	100.0%	0.0%																1
4.00"	100.00		100%	100.0%	0.0%		80%										Ш				80.0%
3.00"	75.00		100%	100.0%	0.0%											\					00.070
2.50"	63.00		100%	100.0%	0.0%											1					1
2.00"	50.00		100%	100.0%	0.0%		70%		-					\mathbb{H}		Ŋ.		-			70.0%
1.75"	45.00		100%	100.0%	0.0%											¥					1
1.50"	37.50		100%	100.0%	0.0%																1
1.25"	31.50		100%	100.0%	0.0%		50%		╫╫╌	-	-	-		-	-			+		++	60.0%
1.00"	25.00		100%	100.0%	0.0%	<u>0</u>	ŀ														1
3/4"	19.00		100%	100.0%	0.0%	% Possing															50.0%
5/8"	16.00		100%	100.0%	0.0%	86	50%		Ш		mm						Ш				50.0%
1/2"	12.50		100%	100.0%	0.0%																1
3/8"	9.50	100%	100%	100.0%	0.0%		10%		Ш		ЩЩ			Ш.		Ш	Ш				40.0%
1/4"	6.30		100%	100.0%	0.0%											1					1
#4	4.75	100%	100%	100.0%	0.0%		ł									k	k				1
#8	2.36		100%	100.0%	0.0%		30%		₩					++++			\mathbb{H}	-			30.0%
#10	2.00	100%	100%	100.0%	0.0%		F										N				1
#16	1.18		100%	100.0%	0.0%												$ \rangle$				1
#20	0.850		100%	100.0%	0.0%		20%		mm		mm		-#	m	1		m	*		11	20.0%
#30	0.600		100%	100.0%	0.0%																1
#40	0.425	100%	100%	100.0%	0.0%		10%		Ш		ЩЩ			Ш		ЩЩ	Щ	\perp	ЩЩ		10.0%
#50	0.300	10070	99%	100.0%	0.0%														N		1
#60	0.250		98%	100.0%	0.0%		-												*	4	1
#80	0.180		98%	100.0%	0.0%		0%		Job	0000	-	4	-	•	0-00-	للوي	ш	٠.	шШ	1	0.0%
#100	0.150	97%	97%	100.0%	0.0%			100.00	0	10.	.000		1.000		0	.100		0.0	10		0.001
#140	0.106	2//0	81%	100.0%	0.0%						Particle	e Size (m	m)								
#170	0.090		75%	100.0%	0.0%																
#200	0.075	69.5%	69.5%	100.0%	0.0%		uo Size-				v Spoor				in Spo				Sieve F	locultr	
		09.5% hnical Services PS, 1996-9	ļ	100.0%	0.0%	+ 3	ve Sizes			— Max	x Specs		_	M	in Specs		_	•	SIEVE N	STIUCHS	

Comments:	
	\wedge \prime
	Negh Bakget and
Reviewed by:	



Hydrometer Report

Project	O.C Lower	Duwamish Waterway	Data Pagai	ved: 29-Jul-21	Visual Identific	eation	
Project #: 2		Duwaiiisii waterway	Sandy Silt	ation			
•				By: Client			
	Anchor QEA	1 GD 21 25 7 A		sted: 23-Aug-21	Sample Color		
		1-GB-21-25.7 ft	Tested	By: A. Eifrig	grayish-brown		
Sample#:		40 HVDDOMET	ED ANIAY VICEO			A COTTO A C	0.012
		28, HYDROMET	EK ANALYSIS			ASTM I	
Sp Gr:	2.55					Sieve Ar	•
Sample Weight:	51.07	grams			~.	Grain Size D	
Hydroscopic Moist.:	0.72%				Sieve	Percent	Soils Particle
Adj. Sample Wgt :	50.70	grams		Certificate #: 1366.01	Size	Passing	Diameter
Hydrometer				Terminate v. 1500io i	3.0" 2.0"	100% 100%	75.000 mm 50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	19.5	39.2%	0.0512 mm		1.0"	100%	25.000 mm
2	19.5	28.2%	0.0312 mm		3/4"	100%	19.000 mm
4	12	24.1%	0.0373 Hilli 0.0266 mm		5/8"	100%	16.000 mm
15	7	14.1%	0.0266 mm 0.0142 mm		1/2"	100%	12.500 mm
30	5	10.1%	0.0142 mm		3/8"	100%	9.500 mm
60	3	6.0%	0.0101 mm		1/4"	100%	6.300 mm
240	2	4.0%	0.0072 mm		#4	100%	4.750 mm
1440	1	2.0%	0.0036 mm		#10	100%	2.000 mm
1440		2.070	0.0015 11111		#20	100%	0.850 mm
% Gravel:	0.0%	Li	quid Limit: n/a		#40	100%	0.425 mm
% Sand:	30.5%		astic Limit: n/a		#100	97%	0.150 mm
% Silt:	64.7%		icity Index: n/a		#200	69.5%	0.075 mm
% Clay:	4.8%	1 1430	icity index. is a		Silts	68.2%	0.074 mm
, o cauj.					Sitts	33.0%	0.050 mm
						18.8%	0.020 mm
					Clays	4.8%	0.005 mm
					Canyo	2.5%	0.002 mm
					Colloids	1.4%	0.001 mm
	USDA	Soil Textural Cla	ssification				
		Particle Size			1		
% Sand:		2.0 - 0.05 mm					
% Sanu: % Silt:		0.05 - 0.002 mm					
% Clay:		< 0.002 mm					
70 Clay.		< 0.002 mm					
	HSDA	Soil Textural Cla	ssification				
	CSDI	Sandy Loam					
All results apply only to actual location	ons and materials tested	As a mutual protection to clients,	the public and ourselves, all repo	rts are submitted as the confidentia	al property of clients, and auti	horization for publication of s	statements, conclusions or extracts from or
regarding our reports is reserved pend	ding our written approv	al.	-				
Comments:							

Comments:			
	Mayte Chalget wills		
Reviewed by:			
	Meghan Blodgett-Carrillo		



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT21-GB-26-31 ft

Sample#: B21-1446

Comments:

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 23-Aug-21

Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

mm

gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications	
No Spece	

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.013 \\ \textbf{D}_{(10)} = 0.026 \\ \textbf{D}_{(15)} = 0.039 \\ \textbf{D}_{(30)} = 0.077 \\ \textbf{D}_{(50)} = 0.119 \\ \textbf{D}_{(60)} = 0.140 \\ \textbf{D}_{(90)} = 0.354 \\ \textbf{Partice} = 12/44 \\ \textbf{D}_{(15)} = 0.144 \\ \textbf{$ mm % Gravel = 0.0% % Sand = 71.1% mm % Silt & Clay = 28.9% mm mm Liquid Limit = n/a Plasticity Index = n/amm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.65$ Coeff. of Uniformity, $C_U = 5.38$ Fineness Modulus = 0.53

Plastic Limit = n/a Moisture %, as sampled = 34.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Di	ust Ratio = $12/41$	111111	Fracture %,	0, 1 Face =			Fracture %,		
						TM D6913, ASTM	C117	Tracture 70,	z · races =	n a	Requi	racture 70,	, 2 · 1 acc	
		Actual	Interpolated	Aug	51W C150, A51	V 50713, A51M	CIII							
		Cumulative	Cumulative					Grain Size [
Sieve	Size	Percent	Percent	Specs	Specs			3,88° 27° 38° 38° 38° 38° 38° 38° 38° 38° 38° 38	0 %		12.88			
US	Metric	Passing	Passing	Max	Min	1	ં તં⊆ ••••• 700	48 95 - 8, 8	4 mm = €	2 4 4 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	2 28			100.0%
12.00"	300.00		100%	100.0%	0.0%		T				\mathbb{T}			
10.00"	250.00		100%	100.0%	0.0%		ŁТ			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
8.00"	200.00		100%	100.0%	0.0%		90%					+-+++	++-	90.0%
6.00"	150.00		100%	100.0%	0.0%									
4.00"	100.00		100%	100.0%	0.0%					i				
3.00"	75.00		100%	100.0%	0.0%		30%			1				80.0%
2.50"	63.00		100%	100.0%	0.0%		11			\ \				
2.00"	50.00		100%	100.0%	0.0%		70%			<u> </u>				70.0%
1.75"	45.00		100%	100.0%	0.0%		11							
1.50"	37.50		100%	100.0%	0.0%					i				
1.25"	31.50		100%	100.0%	0.0%		50%					+		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	<u>0</u>	H				\			9
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%				\			50.0% _k
5/8"	16.00		100%	100.0%	0.0%	₽€	50%							50.0% _{BR}
1/2"	12.50	100%	100%	100.0%	0.0%									
3/8"	9.50	100%	100%	100.0%	0.0%		40%				+			40.0%
1/4"	6.30		100%	100.0%	0.0%						Į.			
#4	4.75	100%	100%	100.0%	0.0%						N. I. I			
#8	2.36		100%	100.0%	0.0%		30%				*		+	30.0%
#10	2.00	100%	100%	100.0%	0.0%		ł I							
#16	1.18		99%	100.0%	0.0%		20%							20.0%
#20	0.850		99%	100.0%	0.0%									20.076
#30	0.600		99%	100.0%	0.0%									
#40	0.425	99%	99%	100.0%	0.0%		10%							10.0%
#50	0.300		83%	100.0%	0.0%									
#60	0.250		77%	100.0%	0.0%									
#80	0.180		69%	100.0%	0.0%		0%	00.000 10.000	1.00	D*0 'd-00 '00 10	0.100	0.010	0.0	0.0%
#100	0.150	65%	65%	100.0%	0.0%									
#140	0.106		44%	100.0%	0.0%			Par	ticle Size (mm)					
#170	0.090		36%	100.0%	0.0%									
#200	0.075	28.9%	28.9%	100.0%	0.0%	+ Si	eve Sizes	——▲ — Max Spe	cs —	- Min Spec	es =	Sieve I	Results	
	Spears Engineering & Tec													
esults apply only to a	ctual locations and material	ls tested. As a mutual prote	ection to clients, the public	and ourselves, all reports are	submitted as the confide	ntial property of clients, and a	uthorization f	or publication of statements	, conclusions or e	extracts from or r	egarding our re	ports is reserved	pending our	written appro

Reviewed by: _ Meghan Blodgett-Carrillo



As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: August 24, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1321	LDW21-GT24-0-5 ft	233.2	648.4	595.4	53.0	362.2	14.6%
B21-1322	LDW21-GT24-5-13.6ft	234.1	1046.2	877.7	168.5	643.6	26.2%
B21-1323	LDW21-GT24-13.6-29 ft	232.6	1197.1	1046.9	150.2	814.3	18.4%
B21-1324	LDW21-GT24-33-35 ft	229.5	540.4	454.5	85.9	225.0	38.2%
B21-1325	LDW21-GT24-35-43 ft	233.3	1203.4	995.3	208.1	762.0	27.3%
B21-1326	LDW21-GT24-43-50 ft	223.9	840.4	682.9	157.5	459.0	34.3%
B21-1327	LDW21-GT24-53.3-59 ft	234.6	1087.0	874.9	212.1	640.3	33.1%
B21-1328	LDW21-GT36-0-3.6 ft	215.2	760.8	729.9	30.9	514.7	6.0%
B21-1329	LDW21-GT36-3.6-6.2 ft	217.1	499.1	461.2	37.9	244.1	15.5%
B21-1330	LDW21-GT36-6.2-9.5 ft	91.9	740.7	600.6	140.1	508.7	27.5%
B21-1331	LDW21-GT36-9.5-11.7 ft	221.2	864.4	682.7	181.7	461.5	39.4%
B21-1332	LDW21-GT36-11.7-32 ft	215.5	1106.1	985.3	120.8	769.8	15.7%
B21-1333	LDW21-GT36-32-34.7 ft	223.9	674.7	563.9	110.8	340.0	32.6%
B21-1334	LDW21-GT36-34.7-50 ft	759.4	1828.1	1623.0	205.1	863.6	23.7%
B21-1335	LDW21-GT36-50.5-61.5 ft	233.5	678.3	545.8	132.5	312.3	42.4%

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: August 26, 2021	Tested by: A. Eifrig

	ī			•		1	•	•	■ Mass at	•				
									Mass of	Massaf	Т		Т	
			D C 11	M CD		3.6 C	37.1		Pycno filled				Temp.	
		_		Mass of Dry		Mass of		Density of						Corrected
Sample #	Location	Tare	Tare	Soil	Pycno ID	Pycno	Pycno	Water @ Tx		w/ water	*C	Soils	Factor	SpG
B21-1323	LDW21-GT24-13.6-29 ft	601.52	701.51	100.0	TSA-010	180.3	499.5	0.99754	742.00	678.62		2.7311347		2.7293049
B21-1326	LDW21-GT24-43-50 ft	497.42	571.51	74.1	TSA-017	187.9	499.4	0.99754	731.68	686.06		2.6022626		2.600519
B21-1332	LDW21-GT36-11.7-32 ft	497.79	598.00	100.2	TSA-015	187.6	499.5	0.99754	748.84	685.87	23.0	2.6908295		2.6890267
B21-1335	LDW21-GT36-50.5-61.5 ft	600.15	650.57	50.4	TSA-016	197.2	499.5	0.99754	726.46	695.45	23.0	2.5974523	0.99933	2.595712

All results apply only to actual locations and materials tested.	As a mutual protection to clients, the	e public and ourselves, all reports are subm	utted as the confidential property of clients, and au	uthorization for publication of statements, co	conclusions or extracts from or regarding ou	ir reports is reserved pending our written approval

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Meghan Blodgett-Carrillo

Project #: 21B233 Client: Anchor QEA Source: LDW-GT24-5-13.6 ft

Sample#: B21-1322

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 24-Aug-2

Date Tested: 24-Aug-21 Tested By: A. Eifrig Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

Coeff. of Curvature, $C_C = 1.20$ Coeff. of Uniformity, $C_U = 2.38$ Fineness Modulus = 1.60 Plastic Limit = 0.0% Moisture %, as sampled = 26.2%

Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Dus	st Ratio =	1/20		Fra	ture %, 2	2+ Face	es = n/	'a	R	teq'd F	racture	e %, 2+	Faces =	=
				AS	STM C136, AST	M D6913,	ASTM C1	17											
			Interpolated							Grain Size E	istributio	n							
		Cumulative	Cumulative																
Sieve		Percent	Percent	Specs	Specs			o :. :.		3/8"	4 ## C	288	8 2 8 8	8258					
US	Metric	Passing	Passing	Max	Min		100%	•			* **	-	* # # # 	*****		т	пттт	T 100	00.0%
12.00"	300.00		100%	100.0%	0.0%							1						1 1	
10.00"	250.00		100%	100.0%	0.0%							1						1 1	
8.00"	200.00		100%	100.0%	0.0%		90%	t			++++		-		HH	+-+	###	90.	0.0%
6.00"	150.00		100%	100.0%	0.0%			ł I					١					1 1	
4.00"	100.00		100%	100.0%	0.0%		80%	H					Ĭ					1 1	0.0%
3.00"	75.00		100%	100.0%	0.0%		00%	F							Ш		iTTTT	T T	.0%
2.50"	63.00		100%	100.0%	0.0%													1 1	
2.00"	50.00	100%	100%	100.0%	0.0%		70%	<u> </u>			++++		Ш.		Щ.		####	70.	0.0%
1.75"	45.00		100%	100.0%	0.0%													1 1	
1.50"	37.50		100%	100.0%	0.0%													1 1	
1.25"	31.50		100%	100.0%	0.0%		60%	$\vdash \vdash$			++++				HH	+-++	HHH	60.	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%	8		H										1 1	ē
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing												1 1	% %0.0
5/8"	16.00		100%	100.0%	0.0%	96	50%	H							Ш		ШТ	50.	.0% 88
1/2"	12.50	100%	100%	100.0%	0.0%								1					1 1	
3/8"	9.50	100%	100%	100.0%	0.0%		40%				$\bot \bot \bot \bot$		Ш	L	Щ		ШШ	40.	0.0%
1/4"	6.30		100%	100.0%	0.0%													1 1	
#4	4.75	100%	100%	100.0%	0.0%													1 1	
#8	2.36		100%	100.0%	0.0%		30%	\vdash			++++				HH	+-++	HHH	30.	0.0%
#10	2.00	100%	100%	100.0%	0.0%			H					III 1					1 1	
#16	1.18		99%	100.0%	0.0%		007											1 1	
#20	0.850	99%	99%	100.0%	0.0%		20%								Ш		ı	20.0	0.0%
#30	0.600		88%	100.0%	0.0%									ì				1 1	
#40	0.425	81%	81%	100.0%	0.0%		10%	<u> </u>			++-+			Ţ	Ш.	4	####	10.	0.0%
#50	0.300		44%	100.0%	0.0%									N				1 1	
#60	0.250	29%	29%	100.0%	0.0%									ľ				1 1	
#80	0.180		16%	100.0%	0.0%		0%	900 0	0.000	10.000	-	1.000	0-00	0.100	,4444	0.010	11111	0.001	3%
#100	0.150	10%	10%	100.0%	0.0%			10		10.000		1.000		0.100		0.010		0.001	
#140	0.106	-	7%	100.0%	0.0%					Part	icle Size (m	nm)							
#170	0.090		5%	100.0%	0.0%														
#200	0.075	4.0%	4.0%	100.0%	0.0%		+ Sieve S	izes		— Max Spec	:s		- Min S	Specs	_		Sieve Resul	lts	
	Spears Engineering & Tec				****														
17. 0	1 0 0			and ourselves, all reports are	1 20 1 0 01 0			1 1 0	111 -1	6		_			=	=			

Il results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval

Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1322
Sample Date:	7/26/2021
Test Date:	8/24/2021
Technician:	M. Carrillo

 Sample Source:
 LDW-GT24-5-13.6 ft

 Visual Soil Description:
 brown sand with silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

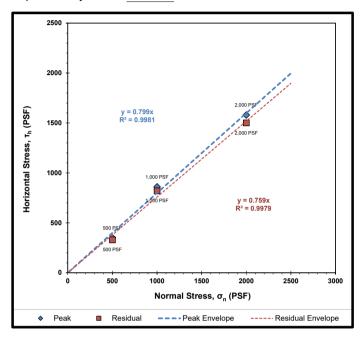
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	26.4	
	Initial	Post-Consolidation
Dry Density (PCF):	108.1	108.3
Void Ratio:	0.559	0.556
Porosity (%):	35.9	35.7
Degree of Saturation (%):	saturated	saturated

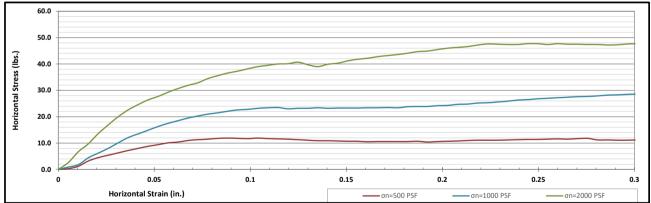
Summary of Samp	le Data:	σ _n =1000 PSF
Initial Moisture Content (%):	27.1	
	Initial	Post-Consolidation
Dry Density (PCF):	107.4	109.3
Void Ratio:	0.569	0.541
Porosity (%):	36.3	35.1
Degree of Saturation (%):	saturated	saturated

Summary of Sample	e Data:	σ _n =2000 PSF
Initial Moisture Content (%):	29.0	
	Initial	Post-Consolidation
Dry Density (PCF):	105.6	108.6
Void Ratio:	0.595	0.551
Porosity (%):	37.3	35.5
Degree of Saturation (%):	saturated	saturated

ESTIMATED STR	ENGTH PARA	METERS
	PEAK	RESIDUAL
Angle of Internal Friction, φ (°):	39	37
Cohesion (PSF):	0	0



Failure Envelope Test	Values:		
Normal Stress, σ _n (PSF):	500	1000	2000
Peak Horizontal Stress, τ _h (PSF):	350	860	1580
Residual Horizontal Stress, τ _h (PSF):	330	820	1500





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW-GT24-13.6-29 ft Sample#: B21-1323

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 24-Aug-21

Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

mm

Sample Color:

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.091 \\ \textbf{D}_{(10)} = 0.163 \\ \textbf{D}_{(15)} = 0.201 \\ \textbf{D}_{(30)} = 0.292 \\ \textbf{D}_{(50)} = 0.389 \\ \textbf{D}_{(60)} = 0.457 \\ \textbf{D}_{(90)} = 0.815 \end{array}$ mm % Gravel = 0.0% % Sand = 95.9% mm % Silt & Clay = 4.1% mm mm Liquid Limit = 0.0% Plasticity Index = 0.0% mm

Sand Equivalent = n/a Fracture %. 1 Face = n/a

Coeff. of Curvature, $C_C = 1.15$ Coeff. of Uniformity, $C_U = 2.81$ Fineness Modulus = 1.94

Plastic Limit = 0.0% Moisture %, as sampled = 18.4% Req'd Sand Equivalent = Rea'd Fracture %, 1 Face =

					D	$D_{(90)} = 0.813$ mm ust Ratio = 1/14	Fracture %, 1 Face = n/s Fracture %, 2+ Faces = n/s	
							rracture %, 2+ races = n/s	Req'd Fracture %, 2+ Faces =
		Actual	Interpolated	AS	1 M C136, AS	TM D6913, ASTM C117		
			Cumulative			ľ	Grain Size Distribution	
Ciono	Size	Percent	Percent	Su ann	Specs	-	7/ :- :	
US	Metric	Passing	Passing	Specs Max	Min	5 9 9 4 1	7 2 3 5 5 7 7 7 3 8 4 1 5 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 3 1	#### #### 1000 ####
12.00"	300.00	rassing	100%	100.0%	0.0%	100%		100.0%
10.00"	250.00		100%	100.0%	0.0%			
8.00"	200.00		100%	100.0%	0.0%	90%	iii ii	90.0%
6.00"	150.00		100%	100.0%	0.0%			
4.00"	100.00		100%	100.0%	0.0%			
3.00"	75.00		100%	100.0%	0.0%	80%	H	80.0%
2.50"	63.00		100%	100.0%	0.0%			
2.00"	50.00	100%	100%	100.0%	0.0%			
1.75"	45.00	10070	100%	100.0%	0.0%	70%		70.0%
1.50"	37.50		100%	100.0%	0.0%			\
1.25"	31.50		100%	100.0%	0.0%	60%		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	0		
3/4"	19.00	100%	100%	100.0%	0.0%	50 1880 1880 1880		50.0% & 50.0% & 50.0%
5/8"	16.00	10070	100%	100.0%	0.0%	in 50%		50.0% &
1/2"	12.50	100%	100%	100.0%	0.0%	-		
3/8"	9.50	100%	100%	100.0%	0.0%	40%		40.0%
1/4"	6.30	10070	100%	100.0%	0.0%	40%		40.0%
#4	4.75	100%	100%	100.0%	0.0%			
#8	2.36	10070	100%	100.0%	0.0%	30%		30.0%
#10	2.00	99%	99%	100.0%	0.0%			
#16	1.18	7770	95%	100.0%	0.0%			
#20	0.850	93%	93%	100.0%	0.0%	20%		20.0%
#30	0.600	2370	72%	100.0%	0.0%			
#40	0.425	57%	57%	100.0%	0.0%	10%		10.0%
#50	0.300	3770	32%	100.0%	0.0%	10,0		111 10.0%
#60	0.250	21%	21%	100.0%	0.0%] 1
#80	0.180	2170	12%	100.0%	0.0%	0%	Walanda ka a Wilda Li Jab - a Wild	0.0%
#100	0.150	8%	8%	100.0%	0.0%	100.00	00 10.000 1.000	0.100 0.010 0.001
#140	0.106	070	6%	100.0%	0.0%		Particle Size (mm)	
#170	0.090		5%	100.0%	0.0%			
#200	0.075	4.1%	4.1%	100.0%	0.0%	+ Sieve Sizes	—▲ — Max Specs — ●	— Min Specs — Sieve Results
	t Spears Engineering & Tec	l	1	100.070	0.070	. 55070 51205		
17 0	1 0					ential property of clients, and authorization for p	sublication of statements, conclusions or extra	

Reviewed by:

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Limit Unit Datamin din	
Liquid Limit Determination	
#1 #2 #3 #4 #5 #6 Weight of Wet Soils + Pan:	
Weight of Dry Soils + Pan: Liquid Limit cannot be established	
Weight of Pan: Weight of Dry Soils: Liquid Limit (25 Blows: N/A
Weight of Moisture:	stic Limit: N/A
% Moisture: Plasticii Number of Blows:	Index, I _P : N/A
Number of Brows.	
Plastic Limit Determination	
#1 #2 #3 #4 #5 #6 Weight of Wet Soils + Pan:	
Weight of Dry Soils + Pan: Plastic Limit cannot be determined	
Weight of Pan:	
Weight of Dry Soils: Weight of Moisture: Conflicate #:	EDITED 66.01, 1366.02 & 1366.04
% Moisture:	
Plasticity Chart	
70 % Liqu	d Limit
60 % 90% 90% 80%	
50% †	
50 %	
xo pul 40 %	
20 % MH or OH	
10 % GL-MIL N/L or OL 20%	
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% 110%	
Liquid Limit	100 er of Blows, "N"
Copyright Spears Engineering & Technical Services PS, 1996-98	er or blows, N

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA Source: LDW-GT24-35-43 ft

Sample#: B21-1325

#100

#140

#170

#200

0.150

0.106

0.090

0.075

8.9%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 24-Aug-21

Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color:

mm

gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

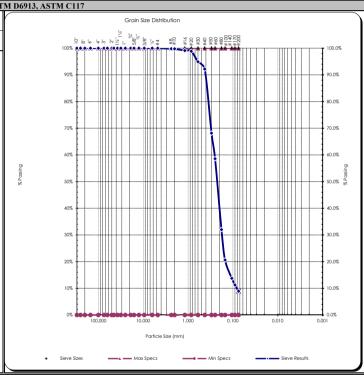
 $\begin{array}{c} D_{(5)} = 0.042 \\ D_{(10)} = 0.082 \\ D_{(15)} = 0.114 \\ D_{(30)} = 0.175 \end{array}$ mm % Gravel = 0.0%% Sand = 91.1% mm % Silt & Clay = 8.9% mm mm Liquid Limit = 0.0% $D_{(50)} = 0.227$ Plasticity Index = 0.0% $D_{(60)} = 0.257$ mm $D_{(90)} = 0.237$ $D_{(90)} = 0.414$ <u>ust Ratio</u> = 3/31

Sand Equivalent = n/a Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.45$ Coeff. of Uniformity, $C_U = 3.14$ Fineness Modulus = 1.17 Plastic Limit = 0.0% Moisture %, as sampled = 27.3%

Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

				AS	TM C126		
		Actual Cumulative	Interpolated Cumulative	As	TM C136, A		
Sieve	Size	Percent	Percent	Specs	Specs		
US	Metric Passing		Passing	Max	Min		
12.00"	300.00		100%	100.0%	0.0%		
10.00"	250.00	ĺ	100%	100.0%	0.0%		
8.00"	200.00	İ	100%	100.0%	0.0%		
6.00"	150.00	1	100%	100.0%	0.0%		
4.00"	100.00	1	100%	100.0%	0.0%		
3.00"	75.00	ĺ	100%	100.0%	0.0%		
2.50"	63.00	ĺ	100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00	ĺ	100%	100.0%	0.0%		
1.50"	37.50	1	100%	100.0%	0.0%		
1.25"	31.50	1	100%	100.0%	0.0%		
1.00"	25.00	100%	100%	100.0%	0.0%		
3/4"	19.00	100%	100%	100.0%	0.0%		
5/8"	16.00	1	100%	100.0%	0.0%		
1/2"	12.50	100%	100%	100.0%	0.0%		
3/8"	9.50	100%	100%	100.0%	0.0%		
1/4"	6.30	ĺ	100%	100.0%	0.0%		
#4	4.75	100%	100%	100.0%	0.0%		
#8	2.36	1	100%	100.0%	0.0%		
#10	2.00	100%	100%	100.0%	0.0%		
#16	1.18	1	99%	100.0%	0.0%		
#20	0.850	99%	99%	100.0%	0.0%		
#30	0.600	İ	95%	100.0%	0.0%		
#40	0.425	92%	92%	100.0%	0.0%		
#50	0.300	İ	68%	100.0%	0.0%		
#60	0.250	59%	59%	100.0%	0.0%		
#80	0.180	İ	32%	100.0%	0.0%		



0.0%

0.0%

0.0%

0.0%

Comments: Reviewed by:

100.0%

100.0%

100.0%

100.0%

21%

14%

11%

8.9%

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Clien Source		amish Waterway	Sar Da		Client 25-Aug-21	5	Visual Identific Silty Sand Sample Color lark brown			
		Liquid Lim	it Determination							
		#1	#2	#3	#4	#5	#6			
		T1 11T		. 1 1						
weig	-	Liquid L	imit cannot be establ	isned						
	Weight of Dry Soils:							Liquid	Limit @ 25 Blows:	N/A
	Weight of Moisture:							1		N/A
	Number of Blows:								lasticity flucx, 1p.	IV/A
				#2	#4	#5	#6			
Weig	ht of Wet Soils + Pan:	π1	πΔ	πο	π -1	πυ	π0	9		
Weig		Plastic L	imit cannot be deterr	nined						
	Weight of Dry Soils: Weight of Moisture: % Moisture:							٥	ACCREDITED rtificate #: 1366.01, 1366.02 & 1366.04	ı.
		Plast	icity Chart					1	Linuid Lind	
70 %	F							100% -	Liquia Limit	
60 %	\$ [ir Line			90% -		
				"1	, OH _	MAN THE		80%		
6 40 %	6			CH	or			e in the 60%		
30 %	, <u>[</u>							™ 50%		
Plasticity Index		NorOL		M	H or OH			40% - 30% -		
10 %	· / /							20% -		
0 %	·	+ + + +	50% 60%	70%	80%	90% 100	110%			
	Completer Liquid Limit Determination Flat F		100							
Copyrig	tht Spears Engineering & Tech		-						Hallber of Blows, N	

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW-GT24-53.3-59 ft Sample#: B21-1327

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 24-Aug-21 Tested By: A. Eifrig

Visual Identification Sandy Silt

Sample Color: brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{c} \textbf{ASTM D43} \\ D_{(5)} = 0.007 \\ D_{(10)} = 0.014 \\ D_{(15)} = 0.021 \\ D_{(30)} = 0.042 \\ D_{(50)} = 0.070 \\ D_{(60)} = 0.088 \\ D_{(50)} = 0.161 \end{array}$ mm % Gravel = 0.0%% Sand = 46.3% mm % Silt & Clay = 53.7% mm mm Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a $D_{(90)} = 0.161$ mm Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.42$ Coeff. of Uniformity, $C_U = 6.33$ Fineness Modulus = 0.15 Plastic Limit = n/a

Moisture %, as sampled = 33.1% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face =

		Actual Cumulative	Interpolated Cumulative							Grain Siz	ze Distri	bution								
Sieve	Size	Percent	Percent	Specs	Specs				2 s 1 1 2 s	×	% # ½ 9/0 # 4	O	900		8988					
US	Metric	Passing	Passing	Max	Min				o 0 ≥ :		5 × 4	∞2 ##	± ξ ξ	# # # # # # # #	****					- 100.0%
12.00"	300.00		100%	100.0%	0.0%	1	T							***						1
10.00"	250.00		100%	100.0%	0.0%		ŀ							\						ł
8.00"	200.00		100%	100.0%	0.0%		90%	+-+	++++	-		++-			•		+			90.0%
6.00"	150.00		100%	100.0%	0.0%										1					1
4.00"	100.00		100%	100.0%	0.0%										1					
3.00"	75.00		100%	100.0%	0.0%		80%													80.0%
2.50"	63.00		100%	100.0%	0.0%		1								1					1
2.00"	50.00	100%	100%	100.0%	0.0%		70%	1				44		444	-1111	Щ.				70.0%
1.75"	45.00		100%	100.0%	0.0%		1								i					1
1.50"	37.50		100%	100.0%	0.0%		ŀ								N					1
1.25"	31.50		100%	100.0%	0.0%		60%	+-+	++++	-		++-		+++	- 1		+			60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	2	ŀ								J.					
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%								ı					50.0%
5/8"	16.00		100%	100.0%	0.0%	96	50%													50.0%
1/2"	12.50	100%	100%	100.0%	0.0%		1													1
3/8"	9.50	100%	100%	100.0%	0.0%		40%							+++						40.0%
1/4"	6.30		100%	100.0%	0.0%		1													1
#4	4.75	100%	100%	100.0%	0.0%		1													
#8	2.36		100%	100.0%	0.0%		30%	+-+	+++	-		++-		+++			+-+			30.0%
#10	2.00	100%	100%	100.0%	0.0%		ŀ													
#16	1.18		100%	100.0%	0.0%		20%													20.0%
#20	0.850	100%	100%	100.0%	0.0%		20% F					П								20.0%
#30	0.600		99%	100.0%	0.0%		-													1
#40	0.425	99%	99%	100.0%	0.0%		10%			-		+								10.0%
#50	0.300		98%	100.0%	0.0%		ļ													1
#60	0.250	97%	97%	100.0%	0.0%		ŀ													1
#80	0.180		92%	100.0%	0.0%		0%	100.00		10.0	00	-00	1.000	00-0	0.100		0.010)	0.	0.0%
#100	0.150	89%	89%	100.0%	0.0%			.00.00	-	10.0					200		0.01	-		
#140	0.106		68%	100.0%	0.0%						Particle:	Size (mm)							
#170	0.090		61%	100.0%	0.0%															
#200	0.075	53.7%	53.7%	100.0%	0.0%		Sieve Sizes			- Max	Specs		 -	- Min Sp	ecs	_		Sieve Re:	ults	

Reviewed by: _



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW-GT36-3.6-6.2 ft Sample#: B21-1329

#20

#30

#40

#50

#60

#80

#100

#140

#170

#200

0.850

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

81%

77%

39.4%

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 24-Aug-21 Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.016$ $D_{(10)} = 0.055$ $D_{(15)} = 0.058$ mm % Gravel = 8.6% % Sand = 52.0% mm % Silt & Clay = 39.4% mm $D_{(30)} = 0.069$ mm Liquid Limit = n/a $D_{(50)} = 0.106$ Plasticity Index = n/a $D_{(60)} = 0.135$ mm Sand Equivalent = n/a mm

Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 0.64$ Coeff. of Uniformity, $C_U = 2.46$ Fineness Modulus = 1.19

Plastic Limit = n/a Moisture %, as sampled = 15.5% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						D(60) —	
						$D_{(90)} =$	
					D	ust Ratio =	39/80
				AS	STM C136, AS	TM D6913,	ASTM
		Actual	Interpolated				
		Cumulativ	e Cumulative				
Sieve	Size	Percent	Percent	Specs	Specs		
US	Metric	Passing	Passing	Max	Min		1
12.00"	300.00		100%	100.0%	0.0%		
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		
1.00"	25.00	100%	100%	100.0%	0.0%	2	
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	
5/8"	16.00		99%	100.0%	0.0%	96	
1/2"	12.50	98%	98%	100.0%	0.0%		
3/8"	9.50	95%	95%	100.0%	0.0%		
1/4"	6.30		92%	100.0%	0.0%		
#4	4.75	91%	91%	100.0%	0.0%		
#8	2.36		86%	100.0%	0.0%		
#10	2.00	85%	85%	100.0%	0.0%		
#16	1.18		84%	100.0%	0.0%		

84%

82%

81%

78%

77%

69%

65%

50%

45%

39.4%

100.0%

100.0%

100.0%

100.0%

100.0%

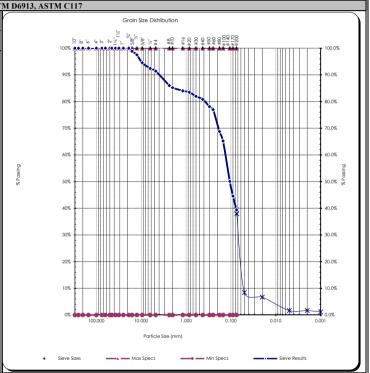
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Comments: Reviewed by: Meghan Blodgett-Carrillo



Hydrometer Report

Project:	Q.C Lower	Duwamish Wat	terway Date Recei	ved: 29-Jul-21	Unified Soils C	lassification Sy	stem, ASTM D-2487
Project #: 2	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 24-Aug-21	Sample Color		
Source:	LDW-GT36-3	3.6-6.2 ft	Tested	By: A. Eifrig	brown		
Project ##: 21B233							
AS	STM D7928	B, HYDROME	ETER ANALYSIS	S		ASTM	D6913
		-					
-		grams					•
	Client Archor QEA Date Tested 2: 24-Mg.21						
		grams		ACCREDITED			
raji sampie i i ge i	50.15	granio.		Certificate #: 1366.01			
Hydrometer							
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1			0.0537 mm		1.0"		
2	5	8.4%	0.0380 mm		3/4"	100%	19.000 mm
- 1 1 1 1							
% Gravel:	8.6%	L	iquid Limit: n/a				
/v c.m.j.	11,7,0						
					Clavs		
					Ciays		
					Colloids		
					Conords	1.270	0.001
	USDA S	oil Textural C	Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mm	į				
% Clay:		< 0.002 mm					
	TIOD 4 O		N 100 11				
	USDA S		lassification				
		Sand					
All results annly only to actual location	ne and materiale tested	As a mutual protection to	cliente the public and ourselves	all reports are submitted as the cor	fidential property of cliente	and authorization for public	ration of statements, conclusions or extracts from or
			cheris, the public and ourserves,	an reports are submitted as the con	indication property of cacatos, a	and addiorization for public	and of statements, conclusions of extracts from of
C							
Comments:							
	1 . 1	n. 1.11					
	Weigh Ell	reget and o					
Reviewed by:		0					
Terrewed by.	Manhan Dladass	. Camilla					

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1329
Sample Date:	7/26/2021
Test Date:	8/26/2021
Technician:	M. Carrillo

Sample Source: LDW-GT36-3.6-6.2 ft

Visual Soil Description: brown silty sand

Type of Specimen: Remolded Cylindrical Shear Box

Specimen Diameter (in): 2.5

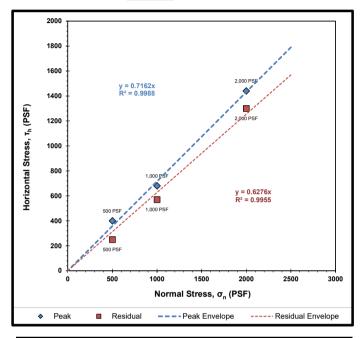
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Samp	le Data:	σ _n =500 PSF
Initial Moisture Content (%):	19.8	
	Initial	Post-Consolidation
Dry Density (PCF):	114.5	115.4
Void Ratio:	0.472	0.460
Porosity (%):	32.1	31.5
Degree of Saturation (%):	saturated	saturated

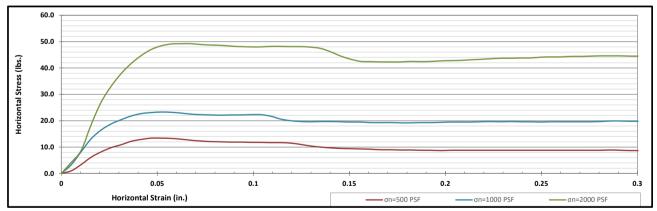
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	20.2	
	Initial	Post-Consolidation
Dry Density (PCF):	115.0	117.1
Void Ratio:	0.465	0.439
Porosity (%):	31.7	30.5
Degree of Saturation (%):	saturated	saturated

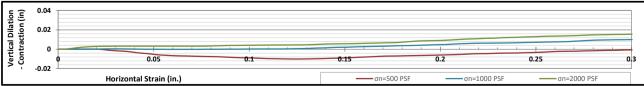
Summary of Sample	e Data:	σ _n =2000 PSF
Initial Moisture Content (%):	19.0	
	Initial	Post-Consolidation
Dry Density (PCF):	115.4	120.1
Void Ratio:	0.460	0.403
Porosity (%):	31.5	28.7
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS										
	PEAK	RESIDUAL								
Angle of Internal Friction, φ (°):	36	32								
Cohesion (PSF):	0	0								



Failure Envelope Test	Horizontal Stress, τ _h (PSF): 400 680 1440				
Normal Stress, σ _n (PSF):	500	1000	2000		
Peak Horizontal Stress, τ _h (PSF):	400	680	1440		
Residual Horizontal Stress, τ _h (PSF):	250	570	1300		





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW-GT36-6.2-9.5 ft Sample#: B21-1330

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 24-Aug-21

Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Meghan Blodgett-Carrillo

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{AS IM D43I} \\ \textbf{D}_{(5)} = 0.017 \\ \textbf{D}_{(10)} = 0.035 \\ \textbf{D}_{(15)} = 0.052 \\ \textbf{D}_{(30)} = 0.092 \\ \textbf{D}_{(50)} = 0.132 \\ \textbf{D}_{(60)} = 0.152 \\ \textbf{D}_{(90)} = 0.240 \\ \textbf{Partice} = 7/32 \\ \end{array}$ mm % Gravel = 0.0% % Sand = 78.4% mm % Silt & Clay = 21.6% mm mm Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.59$ Coeff. of Uniformity, $C_U = 4.38$ Fineness Modulus = 0.47

Plastic Limit = n/a Moisture %, as sampled = 27.5% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Du	ust Ratio =	7/32			re %, 2+ I					Fracture		Faces =
				AS	TM C136, AST	rm D6913,	ASTM C11	7									
		Actual	Interpolated						Gro	ain Size Distrib	oution						
			Cumulative														
Sieve		Percent	Percent	Specs	Specs		ь	in in thi	7 Z Z	3/8" 2/8" 4 # 4	92 92 22 23 23 33 24 25	8 8 8	88845	₹			
US	Metric	Passing	Passing	Max	Min		100%					***	* * * * *	•	-тт		T 100.0%
12.00"	300.00		100%	100.0%	0.0%							ΙN					
10.00"	250.00		100%	100.0%	0.0%							1					
8.00"	200.00		100%	100.0%	0.0%		90%						1	####			90.0%
6.00"	150.00		100%	100.0%	0.0%		ŀ										1 1
4.00"	100.00		100%	100.0%	0.0%		80%										80.0%
3.00"	75.00		100%	100.0%	0.0%		*** F										00.0%
2.50"	63.00		100%	100.0%	0.0%		1										1 1
2.00"	50.00	100%	100%	100.0%	0.0%		70%	44	\square				1	4444			70.0%
1.75"	45.00		100%	100.0%	0.0%		1						1				
1.50"	37.50		100%	100.0%	0.0%		t						11				
1.25"	31.50		100%	100.0%	0.0%		60%	+-+	++++					++++		╫╫┼	60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	9	ŀ										1 2
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing											50.0%
5/8"	16.00		100%	100.0%	0.0%	96	50%										50.0% ₈₆
1/2"	12.50	100%	100%	100.0%	0.0%		1										
3/8"	9.50	100%	100%	100.0%	0.0%		40%							ЩЦ			40.0%
1/4"	6.30		100%	100.0%	0.0%		t						1				
#4	4.75	100%	100%	100.0%	0.0%		ŀ						\				1 1
#8	2.36		100%	100.0%	0.0%		30%	+-+					1	₩₩			30.0%
#10	2.00	100%	100%	100.0%	0.0%												
#16	1.18		100%	100.0%	0.0%		-										1 1
#20	0.850	99%	99%	100.0%	0.0%		20%							mm			20.0%
#30	0.600		99%	100.0%	0.0%		1										
#40	0.425	99%	99%	100.0%	0.0%		10%						1	ШЦ		Ш	10.0%
#50	0.300		95%	100.0%	0.0%												
#60	0.250	93%	93%	100.0%	0.0%		t										1 1
#80	0.180		70%	100.0%	0.0%		0%	100.00		10.000	1.000		0.100	لمللكن	0.010	шш	0.0%
#100	0.150	59%	59%	100.0%	0.0%			100.00		10.000	1.000	,	0.100	,	0.010		0.001
#140	0.106		37%	100.0%	0.0%					Particle S	ize (mm)						
#170	0.090		29%	100.0%	0.0%												
#200	0.075	21.6%	21.6%	100.0%	0.0%		+ Sieve Size	s		Max Specs	_	• — Mir	n Specs	_	s	ieve Result	5
		hnical Services PS, 1996-9	ļ	100.070	0.070								.,				
				and ourselves, all reports are	submitted as the confide	ntial property of c	lients and authoriz	ation for n	ublication of s	tatements con	lusions or e	vtracts from	m or regard	ling our p	enorts is res	erved pend	ing our written and

Reviewed by: _



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW-GT36-11.7-32 ft Sample#: B21-1332

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 24-Aug-21 Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SP-SM, Poorly graded Sand with Silt

Sample Color:

mm

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{c} \textbf{ASIM D431} \\ D_{(5)} = 0.053 \\ D_{(10)} = 0.129 \\ D_{(15)} = 0.186 \\ D_{(30)} = 0.285 \\ D_{(50)} = 0.368 \\ D_{(60)} = 0.410 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.738 \\ D_{(15)} = 0.053 \\ D_{(15)} = 0.129 \\ D_{(15)} =$ mm % Gravel = 0.0% % Sand = 92.9% mm % Silt & Clay = 7.1% mm mm Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a $D_{(90)} = 0.738$

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.53$ Coeff. of Uniformity, $C_U = 3.18$ Fineness Modulus = 1.77 Plastic Limit = n/a Moisture %, as sampled = 15.7%

Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

							1/9		Fracture	%, 2+ F	aces = n	/a	Req	'd Fractu	ıre %, 2	+ Faces =	
				AS	TM C136, AS	TM D6913,	ASTM C11	7									
		Actual	Interpolated						Grain	Size Distribu	rtion						
			Cumulative		1				=_								
Sieve		Percent	Percent	Specs	Specs		ь	. !	58.7.7.8	90 :• 4	2 2 2	3 5 8 8 8	8558				
US	Metric	Passing	Passing	Max	Min		100%	******		entre en la companya de la companya		* * * * * *	****	г т т		T 10	00.0%
12.00"	300.00		100%	100.0%	0.0%						1					1 1	
10.00"	250.00		100%	100.0%	0.0%		ļ.										
8.00"	200.00		100%	100.0%	0.0%		90%								-	90	0.0%
6.00"	150.00		100%	100.0%	0.0%		ŀ									1 1	
4.00"	100.00		100%	100.0%	0.0%		80%									1 1	0.0%
3.00"	75.00		100%	100.0%	0.0%		°0% T									T T °	U.U%
2.50"	63.00		100%	100.0%	0.0%							N				1	
2.00"	50.00	100%	100%	100.0%	0.0%		70%	1				+++			шш	70	0.0%
1.75"	45.00		100%	100.0%	0.0%							 				1	
1.50"	37.50		100%	100.0%	0.0%							1					
1.25"	31.50		100%	100.0%	0.0%		60%					HHH					0.0%
1.00"	25.00	100%	100%	100.0%	0.0%	0	ł									1 1	ē.
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing										1 1	0.0%
5/8"	16.00		100%	100.0%	0.0%	96	50%									1 50	0.0% 80
1/2"	12.50	100%	100%	100.0%	0.0%											11	
3/8"	9.50	100%	100%	100.0%	0.0%		40%									40	0.0%
1/4"	6.30		100%	100.0%	0.0%												
#4	4.75	100%	100%	100.0%	0.0%												
#8	2.36		100%	100.0%	0.0%		30%									30	0.0%
#10	2.00	100%	100%	100.0%	0.0%		ł									1 1	
#16	1.18		100%	100.0%	0.0%		20%					1 1				1 1	0.0%
#20	0.850	99%	99%	100.0%	0.0%		20%					III V				1 20	U.U%
#30	0.600		78%	100.0%	0.0%											1 1	
#40	0.425	64%	64%	100.0%	0.0%		10%						N. III			10	0.0%
#50	0.300		34%	100.0%	0.0%								**				
#60	0.250	22%	22%	100.0%	0.0%												
#80	0.180		14%	100.0%	0.0%		0%	100.000	4000000	0.000	1.000) (0.100		111111111 010	0.001	.0%
#100	0.150	11%	11%	100.0%	0.0%			.00.000			1.000			0.1		0.001	
#140	0.106		9%	100.0%	0.0%					Particle Siz	e (mm)						
#170	0.090		8%	100.0%	0.0%												
#200	0.075	7.1%	7.1%	100.0%	0.0%		+ Sieve Size:		Mo	ax Specs	_	- Min Sp	ecs		Sieve Resu	ilts	
Copyright	Spears Engineering & Tecl	hnical Services PS, 1996-9	8														

Comments: Reviewed by:

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C Lower Duw Project #: 21B233 Client: Anchor QEA Source: LDW-GT36-32-34 Sample #: B21-1333	·	sual Identific nd with Silt mple Color own	ation			
	Liquid Lim	it Determination				
	#1	#2 #3	#4	#5	#6	
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:	Liquid L	mit cannot be established				
Weight of Pan: Weight of Dry Soils:						Liquid Limit @ 25 Blows: N/A
Weight of Moisture:						Plastic Limit: N/A
% Moisture:						Plasticity Index, I _P : N/A
Number of Blows:						
	Plastic Lim	it Determination				
	#1	#2 #3	#4	#5	#6	
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan: Weight of Pan:	Plastic L	imit cannot be determined				
Weight of Dry Soils:						ACCREDITED
Weight of Moisture: % Moisture:						Certificate #: 1366.01, 1366.02 & 1366.04
70 Moisture.						
70.0/	Plast	icity Chart)	Liquid Limit
70 %						100% E
60 %			"U" Line			90%
50 %			W all	wall Likite		80%
			HorOH			g 70%
40 %			Y			18 60%
40 % Jasticity Index						wo 50%
asti	OL					40%
20 %	ClorOt		MH or OH			30%
10 %						20%
CL-ML	ML or OL					10%
0% 10%	20% 30% 40%	50% 60% 7	0% 80%	90% 100%	110%	0% 100 100
l	Lic	uid Limit				Number of Blows, "N"
Copyright Spears Engineering & Techn						publication of statements, conclusions or extracts from or regarding our

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW-GT36-34.7-50 ft Sample#: B21-1334

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 24-Aug-21 Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SP-SM, Poorly graded Sand with Silt

Sample Color: grayish-brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{c} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.058 \\ \textbf{D}_{(10)} = 0.096 \\ \textbf{D}_{(15)} = 0.126 \\ \textbf{D}_{(30)} = 0.177 \\ \textbf{D}_{(50)} = 0.226 \\ \textbf{D}_{(60)} = 0.251 \\ \textbf{D}_{(90)} = 0.441 \\ \textbf{Patic} = -6/83 \end{array}$ mm % Gravel = 0.0% % Sand = 93.5% mm % Silt & Clay = 6.5% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.30$ Coeff. of Uniformity, $C_U = 2.62$ Fineness Modulus = 1.19

Plastic Limit = n/a Moisture %, as sampled = 23.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Du	ust Ratio =	6/83		ure %, 2+ I				d Fracture	e %, 2+ I	
				AS	TM C136, AST	ГМ D6913, A	STM C117								
		Actual	Interpolated					G	rain Size Distrib	ution					
		Cumulative	Cumulative												
Sieve		Percent	Percent	Specs	Specs		ا ما ا	2 4 % 4 ° ° '' '' '' '' '' '' '' '' '' '' '' ''	95 90 1* 4	2 2 2	3 4 23 3 3	88 58			
US	Metric	Passing	Passing	Max	Min		100%				 - 	####	т-т		T 100.0%
12.00"	300.00		100%	100.0%	0.0%					N					- 1
10.00"	250.00		100%	100.0%	0.0%						NII				- 1
8.00"	200.00		100%	100.0%	0.0%		90%						++		90.0%
6.00"	150.00		100%	100.0%	0.0%		ł I								1
4.00"	100.00		100%	100.0%	0.0%		80%								80.0%
3.00"	75.00		100%	100.0%	0.0%		80% FT								00.0%
2.50"	63.00		100%	100.0%	0.0%										- 1
2.00"	50.00	100%	100%	100.0%	0.0%		70%				!!!!		4-44		70.0%
1.75"	45.00		100%	100.0%	0.0%						i				- 1
1.50"	37.50		100%	100.0%	0.0%										1
1.25"	31.50		100%	100.0%	0.0%		60%						+	+++++	60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	2	H				 				2
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing									50.0% be
5/8"	16.00		100%	100.0%	0.0%	96	50%								50.0% be
1/2"	12.50	100%	100%	100.0%	0.0%										- 1
3/8"	9.50	100%	100%	100.0%	0.0%		40%						4		40.0%
1/4"	6.30		100%	100.0%	0.0%		11								1
#4	4.75	100%	100%	100.0%	0.0%		ł I								1
#8	2.36		100%	100.0%	0.0%		30%						+	++++	30.0%
#10	2.00	100%	100%	100.0%	0.0%		- I								- }
#16	1.18		100%	100.0%	0.0%							\			1
#20	0.850	100%	100%	100.0%	0.0%		20%					1			20.0%
#30	0.600		94%	100.0%	0.0%							\			- 1
#40	0.425	90%	90%	100.0%	0.0%		10%					1			10.0%
#50	0.300		68%	100.0%	0.0%		1 1					N.			1
#60	0.250	60%	60%	100.0%	0.0%		11								1
#80	0.180		31%	100.0%	0.0%		0%	100.000	10.000	1.000) 	0.100	0.010		0.0%
#100	0.150	19%	19%	100.0%	0.0%			100.000	10.000	1.000		0.100	0.010		0.001
#140	0.106		12%	100.0%	0.0%				Particle S	ze (mm)					
#170	0.090		9%	100.0%	0.0%										
#200	0.075	6.5%	6.5%	100.0%	0.0%		Sieve Sizes		Max Specs	_	— Min Sp	oecs .		sieve Results	
		hnical Services PS, 1996-9	ļ	100.070	0.070				,						
				and ourselves, all reports are	submitted as the confide	ntial property of clie	ents, and authorizatio	n for publication of	statements, cond	lusions or extr	acts from o	r regarding ou	r reports is res	erved pendin	g our written app

Reviewed by: _

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Sar	Client: Anchor QEA Source: LDW-GT-36-50.5-61. mple #: B21-1335	5 ft		Sampled By: Date Tested: Tested By:	25-Aug-21		Silty Clay Sample Color brown	
		Liquid I	imit Determinat	ion				
		#1	#2	#3	#4	#5	#6	
	Weight of Wet Soils + Pan:	29.50	30.28	27.77				
	Weight of Dry Soils + Pan:	26.95	27.50	24.20				
	Weight of Pan: Weight of Dry Soils:	19.61	19.98 7.52	14.98 9.22				Liquid Limit @ 25 Blows: 36 %
	Weight of Moisture:	7.34 2.55	2.78	3.57				Plastic Limit: 25 %
	% Moisture:	34.7 %	37.0 %	38.7 %				Plasticity Index, I _P : 11 %
	Number of Blows:	30	21	11				
		Plactic I	.imit Determinat	ion				
		#1	#2	#3	#4	#5	#6	
	Weight of Wet Soils + Pan:	34.74	35.86					
	Weight of Dry Soils + Pan:	33.48	34.32					
	Weight of Pan:	28.53	28.24					
	Weight of Dry Soils:	4.95	6.08					ACCREDITED
	Weight of Moisture:	1.26	1.54					Certificate #: 1366.01, 1366.02 & 1366.04
	% Moisture:	25.5 %	25.3 %					
	70 % 60 %	Pla	asticity Chart	, iti	Tine	MAN LINE		Liquid Limit 45% 40% 35%
			/ /	CH	or OH			<u>e</u> 30%
	40 %			<u> </u>				en 30%
	30 % -							%
		at.		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8				S [®] 20% ±
	20 %	CLorot	$\overline{}$	N 4	H or OH			15%
	10 %	\C		IVI	H or UH			10%
	CL-ML	ML or OL						5%
	0 % 10% 20%	-	50% 6	0% 70%	80%	90%	100% 110%	0%
	0% 10% 20%		Liquid Limit	076 7076	00%	90%	100% 110%	10 100 Number of Blows, "N"
	Copyright Spears Engineering & Technical S	ervices PS 1996-98						Number of Biows, 14
ults ap	oply only to actual locations and materials test		nts, the public and oursely	es, all reports are sub	mitted as the confiden	tial property of c	lients, and authorization for J	publication of statements, conclusions or extracts from or regarding
is res	served pending our written approval.							
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Client:	Anchor QEA	Date:	September 29, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-1447 - 1466
Revised on:		Date sampled:	7-8-21 & 7-9-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: August 31, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moistur
B21-1447	LDW21-GT21-GB-31-32.5 ft	222.3	700.9	590.1	110.8	367.8	30.1%
B21-1448	LDW21-GT12-GB-0-1.5 ft	208.8	636.4	466.8	169.6	258.0	65.7%
B21-1449	LDW21-GT12-GB-0-12 ft	224.0	851.3	609.9	241.4	385.9	62.6%
B21-1450	LDW21-GT12-GB-12-13.5 ft	233.8	567.3	458.5	108.8	224.7	48.4%
B21-1451	LDW21-GT12-GB-18-22 ft	222.9	780.0	643.4	136.6	420.5	32.5%
B21-1452	LDW21-GT12-GB-22-23.5 ft	229.4	723.2	606.3	116.9	376.9	31.0%
B21-1453	LDW21-GT11-GB-0-1.5 ft	221.8	617.6	440.0	177.6	218.2	81.4%
B21-1454	LDW21-GT11-GB-0-8.5 ft	233.8	686.2	473.2	213.0	239.4	89.0%
B21-1455	LDW21-GT11-GB-8.5-10 ft	224.8	616.6	455.4	161.2	230.6	69.9%
B21-1456	LDW21-GT11-GB-8.5-16.7 ft	182.3	495.3	374.9	120.4	192.6	62.5%
B21-1457	LDW21-GT11-GB-16.7-18.5 ft	186.7	993.2	821.5	171.7	634.8	27.0%
B21-1458	LDW21-GT11-GB-18.5-20 ft	220.1	643.5	566.8	76.7	346.7	22.1%
B21-1459	LDW21-GT9-GB-0-1.5 ft	221.4	388.1	331.3	56.8	109.9	51.7%
B21-1460	LDW21-GT9-GB-10-11.5 ft	225.6	534.4	429.8	104.6	204.2	51.2%
B21-1461	LDW21-GT9-GB -16-20 ft	225.7	665.4	521.2	144.2	295.5	48.8%
B21-1462	LDW21-GT9-GB-20-21.5 ft	235.5	299.4	285.9	13.5	50.4	26.8%
B21-1463	LDW21-GT7-GB-0-1.5 ft	301.1	545.2	480.4	64.8	179.3	36.1%
B21-1464	LDW21-GT7-GB-0-5.7 ft	182.9	988.2	806.6	181.6	623.7	29.1%
B21-1465	LDW21-GT7-GB-8.5-10 ft	217.2	591.3	504.5	86.8	287.3	30.2%
B21-1466	LDW21-GT7-GB-8.5-18.5 ft	233.4	693.2	578.2	115.0	344.8	33.4%
	Ì						
		\					<u> </u>

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	_
Date Received: July 29, 2021	Sampled by: Client
Date Tested: August 31, 2021	Tested by: A. Eifrig

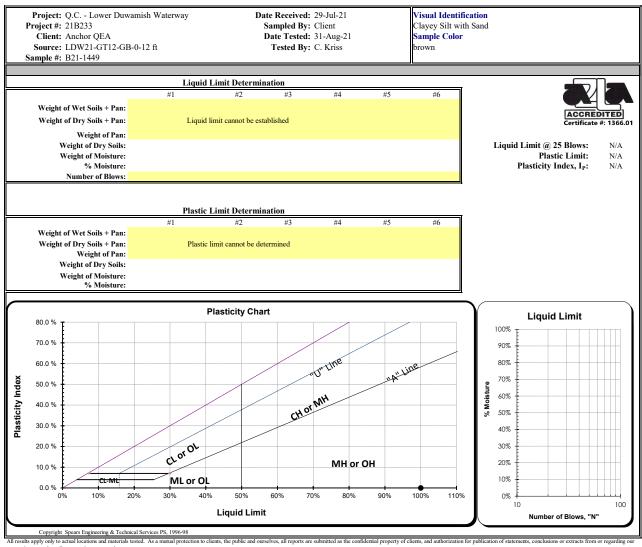
Sample # B21-1449	Location LDW21-GT12-GB-0-12 ft	Tare 493.02	Dry Soil + Tare 545.53	Mass of Dry Soil 52.5	Pycno ID TSA-012	Mass of Pycno 180.4	Volume of Pycno 499.5	Density of Water @ Tx 0.99749	w/ water &	Mass of Pycno filled w/ water 709.46	Water, 0.1 *C	SpG of Soils	Factor	Corrected SpG 2.6275773
B21-1451	LDW21-GT12-GB-18-22 ft	497.56	597.70	100.1	TSA-023	163.9	498.7	0.99749	723.96	661.41	23.2	2.6641366	0.99929	2.6622451
B21-1459	LDW21-GT9-GB-0-1.5 ft	601.92	676.89	75.0	TSA-015	187.6	499.5	0.99749	732.66	685.85	23.2	2.6626339	0.99929	2.6607434
B21-1461	LDW21-GT7-GB-0-5.7 ft	502.15	601.95	99.8	TSA-021	183.4	499.4	0.99749	744.55	681.58	23.2	2.7100064	0.99929	2.7080823
		1						 	 					
		 												
		 								 				
		1						1	1	1				
		1						1	1	1				
		1						1	1	1				

I results apply only to actual locations and materials tested	d. As a mutual protection to clients, the public and ourselves, all r	eports are submitted as the confidential property of clients, and author	rization for publication of statements, conclusions or extracts from or rega-	rding our reports is reserved pending our written approval.
May 1 DB Bath a	2.1/2			

Reviewed by:

Meghan Blodgett-Carrillo





ut results apply only to actual locations and materians tested. As a mutual protection to clients, the punic and ourserves, an reports are summitted as the contineernal property of clients, and authorization for punication of statements, conclusions or extracts from or regarding our

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT12-GB-18-22 ft Sample#: B21-1451

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 31-Aug-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color: brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.010 \\ D_{(10)} = 0.035 \\ D_{(15)} = 0.062 \\ D_{(30)} = 0.115 \\ D_{(50)} = 0.188 \\ D_{(60)} = 0.222 \\ D_{(90)} = 0.417 \\ Dust Ratio = 7/33 \\ \end{array}$ % Gravel = 0.2% % Sand = 80.4% mm % Silt & Clay = 19.3% mm Liquid Limit = 0.0% mm Plasticity Index = 0.0% mm

mm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.73$ Coeff. of Uniformity, $C_U = 6.41$ Fineness Modulus = 0.95

Plastic Limit = 0.0% Moisture %, as sampled = 32.5% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						Oust Ratio = 7/33 Fracture %, 2+ Faces = n/a Req'd Fracture %, 2+ Faces =
ASTM C136, ASTM D6913, ASTM C117 Actual Interpolated						
			Cumulative			Grain Size Distribution
Sieve	Sizo	Percent	Percent	Specs	Specs	-
US	Metric	Passing	Passing	Max	Min	5 9 9 4 9 5 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
12.00"	300.00	1 assing	100%	100.0%	0.0%	100%
10.00"	250.00		100%	100.0%	0.0%	
8.00"	200.00		100%	100.0%	0.0%	90%
6.00"	150.00		100%	100.0%	0.0%	
4.00"	100.00		100%	100.0%	0.0%	
3.00"	75.00		100%	100.0%	0.0%	80%
2.50"	63.00		100%	100.0%	0.0%	
2.00"	50.00	100%	100%	100.0%	0.0%	70.0%
1.75"	45.00	10070	100%	100.0%	0.0%	70%
1.50"	37.50		100%	100.0%	0.0%	[
1.25"	31.50		100%	100.0%	0.0%	60%
1.00"	25.00	100%	100%	100.0%	0.0%	
3/4"	19.00	100%	100%	100.0%	0.0%	0
5/8"	16.00	10070	100%	100.0%	0.0%	\$0.0% be
1/2"	12.50	100%	100%	100.0%	0.0%	
3/8"	9.50	100%	100%	100.0%	0.0%	40.0%
1/4"	6.30	10070	100%	100.0%	0.0%	40.0
#4	4.75	100%	100%	100.0%	0.0%	
#8	2.36	10070	99%	100.0%	0.0%	30%
#10	2.00	99%	99%	100.0%	0.0%	
#16	1.18	,,,,	98%	100.0%	0.0%	
#20	0.850	98%	98%	100.0%	0.0%	20%
#30	0.600		94%	100.0%	0.0%	
#40	0.425	91%	91%	100.0%	0.0%	10%
#50	0.300		75%	100.0%	0.0%	
#60	0.250	68%	68%	100.0%	0.0%	
#80	0.180		48%	100.0%	0.0%	0% ded = 4444ded de 4444ded = 4444ded de 4444ded = 4444d
#100	0.150	39%	39%	100.0%	0.0%	100.000 1.000 0.100 0.010 0.001
#140	0.106		28%	100.0%	0.0%	Particle Size (mm)
#170	0.090		23%	100.0%	0.0%	
#200	0.075	19.3%	19.3%	100.0%	0.0%	+ Sieve Sizes — Max Specs — Min Specs — Sieve Results
		hnical Services PS, 1996-9		100.070	0.070	

Reviewed by:



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soil Classification System, ASTM-2487 Project #: 21B233 Sampled By: Client SM, Silty Sand Client: Anchor QEA Date Tested: 31-Aug-21 Sample Color Source: LDW21-GT12-GB-18-22 ft Tested By: C. Kriss brown Sample#: B21-1451 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp Gr: Sieve Analysis 2.66 Sample Weight: 102.98 **Grain Size Distribution** Hydroscopic Moist.: 1.38% Soils Particle Sieve Percent ACCREDITED Passing Adj. Sample Wgt: 101.58 grams Size Diameter 75.000 mm 3.0" 100% 2.0" 100% 50.000 mm Hydrometer Soils Particle 37.500 mm 1.5" 100% Reading Corrected Percent 1.25" 31.500 mm 100% Minutes Reading **Passing** Diameter 0.0516 mm 100% 25.000 mm 11.7% 1.0" 0.0370 mm 10.3% 3/4" 10.5 100% 19.000 mm 0.0235 mm 5 9 8.8% 5/8" 100% 16.000 mm 15 6.5 6.3% $0.0138\ mm$ 1/2" 100% 12.500 mm 30 5 4 9% $0.0098\ mm$ 3/8" 100% 9.500 mm 60 3.5 3.4% $0.0070\ mm$ 1/4" 100% 6.300 mm 240 1.5 1.5% $0.0035 \ mm$ #4 100% 4.750 mm 1440 1.0% $0.0014\ mm$ #10 99% 2.000 mm 0.850 mm #20 98% % Gravel: 0.2% Liquid Limit: 0.0 % #40 0.425 mm % Sand: 80.4% Plastic Limit: 0.0 % #100 39% 0.150 mm % Silt: 17.1% Plasticity Index: 0.0 % #200 19.3% 0.075 mm 0.074 mm % Clay: 2.3% Silts 19.0% 0.050 mm 11.7% 7.9% 0.020 mm 2.3% 0.005 mm Clavs 0.002 mm 1.1% Colloids 0.7% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: % Silt: 0.05 - 0.002 mm < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding **Comments:**

Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1451
Sample Date:	7/8/2021
Test Date:	8/23/2021
Technician:	M. Carrillo

| Sample Source: LDW21-GT12-GB-18-22 ft |
| Visual Soil Description: brown clayey silt |
| Type of Specimen: Remolded Cylindrical Shear Box |
| Specimen Diameter (in): 2.5

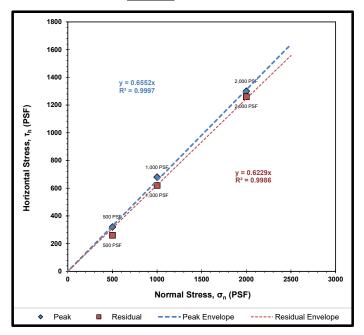
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	σ _n =500 PSF	
Initial Moisture Content (%):	34.3	
	Initial	Post-Consolidation
Dry Density (PCF):	104.7	112.4
Void Ratio:	0.609	0.499
Porosity (%):	37.9	33.3
Degree of Saturation (%):	saturated	saturated

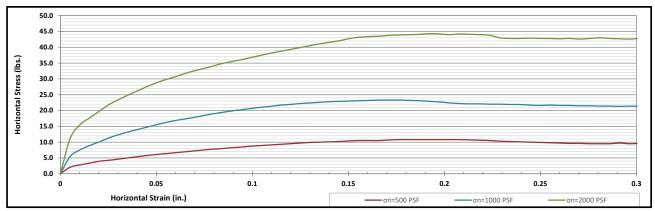
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	32.5	
	Initial	Post-Consolidation
Dry Density (PCF):	106.6	117.5
Void Ratio:	0.580	0.433
Porosity (%):	36.7	30.2
Degree of Saturation (%):	saturated	saturated

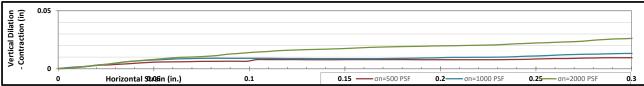
Summary of Sample	Data:	σ _n =2000 PSF
Initial Moisture Content (%):	34.7	
	Initial	Post-Consolidation
Dry Density (PCF):	104.7	119.6
Void Ratio:	0.609	0.409
Porosity (%):	37.8	29.0
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS				
	PEAK	RESIDUAL		
Angle of Internal Friction, φ (°):	33	32		
Cohesion (PSF):	0	0		



Failure Envelope Test Values:				
Normal Stress, σ _n (PSF):	500	1000	2000	
Peak Horizontal Stress, τ _h (PSF):	320	680	1300	
Residual Horizontal Stress, τ _h (PSF):	260	620	1260	





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT11-GB-0-8.5 ft Sample#: B21-1454

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 31-Aug-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

ML, Sandy Silt Sample Color:

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

0.180

0.150

0.106

0.090

0.075

Meghan Blodgett-Carrillo

#80 #100

#140

#170

#200

Sample Meets Specs? N/A

 $D_{(5)} = 0.004$ $D_{(10)} = 0.007$ $D_{(15)} = 0.010$ % Gravel = 0.0%% Sand = 31.3% mm % Silt & Clay = 68.7% mm $D_{(30)} = 0.041$ Liquid Limit = 40.6% mm $D_{(50)} = 0.063$ Plasticity Index = 0.0% $D_{(60)} = 0.069$ $D_{(90)} = 0.146$ mm Sand Equivalent = n/a mm

Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 3.47$ Coeff. of Uniformity, $C_U = 9.80$ Fineness Modulus = 0.14 Plastic Limit = 0.0%

Moisture %, as sampled = 89.0% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face = Reg'd Fracture %, 2+ Faces =

						$D_{(90)}$ -	
						ust Ratio =	
			I+	AS	STM C136, AS	ГМ D6913,	ASTM C
		Actual	Interpolated			r	
		_	Cumulative			_	
Sieve		Percent	Percent	Specs	Specs		
US	Metric	Passing	Passing	Max	Min	4	100%
12.00"	300.00		100%	100.0%	0.0%		
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		90%
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		80%
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		70%
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		60%
1.00"	25.00	100%	100%	100.0%	0.0%	g E	
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%
5/8"	16.00		100%	100.0%	0.0%	96	50%
1/2"	12.50	100%	100%	100.0%	0.0%		
3/8"	9.50	100%	100%	100.0%	0.0%		40%
1/4"	6.30		100%	100.0%	0.0%		
#4	4.75	100%	100%	100.0%	0.0%		
#8	2.36		100%	100.0%	0.0%		30%
#10	2.00	100%	100%	100.0%	0.0%		
#16	1.18		99%	100.0%	0.0%		20%
#20	0.850	99%	99%	100.0%	0.0%		20/0
#30	0.600		98%	100.0%	0.0%		
#40	0.425	98%	98%	100.0%	0.0%		109
#50	0.300		97%	100.0%	0.0%		
#60	0.250	96%	96%	100.0%	0.0%		

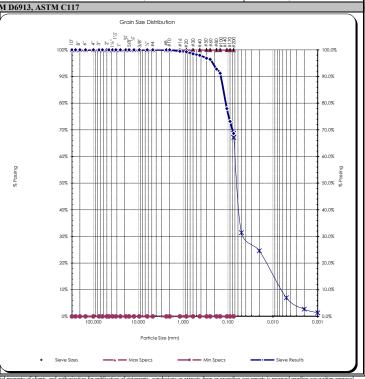
93%

91%

78%

73%

68.7%



0.0%

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Comments: Reviewed by: _

100.0%

100.0%

100.0%

100.0%

100.0%



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soil Classification System, ASTM-2487 Project #: 21B233 Sampled By: Client ML, Sandy Silt Client: Anchor QEA Date Tested: 31-Aug-21 Sample Color Source: LDW21-GT11-GB-0-8.5 ft Tested By: C. Kriss brown Sample#: B21-1454 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: Sieve Analysis 2.65 53.60 Sample Weight: **Grain Size Distribution** Hydroscopic Moist.: 4.63% Soils Particle Sieve Percent 51.23 Passing Adj. Sample Wgt: grams Size Diameter 75.000 mm 3.0" 100% 2.0" 100% 50.000 mm Hydrometer Soils Particle 37.500 mm 1.5" 100% Reading Corrected Percent 1.25" 31.500 mm 100% Minutes Reading **Passing** Diameter 0.0505 mm 100% 25.000 mm 31.2% 1.0" 29.3% 0.0359 mm 3/4" 15 100% 19.000 mm 5 14 27.3% $0.0228\ mm$ 5/8" 100% 16.000 mm 15 9.5 18.5% $0.0136\ mm$ 1/2" 100% 12.500 mm 30 7.5 14.6% $0.0097\ mm$ 3/8" 100% 9.500 mm 60 5 9.8% $0.0069\ mm$ 1/4" 100% 6.300 mm 240 2.5 4.9% $0.0035 \ mm$ #4 100% 4.750 mm 1440 2.0% $0.0014\ mm$ #10 100% 2.000 mm 0.850 mm #20 99% % Gravel: 0.0% Liquid Limit: 40.6 % #40 98% 0.425 mm % Sand: 31.3% Plastic Limit: 0.0 % #100 91% 0.150 mm % Silt: 61.7% Plasticity Index: 0.0 % #200 68.7% 0.075 mm 0.074 mm % Clay: Silts 67.1% 0.050 mm 31.4% 24.6% 0.020 mm 7.0% 0.005 mm Clavs 2.7% 0.002 mm Colloids 1.4% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: % Silt: 0.05 - 0.002 mm < 0.002 mm % Clay: **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding Comments:

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Reviewed by:



Unified Soils Classification System, ASTM D-2487 Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Project #: 21B233 Sampled By: Client ML, Sandy Silt Client: Anchor QEA Date Tested: 31-Aug-21 Sample Color Source: LDW21-GT11-GB-0-8.5 ft Tested By: C. Kriss brown Sample #: B21-1454 **Liquid Limit Determination** Weight of Wet Soils + Pan: 32.18 28.53 30.48 27.32 Weight of Dry Soils + Pan: 28.57 24.52 15.03 Weight of Pan: 19.55 19.88 Liquid Limit @ 25 Blows: Weight of Dry Soils: 9.02 9 49 7 44 Weight of Moisture: Plastic Limit: 3.61 4.01 3.16 N/A % Moisture: Plasticity Index, I_P: 40.0 % 42.3 % 42.5 % N/A Number of Blows: Weight of Wet Soils + Pan: Plastic limit cannot be determined Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 40.0 % 50% 30.0 % CLOrOL MH or OH 20% 10.0 % 10% ML or OL 0.0 % 100% 10 100 **Liquid Limit**

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Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling.

Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1454
Sample Date:	7/8/2021
Test Date:	8/26/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT11-GB-0-8.5 ft

 Visual Soil Description:
 brown silty clay

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

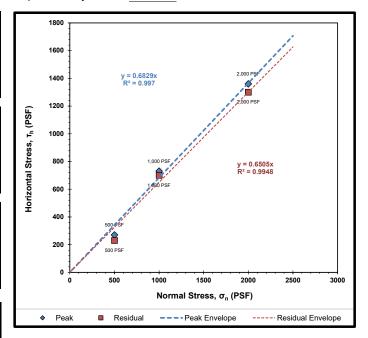
Specimen Height (in): 1
Rate of Strain (in/min): 0.0042
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	Data:	σ _n =500 PSF
Initial Moisture Content (%):	58.2	
	Initial	Post-Consolidation
Dry Density (PCF):	76.6	86.1
Void Ratio:	1.201	0.957
Porosity (%):	54.6	48.9
Degree of Saturation (%):	saturated	saturated

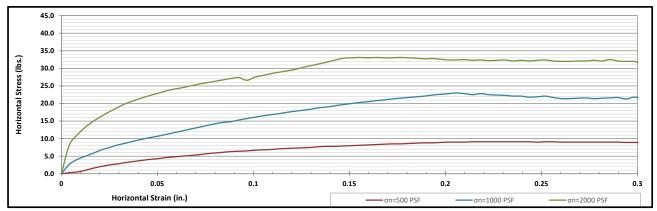
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	54.1	
	Initial	Post-Consolidation
Dry Density (PCF):	78.1	94.3
Void Ratio:	1.157	0.786
Porosity (%):	53.6	44.0
Degree of Saturation (%):	saturated	saturated

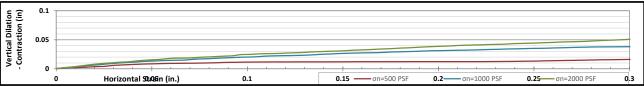
Summary of Sample	σ _n =2000 PSF	
Initial Moisture Content (%):	57.2	
	Initial	Post-Consolidation
Dry Density (PCF):	78.4	103.4
Void Ratio:	1.149	0.630
Porosity (%):	53.5	38.6
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS				
	PEAK	RESIDUAL		
Angle of Internal Friction, φ (°):	34	33		
Cohesion (PSF):	0	0		



Failure Envelope Test Values:				
Normal Stress, σ _n (PSF):	500	1000	2000	
Peak Horizontal Stress, τ _h (PSF):	270	730	1360	
Residual Horizontal Stress, τ _h (PSF):	230	700	1300	





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Visual Identification Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Project #: 21B233 Sampled By: Client Clayey Silt Client: Anchor QEA Date Tested: 31-Aug-21 Sample Color Source: LDW21-GT11-GB-8.5-16.7 ft Tested By: C. Kriss brown Sample #: B21-1456 **Liquid Limit Determination** Weight of Wet Soils + Pan: 33.23 29.16 29.46 25.20 Weight of Dry Soils + Pan: 29.57 25.24 Weight of Pan: 19.86 15.05 14.81 Liquid Limit @ 25 Blows: Weight of Dry Soils: 9 71 10.15 10.43 38 % Weight of Moisture: Plastic Limit: 3.66 3.96 4.22 N/A % Moisture: 40.5 % Plasticity Index, I_P: 37.7 % 39.0 % N/A Number of Blows: Weight of Wet Soils + Pan: Plastic limit cannot be determined Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 40.0 % 50% 30.0 % CLOrOL MH or OH 20% 10.0 % 10% ML or OL 0.0 % 90% 100% 10 100 **Liquid Limit**

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Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#100

#140

#170

#200

0.150

0.106

0.090

0.075

Source: LDW21-GT11-GB-16.7-18.5 ft Sample#: B21-1457

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 31-Aug-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

 $D_{(5)} = 0.019$ $D_{(10)} = 0.038$ $D_{(15)} = 0.057$ $D_{(30)} = 0.126$ % Gravel = 0.0%% Sand = 80.2% mm % Silt & Clay = 19.8% mm Liquid Limit = 0.0% mm $D_{(50)} = 0.220$ Plasticity Index = 0.0% $D_{(60)} = 0.279$ $D_{(90)} = 0.733$ Dust Ratio = 23/90 mm Sand Equivalent = n/a mm

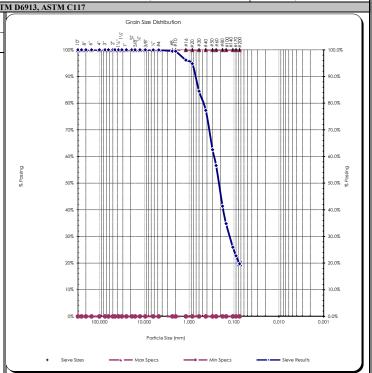
Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.50$ Coeff. of Uniformity, $C_U = 7.34$ Fineness Modulus = 1.22

Plastic Limit = 0.0% Moisture %, as sampled = 27.0% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

Reg'd Fracture %, 2+ Faces =

				AS	TM C136, AST	
		Actual	Interpolated			
	Cumulative Cumulative					
Sieve	Sieve Size		Percent	Specs	Specs	
US	Metric	Passing	Passing	Max	Min	
12.00"	300.00		100%	100.0%	0.0%	
10.00"	250.00		100%	100.0%	0.0%	
8.00"	200.00		100%	100.0%	0.0%	
6.00"	150.00		100%	100.0%	0.0%	
4.00"	100.00		100%	100.0%	0.0%	
3.00"	75.00		100%	100.0%	0.0%	
2.50"	63.00		100%	100.0%	0.0%	
2.00"	50.00	100%	100%	100.0%	0.0%	
1.75"	45.00		100%	100.0%	0.0%	
1.50"	37.50		100%	100.0%	0.0%	
1.25"	31.50		100%	100.0%	0.0%	
1.00"	25.00	100%	100%	100.0%	0.0%	
3/4"	19.00	100%	100%	100.0%	0.0%	
5/8"	16.00		100%	100.0%	0.0%	
1/2"	12.50	100%	100%	100.0%	0.0%	
3/8"	9.50	100%	100%	100.0%	0.0%	
1/4"	6.30		100%	100.0%	0.0%	
#4	4.75	100%	100%	100.0%	0.0%	
#8	2.36		100%	100.0%	0.0%	
#10	2.00	99%	99%	100.0%	0.0%	
#16	1.18		96%	100.0%	0.0%	
#20	0.850	95%	95%	100.0%	0.0%	
#30	0.600		85%	100.0%	0.0%	
#40	0.425	77%	77%	100.0%	0.0%	
#50	0.300		63%	100.0%	0.0%	
#60	0.250	57%	57%	100.0%	0.0%	
#80	0.180		41%	100.0%	0.0%	



0.0%

0.0%

0.0%

0.0%

Comments: Reviewed by: Meghan Blodgett-Carrillo

35%

26%

23%

19.8%

100.0%

100.0%

100.0%

100.0%

35%

19.8%



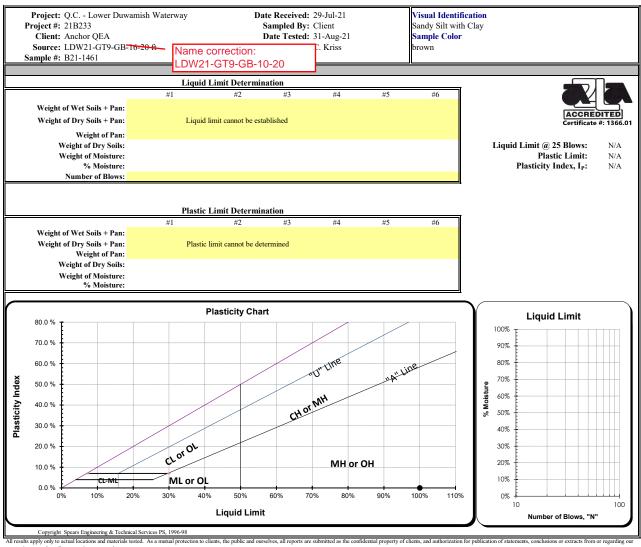
Visual Identification Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Project #: 21B233 Sampled By: Client Sandy Silt Client: Anchor QEA Date Tested: 31-Aug-21 Sample Color Source: LDW21-GT9-GB-0-1.5 ft Tested By: C. Kriss brown Sample #: B21-1459 **Liquid Limit Determination** Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Liquid limit cannot be established Weight of Pan: Liquid Limit @ 25 Blows: Weight of Dry Soils: N/A Weight of Moisture: Plastic Limit: N/A % Moisture: Plasticity Index, I_P: N/A Number of Blows: Weight of Wet Soils + Pan: Plastic limit cannot be determined Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 40.0 % 50% 30.0 % CLOrOL 20.0 % MH or OH 20% 10.0 % 10% ML or OL 0.0 % 100% 10 100 **Liquid Limit** Copyright Spears Engineering & Technical Services PS, 1996-98
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Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:





clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statem

Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic

Reviewed by: Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT9-GB-20-21.5 ft

Sample#: B21-1462

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 31-Aug-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



30.0%

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.006$ $D_{(10)} = 0.010$ $D_{(15)} = 0.019$ $D_{(30)} = 0.058$ % Gravel = 1.6% % Sand = 55.5% mm % Silt & Clay = 43.0% mm Liquid Limit = n/a mm $D_{(50)} = 0.108$ $D_{(60)} = 0.159$ $D_{(90)} = 1.026$ mm Plasticity Index = n/a mm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 2.18$ Coeff. of Uniformity, $C_U = 16.63$ Fineness Modulus = 0.99

Plastic Limit = n/a Moisture %, as sampled = 26.8% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face = eq'd Fracture %, 2+ Faces =

					D	ust Ratio = 38/73	Frac	ture %, 2+ Fac	es = n/a		eq'd Fr
				AS	TM C136, AS	ГМ D6913, ASTM C1	117				
		Actual Cumulative	Interpolated Cumulative					Grain Size Distribution	on		
Sieve US	Size Metric	Percent Passing	Percent Passing	Specs Max	Specs Min	100%	7 2 4 6 6 G	3/8" 3/8" 1/4" #4	# # # # # # # # # # # # # # # # # # #	88458	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
12.00"	300.00		100%	100.0%	0.0%	100/6	E TOTAL STATE				
10.00"	250.00		100%	100.0%	0.0%						
8.00"	200.00		100%	100.0%	0.0%	90%				+	
6.00"	150.00		100%	100.0%	0.0%		ļ		l N		
4.00"	100.00		100%	100.0%	0.0%		ļ				
3.00"	75.00		100%	100.0%	0.0%	80%			 		att t
2.50"	63.00		100%	100.0%	0.0%				 		
2.00"	50.00	100%	100%	100.0%	0.0%	70%			 		Щ
1.75"	45.00		100%	100.0%	0.0%				 	۱ IIII	
1.50"	37.50		100%	100.0%	0.0%					1	
1.25"	31.50		100%	100.0%	0.0%	60%	 		 	1	-
1.00"	25.00	100%	100%	100.0%	0.0%	Di C	F			1 \	
3/4"	19.00	100%	100%	100.0%	0.0%	50 50 86 50%	F			\	
5/8"	16.00		100%	100.0%	0.0%	a. ⊌₹ 50%	FI				Ш
1/2"	12.50	100%	100%	100.0%	0.0%					i.	
3/8"	9.50	100%	100%	100.0%	0.0%	40%	1-1111-		-	*	ЩЦ
1/4"	6.30		99%	100.0%	0.0%					N	
#4	4.75	98%	98%	100.0%	0.0%						A. I
#8	2.36		95%	100.0%	0.0%	30%	 			+	*
#10	2.00	94%	94%	100.0%	0.0%		<u> </u>				. I X I I
#16	1.18		91%	100.0%	0.0%	20%					Ш
#20	0.850	89%	89%	100.0%	0.0%	20%	F				$\Pi \Lambda$
#30	0.600		85%	100.0%	0.0%						,
#40	0.425	83%	83%	100.0%	0.0%	10%					Ш
#50	0.300		74%	100.0%	0.0%						
#60	0.250	70%	70%	100.0%	0.0%						
#80	0.180		62%	100.0%	0.0%	0%	100,000	10.000	1.000	0.100	سب
#100	0.150	59%	59%	100.0%	0.0%		100.000	.0.000		0.100	
#140	0.106		50%	100.0%	0.0%			Particle Size (mm)		
#170	0.090		46%	100.0%	0.0%						
		1	1	1	1	11					

0.0%

#200

Reviewed by:

Meghan Blodgett-Carrillo

43.0%

43.0%

100.0%

0.075



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soil Classification System, ASTM-2487 Project #: 21B233 Sampled By: Client SM, Silty Sand Client: Anchor QEA Date Tested: 31-Aug-21 Sample Color Source: LDW21-GT9-GB-20-21.5 ft Tested By: C. Kriss brown Sample#: B21-1462 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: Sieve Analysis 2.65 Sample Weight: 75.17 **Grain Size Distribution** Hydroscopic Moist.: 1.11% Soils Particle Sieve Percent Passing Adj. Sample Wgt: 74.34 grams Size Diameter 75.000 mm 3.0" 100% 2.0" 100% 50.000 mm Hydrometer Soils Particle 37.500 mm 1.5" 100% Reading Corrected Percent 1.25" 31.500 mm 100% Minutes Reading **Passing** Diameter 0.0496 mm 100% 25.000 mm 24.0% 1.0" 0.0357 mm 3/4" 16.5 20.8% 100% 19.000 mm 5 13.5 17.1% $0.0230\ mm$ 5/8" 100% 16.000 mm 15 9.5 12.0% $0.0136\ mm$ 1/2" 100% 12.500 mm 30 8 10.1% $0.0097\ mm$ 3/8" 100% 9.500 mm 60 6.3% $0.0069\ mm$ 1/4" 99% 6.300 mm 240 2.5% $0.0035 \ mm$ #4 98% 4.750 mm 1440 1.3% $0.0014\ mm$ #10 94% 2.000 mm 0.850 mm #20 89% % Gravel: Liquid Limit: n/a #40 83% 0.425 mm % Sand: 55.5% Plastic Limit: n/a #100 59% 0.150 mm % Silt: 38.8% Plasticity Index: n/a #200 43.0% 0.075 mm 42.2% 0.074 mm % Clay: 4.2% Silts 30.9% 0.050 mm 15.4% 0.020 mm 4.2% 0.005 mm Clavs 1.6% 0.002 mm Colloids 0.9% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: % Silt: 0.05 - 0.002 mm < 0.002 mm % Clay: **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding Comments:

Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1462
Sample Date:	7/8/2021
Test Date:	8/31/2021
Technician:	M. Carrillo

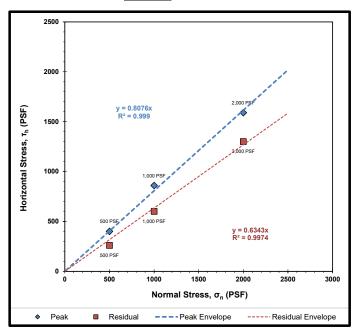
Specimen Height (in): 1
Rate of Strain (in/min): 0.0042
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	σ _n =500 PSF	
Initial Moisture Content (%):	22.7	
	Initial	Post-Consolidation
Dry Density (PCF):	112.8	114.5
Void Ratio:	0.494	0.471
Porosity (%):	33.0	32.0
Degree of Saturation (%):	saturated	saturated

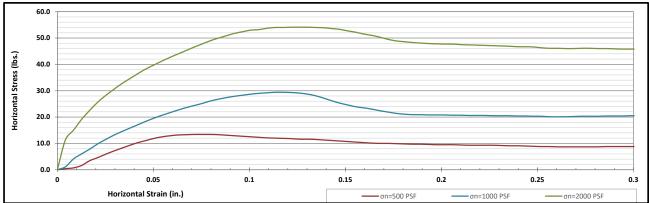
Summary of Sample	σ _n =1000 PSF	
Initial Moisture Content (%):	21.4	
	Initial	Post-Consolidation
Dry Density (PCF):	113.5	120.4
Void Ratio:	0.485	0.399
Porosity (%):	32.7	28.5
Degree of Saturation (%):	saturated	saturated

Summary of Sample	σ _n =2000 PSF	
Initial Moisture Content (%):	19.9	
	Initial	Post-Consolidation
Dry Density (PCF):	114.3	123.5
Void Ratio:	0.474	0.364
Porosity (%):	32.1	26.7
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS					
	PEAK	RESIDUAL			
Angle of Internal Friction, φ (°):	39	32			
Cohesion (PSF):	0	0			



Failure Envelope Test Values:						
Normal Stress, σ _n (PSF):	500	1000	2000			
Peak Horizontal Stress, τ _h (PSF):	400	860	1590			
Residual Horizontal Stress, τ _h (PSF):	260	600	1300			





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT7-GB-0-5.7 ft Sample#: B21-1464

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 31-Aug-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color:

mm

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.066$ $D_{(10)} = 0.135$ $D_{(15)} = 0.170$ % Gravel = 0.2% % Sand = 94.1% mm % Silt & Clay = 5.6% mm $D_{(30)} = 0.247$ Liquid Limit = 0.0% mm $D_{(50)} = 0.327$ $D_{(60)} = 0.367$ $D_{(90)} = 0.741$ Plasticity Index = 0.0% mm Sand Equivalent = n/a

Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.24$ Coeff. of Uniformity, $C_U = 2.73$ Fineness Modulus = 1.68

Plastic Limit = 0.0% Moisture %, as sampled = 29.1% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

Reg'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117	Dust	Ratio =	4/53		
is in Ciso, his in Dolls, As in Cit	ASTM C136, ASTM	D6913,	ASTM (C117	

					Du
				AS	TM C136, AST
		Actual	Interpolated		
		Cumulative	e Cumulative		
Sieve	Size	Percent	Percent	Specs	Specs
US	Metric	Passing	Passing	Max	Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00	l	100%	100.0%	0.0%
8.00"	200.00	l	100%	100.0%	0.0%
6.00"	150.00	l	100%	100.0%	0.0%
4.00"	100.00	l	100%	100.0%	0.0%
3.00"	75.00	l	100%	100.0%	0.0%
2.50"	63.00	l	100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00	l	100%	100.0%	0.0%
1.50"	37.50	l	100%	100.0%	0.0%
1.25"	31.50	l	100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00	l	100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30	l	100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36	l	99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18	l	96%	100.0%	0.0%
#20	0.850	95%	95%	100.0%	0.0%
#30	0.600	l	83%	100.0%	0.0%
#40	0.425	75%	75%	100.0%	0.0%
#50	0.300	l	43%	100.0%	0.0%
#60	0.250	31%	31%	100.0%	0.0%
#80	0.180	l	17%	100.0%	0.0%
#100	0.150	11%	11%	100.0%	0.0%

8%

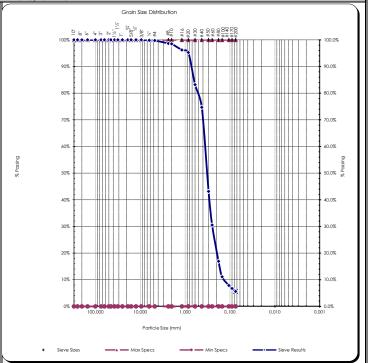
7%

5.6%

100.0%

100.0%

100.0%



Comments:

0.0%

0.0%

0.0%

Meghan Blodgett-Carrillo

5.6%

0.106

0.090

0.075

#140

#170

#200

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT7-GB-8.5-18.5 ft

Sample#: B21-1466

#20

#30

#40

#50

#60

#80

#100

#140

#170

#200

0.850

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 31-Aug-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.022$ $D_{(10)} = 0.063$ $D_{(15)} = 0.080$ % Gravel = 0.2% % Sand = 85.4% mm % Silt & Clay = 14.4% mm $D_{(30)} = 0.186$ Liquid Limit = n/a mm $D_{(50)} = 0.299$ mm Plasticity Index = n/a $D_{(60)} = 0.354$ mm Sand Equivalent = n/a $D_{(90)} = 0.799$ mm

Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.55$ Coeff. of Uniformity, $C_U = 5.61$ Fineness Modulus = 1.54 Plastic Limit = n/a

Moisture %, as sampled = 33.4% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

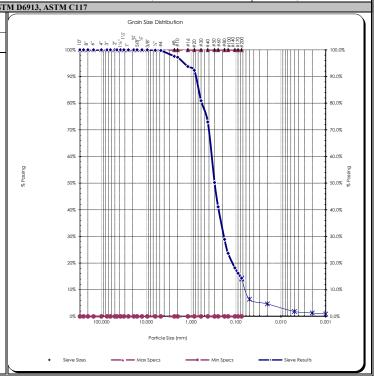
Reg'd Fracture %, 2+ Faces =

						()	0.777
						ust Ratio =	
		Actual Cumulative	Interpolated Cumulative	AS	6TM C136, AS	TM D6913,	ASTM
Sieve	Size	Percent	Percent	Specs	Specs		
US	Metric	Passing	Passing	Max	Min		1
12.00"	300.00		100%	100.0%	0.0%	1	
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		
1.00"	25.00	100%	100%	100.0%	0.0%	20	
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	
5/8"	16.00		100%	100.0%	0.0%	86	
1/2"	12.50	100%	100%	100.0%	0.0%		
3/8"	9.50	100%	100%	100.0%	0.0%		
1/4"	6.30		100%	100.0%	0.0%		
#4	4.75	100%	100%	100.0%	0.0%		
#8	2.36		98%	100.0%	0.0%		
#10	2.00	97%	97%	100.0%	0.0%		
#16	1.18		94%	100.0%	0.0%		
					1	II .	

92%

73%

41%



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Reviewed by: Meghan Blodgett-Carrillo

92%

81%

73%

50%

41%

29%

24%

18%

16%

14.4%

100.0%

100.0%

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100.0%

100.0%



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soil Classification System, ASTM-2487 Project #: 21B233 Sampled By: Client SM, Silty Sand Client: Anchor QEA Date Tested: 31-Aug-21 Sample Color Source: LDW21-GT7-GB-8.5-18.5 ft Tested By: C. Kriss brown Sample#: B21-1466 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: Sieve Analysis 2.65 75.16 Sample Weight: **Grain Size Distribution** Hydroscopic Moist.: 1.29% Soils Particle Sieve Percent ACCREDITED Passing Adj. Sample Wgt: 74.20 grams Size Diameter 75.000 mm 3.0" 100% 2.0" 100% 50.000 mm Hydrometer Soils Particle 37.500 mm 1.5" 100% Reading Corrected Percent 1.25" 31.500 mm 100% Minutes Reading **Passing** Diameter 0.0537 mm 100% 25.000 mm 6.6% 1.0" 0.0381 mm 3/4" 4.5 5.9% 100% 19.000 mm 5 4 5.2% $0.0241\ mm$ 5/8" 100% 16.000 mm 15 3.9% $0.0140\ mm$ 1/2" 100% 12.500 mm 30 2.5 3.3% $0.0100\ mm$ 3/8" 100% 9.500 mm 60 2 2.6% $0.0070\ mm$ 1/4" 100% 6.300 mm 240 1.3% $0.0035 \ mm$ #4 100% 4.750 mm 1440 1.3% $0.0014\ mm$ #10 97% 2.000 mm 0.850 mm #20 92% % Gravel: 0.2% Liquid Limit: n/a #40 73% 0.425 mm % Sand: 85.4% Plastic Limit: n/a #100 24% 0.150 mm % Silt: 12.5% Plasticity Index: n/a #200 14.4% 0.075 mm 0.074 mm % Clay: 1.9% 14.0% 0.050 mm 6.5% 4.7% 0.020 mm 1.9% 0.005 mm Clavs 1.3% 0.002 mm Colloids 0.9% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: % Silt: 0.05 - 0.002 mm < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding **Comments:**

Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1466
Sample Date:	7/9/2021
Test Date:	9/1/2021
Technician:	M. Carrillo

Sample Source: LDW21-GT7-GB-8.5-18.5 ft

Visual Soil Description: brown silty sand

Type of Specimen: Remolded Cylindrical Shear Box

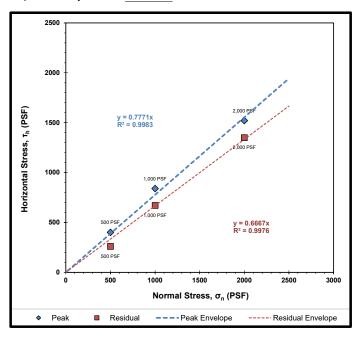
Specimen Diameter (in): 2.5

Summary of Sample	Data:	σ _n =500 PSF
Initial Moisture Content (%):	36.5	
	Initial	Post-Consolidation
Dry Density (PCF):	99.2	102.6
Void Ratio:	0.698	0.642
Porosity (%):	41.1	39.1
Degree of Saturation (%):	saturated	saturated

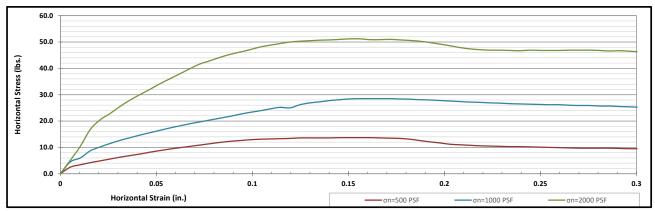
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	37.7	
	Initial	Post-Consolidation
Dry Density (PCF):	97.5	105.0
Void Ratio:	0.728	0.605
Porosity (%):	42.1	37.7
Degree of Saturation (%):	saturated	saturated

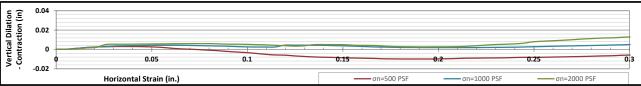
Summary of Sample	Data:	σ _n =2000 PSF
Initial Moisture Content (%):	36.6	
	Initial	Post-Consolidation
Dry Density (PCF):	99.4	106.9
Void Ratio:	0.694	0.576
Porosity (%):	41.0	36.5
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS						
	PEAK	RESIDUAL				
Angle of Internal Friction, φ (°):	38	34				
Cohesion (PSF):	0	0				



Failure Envelope Test Values:							
Normal Stress, σ _n (PSF):	500	1000	2000				
Peak Horizontal Stress, τ _h (PSF):	400	840	1520				
Residual Horizontal Stress, τ _h (PSF):	260	670	1350				





Corporate • 777 Chrysler Drive • Burlington, WA 98233 • Phone 360.755.1990 • Fax 360.755.1980 SW Region • 2118 Black Lake Blvd. S.W.• Olympia, WA 98512 • Phone 360.534.9777 • Fax 360.534.9779 NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111 Kitsap Region • 5451 N.W. Newberry Hill Road, Suite 101 • Silverdale, WA 98383 • Phone/Fax 360.698.6787



Client:	Anchor QEA	Date:	September 30, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-1535-1552
Revised on:		Date sampled:	July 9, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 1, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1535	LDW21-GT7-GB-5.7-8.5 ft	220.0	955.7	691.6	264.1	471.6	56.0%
B21-1536	LDW21-GT7-GB-18.5-23.5 ft	233.7	1022.0	763.2	258.8	529.5	48.9%
B21-1537	LDW21-GT7-GB-23.5-25 ft	229.6	808.5	686.6	121.9	457.0	26.7%
B21-1538	LDW21-GT3-GB-0-1.5 ft	222.7	822.9	608.9	214.0	386.2	55.4%
B21-1539	LDW21-GT3-GB-0-8 ft	223.1	775.1	560.8	214.3	337.7	63.5%
B21-1540	LDW21-GT3-GB-8-9.5 ft	235.0	596.2	499.4	96.8	264.4	36.6%
B21-1541	LDW21-GT3-GB-13.6-18 ft	224.3	840.2	686.6	153.6	462.3	33.2%
B21-1542	LDW21-GT3-GB-18-19.5 ft	208.8	713.1	597.6	115.5	388.8	29.7%
B21-1543	LDW21-GT2-GB-0-1.5 ft	221.9	1015.5	706.7	308.8	484.8	63.7%
B21-1544	LDW21-GT2-GB-0-9 ft	221.9	1057.2	726.4	330.8	504.5	65.6%
B21-1545	LDW21-GT2-GB-9-10.5 ft	234.7	881.9	693.4	188.5	458.7	41.1%
B21-1546	LDW21-GT2-GB-16-19ft	319.9	776.4	594.5	181.9	274.6	66.2%
B21-1547	LDW21-GT1-GB-19-20.5 ft	268.9	932.1	798.3	133.8	529.4	25.3%
B21-1548	LDW21-GT1-GB-0-1.5 ft	270.2	991.8	734.1	257.7	463.9	55.6%
B21-1549	LDW21-GT1-GB-0-10 ft	266.5	951.7	694.7	257.0	428.2	60.0%
B21-1550	LDW21-GT1-GB-10-11.5 ft	303.8	1160.1	875.7	284.4	571.9	49.7%
B21-1551	LDW21-GT1-GB-10-20 ft	311.0	1013.9	756.9	257.0	445.9	57.6%
B21-1552	LDW21-GT1-GB-20-21.5 ft	306.5	1105.1	926.6	178.5	620.1	28.8%
				Edinar and and air air			

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 1, 2021	Tested by: A. Eifrig

1	l	I	I	I			Ī	I	Mass of		I			l I
										Mass of			Temp.	1
			Dry Soil +	Mass of Dry		Mass of	Volume of	Density of	w/ water &	Pycno filled			Correction	Corrected
Sample #	Location	Tare	Tare	Soil	Pycno ID	Pycno	Pycno	Water @ Tx	soils	w/ water	*C	Soils	Factor	SpG
B21-1536	LDW21-GT7-GB-18.5-23.5 ft	414.24	485.84	71.6	TSA-010	180.3	499.5	0.99752	753.80	709.46		2.6265591	0.99931	2.6247467
B21-1541	LDW21-GT3-GB-13.6-18 ft	379.79	481.87	102.1	TSA-011	190.3	499.5	0.99749	752.15	688.62		2.6482538		2.6463735
B21-1546	LDW21-GT2-GB-16-19ft	417.55	468.99	51.4	TSA-017	187.9	499.4	0.99754	717.30	686.06	23.0	2.546361		2.5446549
B21-1549	LDW21-GT1-GB-0-10 ft	411.71	488.70	77.0	TSA-022	198.0	499.5	0.99749	742.60	696.19		2.5179566		2.5161689
B21-1551	LDW21-GT1-GB-10-20 ft	380.03	474.50	94.5	TSA-020	195.0	499.5	0.99749	750.48	693.27	23.2	2.5356867	0.99929	2.5338864
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Sampled By: Client Sand with Silt and Clay **Project #:** 21B233 Client: Anchor QEA Date Tested: 1-Sep-21 Sample Color Source: LDW21-GT7-GB-5.7-8.5 ft Tested By: C. Kriss Sample #: B21-1535 **Liquid Limit Determination** Weight of Wet Soils + Pan: 34.38 32.59 32.44 Weight of Dry Soils + Pan: 30.26 28.85 28.70 Weight of Pan: 19 73 19 58 19 89 Liquid Limit @ 25 Blows: Weight of Dry Soils: 10.68 9.12 8.81 40 % Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: 4 12 3 74 3 74 N/A 38.6 % 41.0 % 42.5 % N/A Number of Blows: **Plastic Limit Determination** #2 Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Plastic limit cannot be determined Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 80.0 % 100% 70.0 % 90% 60.0 % A" Line Plasticity Index 50.0 % 60% 40.0 % 50% 30.0 % CL or OL MH or OH 20% 10.0 % ML or OL 10% 100% 10 100 **Liquid Limit** Copyright Spears Engineering & Technical Services PS, 1996-98

variesturs apply only to extent notations and materials existed. As a material resisted in the control of the c

Comments: Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT7-GB-18.5-23.5 ft

Sample#: B21-1536

#140

#170

#200

Reviewed by:

0.106

0.090

0.075

43.5%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 1-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.009 \\ D_{(10)} = 0.017 \\ D_{(15)} = 0.026 \\ D_{(30)} = 0.052 \\ D_{(50)} = 0.094 \\ D_{(50)} = 0.132 \end{array}$ mm % Gravel = 0.1% % Sand = 56.4% mm % Silt & Clay = 43.5% mm mm Liquid Limit = 0.0% mm Plasticity Index = 0.0% $D_{(60)} = 0.122$ mm Sand Equivalent = n/a

Face = n/a ces = n/a

Coeff. of Curvature, $C_C = 1.27$ Coeff. of Uniformity, $C_U = 7.08$ Fineness Modulus = 0.55

Plastic Limit = 0.0% Moisture %, as sampled = 48.9% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.372$	mm	Fr	racture %	6, 1 Fa	(
					D	ust Ratio = 11/24	t .	Frac	ture %, 2	2+ Fac	ŧ
				AS	TM C136, AS	TM D6913, ASTN	A C117				į
		Actual	Interpolated						Grain Size D	Distributio	
		_	Cumulative		T			E.			
	e Size	Percent	Percent	Specs	Specs		binio	4 % 9 % F	, 26 , 28 .*	. 4 ∞2	2
US	Metric	Passing	Passing	Max	Min		100%		- ***	, , , , , , , , , , , , , , , , , , , 	۰
12.00"	300.00		100%	100.0%	0.0%					.	
10.00"	250.00		100%	100.0%	0.0%		1			.	
8.00"	200.00		100%	100.0%	0.0%		90%		1-1111	.††††	i
6.00"	150.00		100%	100.0%	0.0%					.	
4.00"	100.00		100%	100.0%	0.0%		80%			ШШ	1
3.00"	75.00		100%	100.0%	0.0%		00%			.	
2.50"	63.00		100%	100.0%	0.0%					.	
2.00"	50.00	100%	100%	100.0%	0.0%		70%			++++	ŀ
1.75"	45.00		100%	100.0%	0.0%						
1.50"	37.50		100%	100.0%	0.0%						
1.25"	31.50		100%	100.0%	0.0%		60%		+	.++++	ſ
1.00"	25.00	100%	100%	100.0%	0.0%	. D	ł I				
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%			.	
5/8"	16.00		100%	100.0%	0.0%	86	30%				i
1/2"	12.50	100%	100%	100.0%	0.0%					.	
3/8"	9.50	100%	100%	100.0%	0.0%		40%			++++	ŀ
1/4"	6.30		100%	100.0%	0.0%					.	
#4	4.75	100%	100%	100.0%	0.0%					.	
#8	2.36		100%	100.0%	0.0%		30%		+-+++++++++++++++++++++++++++++++++++	.++++	ï
#10	2.00	100%	100%	100.0%	0.0%		ł I			.	
#16	1.18		97%	100.0%	0.0%		20%			.	
#20	0.850		96%	100.0%	0.0%		20%				i
#30	0.600		95%	100.0%	0.0%					.	
#40	0.425	95%	95%	100.0%	0.0%		10%				ŀ
#50	0.300		83%	100.0%	0.0%						
#60	0.250		79%	100.0%	0.0%						
#80	0.180		72%	100.0%	0.0%		0%	00.000	10.000	-0-	J
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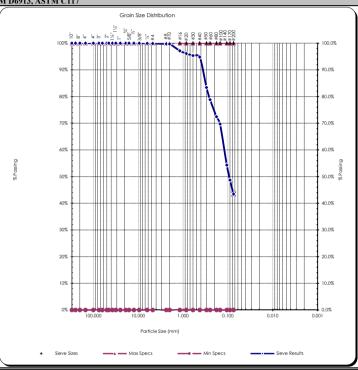
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43.5%



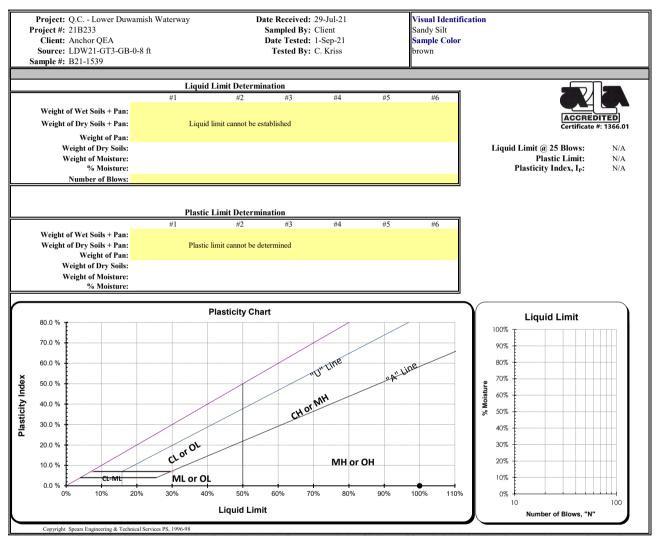
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Comments:





All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding or reports is reserved pending our writerin approval.

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#100

#140

#170

#200

0.150

0.106

0.090

0.075

22.3%

Meghan Blodgett-Carrillo

Source: LDW21-GT3-GB-8-9.5 ft Sample#: B21-1540

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 1-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{AS IM D43} \\ \textbf{D}_{(5)} = 0.017 \\ \textbf{D}_{(10)} = 0.034 \\ \textbf{D}_{(15)} = 0.051 \\ \textbf{D}_{(30)} = 0.100 \\ \textbf{D}_{(50)} = 0.178 \\ \textbf{D}_{(60)} = 0.238 \\ \textbf{D}_{(90)} = 0.417 \end{array}$ mm % Gravel = 0.5% % Sand = 77.3% mm % Silt & Clay = 22.3% mm mm Liquid Limit = 0.0% mm Plasticity Index = 0.0% mm

Sand Equivalent = n/a Fracture %, 1 Face = n/a acture %, 2+ Faces = n/a Coeff. of Curvature, $C_C = 1.25$ Coeff. of Uniformity, $C_U = 7.06$ Fineness Modulus = 0.99 Plastic Limit = 0.0% Moisture %, as sampled = 36.6%

Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

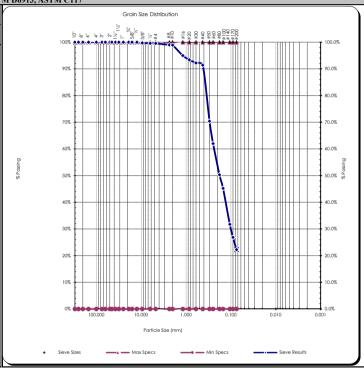
						$D_{(90)} = 0.417$	mm		ŀ	ractu
					D	Oust Ratio = 19/78			Fra	cture
				A	STM C136, AS	TM D6913, ASTM	C117			
		Actual	Interpolated							Grain
	~·	¬	Cumulative	-		4				
	Size	Percent	Percent	Specs	Specs		ø <u>d</u>	\$ 4 th \$!	. Z :	. 86.
US	Metric	Passing	Passing 100%	Max	Min 0.0%	-∥ '	100%		(0.00	
12.00"	300.00			100.0%			H			
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6.00"	150.00		100%	100.0%	0.0%		- 11			
4.00"	100.00		100%	100.0%	0.0%		80%		##	
3.00"	75.00		100%	100.0%	0.0%		- 11			
2.50"	63.00		100%	100.0%	0.0%		- 1			
2.00"	50.00	100%	100%	100.0%	0.0%		70%		+++	-
1.75"	45.00		100%	100.0%	0.0%		- 1			
1.50"	37.50		100%	100.0%	0.0%					
1.25"	31.50		100%	100.0%	0.0%		60%		m	
1.00"	25.00	100%	100%	100.0%	0.0%	Sin G	- 11			
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%		Ш	
5/8"	16.00		100%	100.0%	0.0%	Bc.				
1/2"	12.50	100%	100%	100.0%	0.0%		- 1			
3/8"	9.50	100%	100%	100.0%	0.0%		40%		+++	
1/4"	6.30		100%	100.0%	0.0%		- 11			
#4	4.75	100%	100%	100.0%	0.0%		- 11			
#8	2.36		99%	100.0%	0.0%		30%		###	
#10	2.00	99%	99%	100.0%	0.0%		- 11			
#16	1.18		95%	100.0%	0.0%		20%		Ш	
#20	0.850		93%	100.0%	0.0%		20,0			
#30	0.600		92%	100.0%	0.0%		FI			
#40	0.425	91%	91%	100.0%	0.0%		10%	-++++	+++	
#50	0.300		70%	100.0%	0.0%		- 11			
#60	0.250		62%	100.0%	0.0%		- 11			
#80	0.180		50%	100.0%	0.0%		0%	100,000	4000	0000
		1	I	1	1	II .				

45%

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0.0%

Comments: Reviewed by:

100.0%

100.0%

100.0%

100.0%

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1540
Sample Date:	7/9/2021
Test Date:	9/24/2021
Technician:	M. Carrillo

Sample Source: LDW21-GT3-GB-8-9.5 ft

Visual Soil Description: brown silty sand

Type of Specimen: Remolded Cylindrical Shear Box

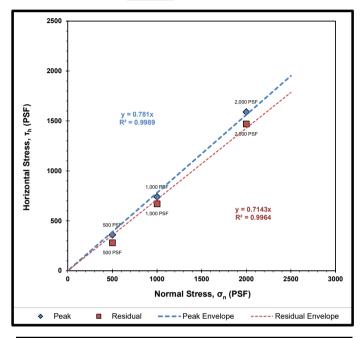
Specimen Diameter (in): 2.5

Summary of Sampl	σ _n =500 PSF				
Initial Moisture Content (%):	33.7				
	Initial	Post-Consolidation			
Dry Density (PCF):	102.4	104.0			
Void Ratio:	0.645	0.620			
Porosity (%):	39.2	38.3			
Degree of Saturation (%):	saturated	saturated			

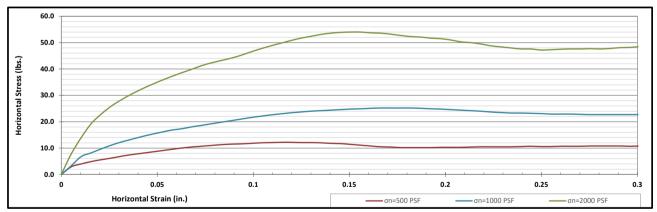
Summary of Sample	σ _n =1000 PSF	
Initial Moisture Content (%):	31.2	
	Initial	Post-Consolidation
Dry Density (PCF):	104.0	109.1
Void Ratio:	0.620	0.544
Porosity (%):	38.3	35.2
Degree of Saturation (%):	saturated	saturated

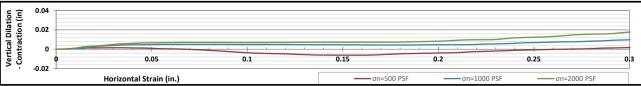
Summary of Sample	σ _n =2000 PSF	
Initial Moisture Content (%):	30.1	
	Initial	Post-Consolidation
Dry Density (PCF):	105.0	110.4
Void Ratio:	0.605	0.526
Porosity (%):	37.7	34.5
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS							
	PEAK	RESIDUAL					
Angle of Internal Friction, φ (°):	38	36					
Cohesion (PSF):	0	0					



Failure Envelope Test Values:								
Normal Stress, σ _n (PSF):	500	1000	2000					
Peak Horizontal Stress, τ _h (PSF):	360	740	1590					
Residual Horizontal Stress, τ _h (PSF):	280	670	1470					





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT3-GB-13.6-18 ft

Sample#: B21-1541

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 1-Sep-21

Date Tested: 1-Sep-21
Tested By: C. Kriss

SP, Poorly graded Sand
Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs ? N/A

Meghan Blodgett-Carrillo

Unified Soil Classification System, ASTM-2487

 $D_{(60)} = 0.349$ mm Sand Equivalent = 174 $D_{(90)} = 1.234$ mm Fracture %, 1 Face = n/a Ratio = -17/89 Fracture %, 2+ Faces = n/a ACCREDITED

Certificate #: 1366.0

 $\begin{aligned} & \text{Coeff. of Curvature, } C_{\text{C}} = 1.00 \\ & \text{Coeff. of Uniformity, } C_{\text{U}} = 2.22 \\ & \text{Fineness Modulus} = 1.74 \\ & \text{Plastic Limit} = n/a \\ & \text{Moisture \%, as sampled} = 33.2\% \\ & \text{Req'd Sand Equivalent} = \end{aligned}$

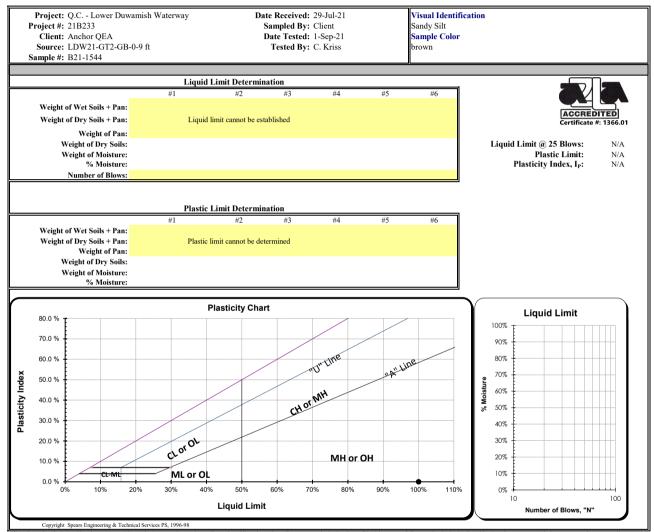
Req'd Fracture %, 1 Face =
Rea'd Fracture %, 2+ Faces =

					D	ust Ratio = - 17/89	Fracture %, 2+ Faces = n/a	Req'd Fracture %, 2+ Faces =
				AS	TM C136, AS	TM D6913, ASTM C117		
		Actual	Interpolated				Grain Size Distribution	
		Cumulative	Cumulative			_	E	
Sieve	Size	Percent	Percent	Specs	Specs	ib :. :.	7.2 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7	88488
US	Metric	Passing	Passing	Max	Min	100%	◆ ** *** ** * * * * * * * * * * * * * *	##### ##### 100.0%
12.00"	300.00		100%	100.0%	0.0%			
10.00"	250.00		100%	100.0%	0.0%			
8.00"	200.00		100%	100.0%	0.0%	90%	 	90.0%
6.00"	150.00		100%	100.0%	0.0%			
4.00"	100.00		100%	100.0%	0.0%	80%		80.0%
3.00"	75.00		100%	100.0%	0.0%	1 80% FT		80.0%
2.50"	63.00		100%	100.0%	0.0%			
2.00"	50.00	100%	100%	100.0%	0.0%	70%		70.0%
1.75"	45.00		100%	100.0%	0.0%			
1.50"	37.50		100%	100.0%	0.0%			
1.25"	31.50		100%	100.0%	0.0%	60%		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	g.		
3/4"	19.00	100%	100%	100.0%	0.0%	Di		50.0%
5/8"	16.00		100%	100.0%	0.0%	be 50%	1	50.0%
1/2"	12.50	100%	100%	100.0%	0.0%			
3/8"	9.50	100%	100%	100.0%	0.0%	40%		40.0%
1/4"	6.30		100%	100.0%	0.0%			
#4	4.75	100%	100%	100.0%	0.0%			
#8	2.36		100%	100.0%	0.0%	30%		30.0%
#10	2.00	100%	100%	100.0%	0.0%	1		
#16	1.18		89%	100.0%	0.0%			20.0%
#20	0.850		85%	100.0%	0.0%	20%		20.0%
#30	0.600		82%	100.0%	0.0%			i
#40	0.425	80%	80%	100.0%	0.0%	10%		10.0%
#50	0.300		47%	100.0%	0.0%			
#60	0.250		34%	100.0%	0.0%			\
#80	0.180		16%	100.0%	0.0%	0%	- 1	0.100 0.010 0.001
#100	0.150	8%	8%	100.0%	0.0%		10000	22
#140	0.106		-6%	100.0%	0.0%		Particle Size (mm)	
#170	0.090		-11%	100.0%	0.0%			
#200	0.075	-15.2%	-15.2%	100.0%	0.0%	+ Sieve Sizes	—▲ — Max Specs — ● — Min S	ipecs Sieve Results
		chnical Services PS, 1996-9	II .				· ·	

Il results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval

Reviewed by:





All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding or reports is reserved pending our writerin approval.

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT2-GB-16-19 ft

Sample#: B21-1546

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 1-Sep-21

Tested By: C. Kriss

Visual Identification Sandy Silt with Clay Sample Color:

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ D_{(5)} = 0.003 \\ D_{(10)} = 0.006 \\ D_{(15)} = 0.009 \\ D_{(30)} = 0.025 \\ D_{(50)} = 0.061 \\ D_{(60)} = 0.072 \\ D_{(90)} = 0.265 \\ \end{array}$ mm mm % Silt & Clay = 63.3% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm

Sand Equivalent = n/a mm Fracture %, 1 Face = n/a

% Gravel = 0.3%

% Sand = 36.4%

Coeff. of Curvature, $C_C = 1.57$ Coeff. of Uniformity, $C_U = 12.88$ Fineness Modulus = 0.28

Plastic Limit = n/a Moisture %, as sampled = 66.2% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face =

					D	ust Ratio = $25/39$	111111		ture %, 2+						%, 2+ I	
ASTM C136, ASTM D6913, ASTM C117																
		Actual	Interpolated					,	Grain Size Distri	bution						
	Cumulative Cumulative															
	Size	Percent	Percent	Specs	Specs		b in	7 2 3 4 6 7 2 2 3 4 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	% % 6 1 4	2 ° 20	8 8 8 8	82558				
US	Metric	Passing	Passing	Max	Min	1	00%				***	*****	TTTT	ттп		T 100.0%
12.00"	300.00		100%	100.0%	0.0%						\\					- 1
10.00"	250.00		100%	100.0%	0.0%		- 1				, V					1
8.00"	200.00		100%	100.0%	0.0%		90%				### *					90.0%
6.00"	150.00		100%	100.0%	0.0%							A III				1
4.00"	100.00		100%	100.0%	0.0%		80%					1				80.0%
3.00"	75.00		100%	100.0%	0.0%		- L					1 1 111				1 00.0%
2.50"	63.00		100%	100.0%	0.0%		- []					1				1
2.00"	50.00	100%	100%	100.0%	0.0%		70%				++++	⊢ i ⊎	+++	+-H	+++-+	70.0%
1.75"	45.00		100%	100.0%	0.0%							1				1
1.50"	37.50		100%	100.0%	0.0%											1
1.25"	31.50		100%	100.0%	0.0%		60%						(60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	D							\			. Bui
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%						\			50.0% kg
5/8"	16.00		100%	100.0%	0.0%	98	50% F						*			30.0% %
1/2"	12.50	100%	100%	100.0%	0.0%								1			1
3/8"	9.50	100%	100%	100.0%	0.0%		40%						+++			40.0%
1/4"	6.30		100%	100.0%	0.0%											1
#4	4.75	100%	100%	100.0%	0.0%								\			1
#8	2.36		99%	100.0%	0.0%		30%					-	++++	(+++-+	30.0%
#10	2.00	99%	99%	100.0%	0.0%		- 1							*		1
#16	1.18		99%	100.0%	0.0%		20%							$ \setminus $		20.0%
#20	0.850		99%	100.0%	0.0%		20%									20.0%
#30	0.600		99%	100.0%	0.0%									1 N		1
#40	0.425	99%	99%	100.0%	0.0%		10%					4	444		\bigvee	10.0%
#50	0.300		92%	100.0%	0.0%										\mathbb{N}	1
#60	0.250		89%	100.0%	0.0%										*	
#80	0.180		85%	100.0%	0.0%		0%	100.000	10.000	1.000	10 0 0 0	0.100		0.010		0.0%
#100	0.150	84%	84%	100.0%	0.0%			100.000	10.000	1.000	,	0.100		0.010		0.001
#140	0.106		72%	100.0%	0.0%				Particle	Size (mm)						
#170	0.090		67%	100.0%	0.0%											
#200	0.075	63.3%	63.3%	100.0%	0.0%	+ Si	eve Sizes		- Max Specs	_	• — Min	Specs	_	Sie	eve Results	
Copyrigh	t Spears Engineering & Tec	hnical Services PS, 1996-9	98													

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	Nagh Gladget and lo	
Reviewed by:	Medhan Blodgett-Carrillo	



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification **Project #:** 21B233 Sandy Silt with Clay Sampled By: Client Client: Anchor QEA Date Tested: 1-Sep-21 Sample Color Source: LDW21-GT2-GB-16-19 ft Tested By: C. Kriss brown Sample#: B21-1546 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp Gr: Sieve Analysis 2.54 Sample Weight: 75.85 **Grain Size Distribution** Hydroscopic Moist .: 6.24% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 71.39 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 38.7% 0.0494 mm 27 1.0" 100% 2 23.5 33.7% $0.0358\ mm$ 3/4" 100% 19.000 mm 20.5 29.4% 0.0231 mm 5/8" 100% 16.000 mm 20.8% 0.0138 mm 1/2" 100% 12.500 mm 30 16.5% 0.0099 mm 3/8" 100% 9.500 mm 11.5 12.9% 0.0071 mm 60 1/4" 100% 6.300 mm 240 6.4% 0.0036 mm 100% 4.750 mm 4.5 #4 2.1% 0.0015 mm #10 99% 2.000 mm 1440 #20 99% 0.850 mm 0.3% Liquid Limit: n/a % Gravel: #40 99% 0.425 mm % Sand: 36.4% Plastic Limit: n/a #100 84% 0.150 mm % Silt: 54.3% Plasticity Index: n/a #200 63.3% 0.075 mm 0.074 mm % Clay: 9.0% Silts 62.3% 47.6% 0.050 mm 0.020 mm 26.5% 9.0% 0.005 mm Clays 3.1% $0.002 \ mm$ Colloids 1.4% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:**

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Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1546
Sample Date:	7/9/2021
Test Date:	9/27/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT2-GB-16-19 ft

 Visual Soil Description:
 brown sandy silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

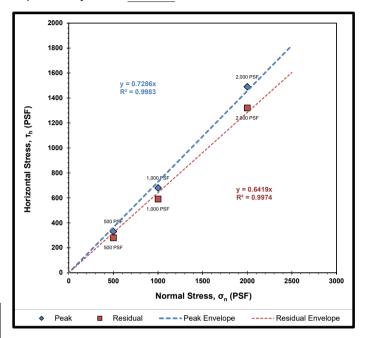
 Specimen Diameter (in):
 2.5

Summary of Samp	le Data:	σ _n =500 PSF			
Initial Moisture Content (%):	38.6				
	Initial	Post-Consolidation			
Dry Density (PCF):	100.0	106.5			
Void Ratio:	0.684	0.581			
Porosity (%):	40.6	36.8			
Degree of Saturation (%):	saturated	saturated			

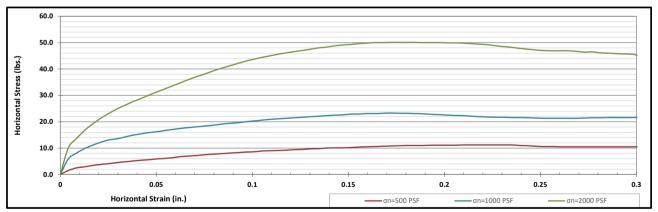
Summary of Samp	le Data:	σ _n =1000 PSF			
Initial Moisture Content (%):	36.2				
	Initial	Post-Consolidation			
Dry Density (PCF):	101.4	111.3			
Void Ratio:	0.661	0.514			
Porosity (%):	39.8	34.0			
Degree of Saturation (%):	saturated	saturated			

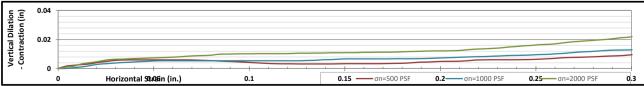
Summary of Sample	Data:	σ _n =2000 PSF			
Initial Moisture Content (%):	34.6				
	Initial	Post-Consolidation			
Dry Density (PCF):	102.5	110.5			
Void Ratio:	0.643	0.525			
Porosity (%):	39.1	34.4			
Degree of Saturation (%):	saturated	saturated			

ESTIMATED STRENGTH PARAMETERS								
	PEAK	RESIDUAL						
Angle of Internal Friction, φ (°):	36	33						
Cohesion (PSF):	0	0						



Failure Envelope Test Values:								
Normal Stress, σ _n (PSF):	500	1000	2000					
Peak Horizontal Stress, τ _h (PSF):	330	680	1490					
Residual Horizontal Stress, τ _h (PSF):	280	590	1320					

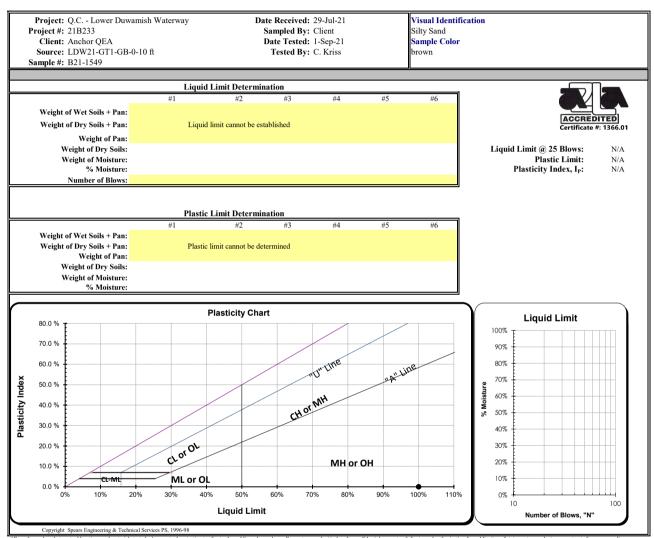




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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils



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Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the

liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#170

#200

0.090

0.075

33.4%

Meghan Blodgett-Carrillo

Source: LDW21-GT1-GB-10-20 ft Sample#: B21-1551

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 1-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ D_{(5)} = 0.013 \\ D_{(10)} = 0.037 \\ D_{(15)} = 0.059 \\ D_{(30)} = 0.072 \\ D_{(50)} = 0.106 \\ D_{(60)} = 0.125 \\ D_{(90)} = 0.327 \\ \end{array}$ mm % Gravel = 0.5% % Sand = 66.2% mm % Silt & Clay = 33.4% mm mm Liquid Limit = n/a mm Plasticity Index = n/a mm Sand Equivalent = n/a mm

Fracture %. 1 Face = n/a

Coeff. of Curvature, $C_C = 1.11$ Coeff. of Uniformity, $C_U = 3.34$ Fineness Modulus = 0.42 Plastic Limit = n/a

Moisture %, as sampled = 57.6% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = eq'd Fracture %, 2+ Faces =

						$D_{(90)} = 0$		11		icture 7						Г
						Oust Ratio = 3			Fracti	ure %, 2	2+ Fa	ices =	n/a		I	Re
				AS	STM C136, AS	TM D6913, A	ASTM C117	7								
		Actual	Interpolated						Gr	rain Size [Distribu	ition				
			Cumulative			4			Ę.							
	Size	Percent	Percent	Specs	Specs		<u>.</u>	p 6 4 60	\$ =. : % is	, 88 , 88 ;	. 4 .	2 ° ° °	14 13 8	888	8458	ş
US	Metric	Passing	Passing	Max	Min	4	100%			****	7	**	1010	+	-	m
12.00"	300.00		100%	100.0%	0.0%		-			. !!!!			\			
10.00"	250.00		100%	100.0%	0.0%		90%			. !!!!			1	l		Ш
8.00"	200.00		100%	100.0%	0.0%		90%				Ш					Ш
6.00"	150.00		100%	100.0%	0.0%		1			. !!!!				1		
4.00"	100.00		100%	100.0%	0.0%		80%				Ш		ШШ	I.	Щ.	Ш
3.00"	75.00		100%	100.0%	0.0%					. !!!!				1		
2.50"	63.00		100%	100.0%	0.0%		ŀ			. !!!!				1	•	
2.00"	50.00	100%	100%	100.0%	0.0%		70%		++-+	гНН	+++	+	₩₩	++	₩	Н
1.75"	45.00		100%	100.0%	0.0%		-								1	
1.50"	37.50		100%	100.0%	0.0%		1								1	
1.25"	31.50		100%	100.0%	0.0%		60%		+++	,	$^{++}$	1	m	++	111	Ш
1.00"	25.00	100%	100%	100.0%	0.0%	% Possing	į.			. !!!!					M	
3/4"	19.00	100%	100%	100.0%	0.0%	P 8	50%				ШШ				, i	Ш
5/8"	16.00		100%	100.0%	0.0%	94	30,0								Ĭ	
1/2"	12.50	100%	100%	100.0%	0.0%		-			. !!!!					N	Ш
3/8"	9.50	100%	100%	100.0%	0.0%		40%		+	, — 	+++		###	+	-1	Н
1/4"	6.30		100%	100.0%	0.0%		1			. !!!!					1	
#4	4.75	100%	100%	100.0%	0.0%		1			. !!!!						č
#8	2.36		99%	100.0%	0.0%		30%	1-1111	+++	,	+++		###	++	-#	H
#10	2.00	99%	99%	100.0%	0.0%		ŀ			. !!!!						M
#16	1.18		99%	100.0%	0.0%		20%				ШШ					V
#20	0.850		99%	100.0%	0.0%		20% T				Ш		m	TT		T
#30	0.600		99%	100.0%	0.0%		-			. !!!!						ķ
#40	0.425	99%	99%	100.0%	0.0%		10%				###		₩₩.	₩.		1
#50	0.300		87%	100.0%	0.0%		1			. !!!!						Ш
#60	0.250		83%	100.0%	0.0%		1									
#80	0.180		76%	100.0%	0.0%		0%	100.000	0000	10.000	-	1.00	الواوار 0	40-01	0.100	للز
#100	0.150	73%	73%	100.0%	0.0%			100.000		10.000		1.00	-		5.100	
#140	0.106		50%	100.0%	0.0%					Par	rticle Size	∍ (mm)				
		1	1			II .										

30.0%

0.0%

0.0%

Comments: Reviewed by:

100.0%

100.0%

41%

33.4%



Hydrometer Report

Project:	Q.C Lower	Duwamish Wat	terway Date Recei	ved: 29-Jul-21		assification Sys	tem, ASTM-2487
Project #: 1	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 1-Sep-21	Sample Color		
Source:	LDW21-GT1	-GB-10-20 ft	Tested	By: C. Kriss	brown		
Sample#:	B21-1551			·			
AS	STM D7928	, HYDROME	ETER ANALYSIS	S		ASTM	D6913
Sp Gr :	2.53					Sieve A	nalysis
Sample Weight:	75.48	grams				Grain Size I	Distribution
Hydroscopic Moist.:	2.34%			65 Gr	Sieve	Percent	Soils Particle
Adj. Sample Wgt :	73.75	grams		ACCREDITED	Size	Passing	Diameter
		0		Certificate #: 1366.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	8	11.1%	0.0554 mm		1.0"	100%	25.000 mm
2	7.5	10.4%	0.0394 mm		3/4"	100%	19.000 mm
5	5.5	7.6%	0.0252 mm		5/8"	100%	16.000 mm
15	4	5.5%	0.0146 mm		1/2"	100%	12.500 mm
30	3	4.2%	0.0104 mm		3/8"	100%	9.500 mm
60	1.5	2.1%	0.0074 mm		1/4"	100%	6.300 mm
240	1.3	1.4%	0.0074 mm		#4		
						100%	4.750 mm
1440	1	1.4%	0.0015 mm		#10	99%	2.000 mm
		_			#20	99%	0.850 mm
% Gravel:	0.5%		iquid Limit: n/a		#40	99%	0.425 mm
% Sand:	66.2%		lastic Limit: n/a		#100	73%	0.150 mm
% Silt:	31.8%	Plas	ticity Index: n/a		#200	33.4%	0.075 mm
% Clay:	1.6%				Silts	32.2%	0.074 mm
						12.5%	0.050 mm
						6.6%	0.020 mm
					Clays	1.6%	0.005 mm
					•	1.4%	0.002 mm
					Colloids	0.9%	0.001 mm
	USDA S	oil Textural (Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mm	ı				
% Clay:		< 0.002 mm					
	HCDAC	oil Textural C	Tassification				
	USDAS	Sand	lassification				
All results apply only to actual locatio regarding our reports is reserved pend			clients, the public and ourselves,	all reports are submitted as the cor	fidential property of clients,	and authorization for publica	ation of statements, conclusions or extracts from or
regarding our reports is reserved pene	ang our wracer approv	ai.					
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Comments:							
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Reviewed by:	0						
1	Meghan Blodget	t-Carrillo					

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1551
Sample Date:	7/9/2021
Test Date:	9/23/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT1-GB-10-20 ft

 Visual Soil Description:
 brown silty sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

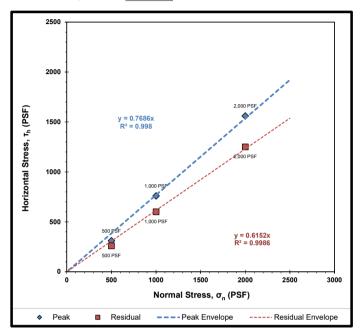
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	e Data:	σ _n =500 PSF			
Initial Moisture Content (%):	30.0				
	Initial	Post-Consolidation			
Dry Density (PCF):	106.5	108.9			
Void Ratio:	0.581	0.547			
Porosity (%):	36.8	35.4			
Degree of Saturation (%):	saturated	saturated			

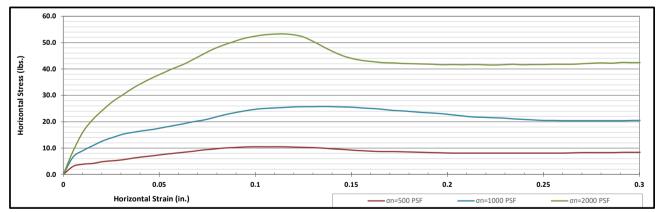
Summary of Sampl	σ _n =1000 PSF	
Initial Moisture Content (%):	29.7	
	Initial	Post-Consolidation
Dry Density (PCF):	598.3	612.5
Void Ratio:	-0.718	-0.725
Porosity (%):	-255.1	-263.6
Degree of Saturation (%):	-111.5	saturated

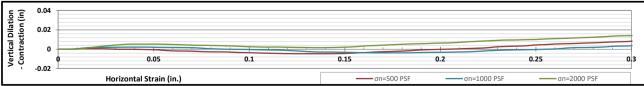
Summary of Sample	e Data:	σ _n =2000 PSF
Initial Moisture Content (%):	29.8	
	Initial	Post-Consolidation
Dry Density (PCF):	107.6	113.2
Void Ratio:	0.566	0.488
Porosity (%):	36.1	32.8
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS										
PEAK RESIDUAL										
Angle of Internal Friction, φ (°):	38	32								
Cohesion (PSF):	0	0								



Failure Envelope Test Values:									
Normal Stress, σ _n (PSF):	500	1000	2000						
Peak Horizontal Stress, τ _h (PSF):	310	760	1560						
Residual Horizontal Stress, τ _h (PSF):	260	600	1250						





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Client:	Anchor QEA	Date:	October 1, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-1563-1577
Revised on:		Date sampled:	7-12-21 & 7-13-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 3, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1563	LDW21-GT13-GB-0-1.5 ft	229.0	1015.9	773.9	242.0	544.9	44.4%
B21-1564	LDW21-GT13-GB-0-11 ft	221.0	537.3	449.8	87.5	228.8	38.2%
B21-1565	LDW21-GT13-GB-11-12.5 ft	217.1	1140.1	930.2	209.9	713.1	29.4%
B21-1566	LDW21-GT13-GB-11-21 ft	233.4	922.3	739.9	182.4	506.5	36.0%
B21-1567	LDW21-GT13-GB-21-22.5 ft	222.0	1231.9	1002.3	229.6	780.3	29.4%
B21-1568	LDW21-GT13-GB-21-31 ft	222.1	758.0	621.0	137.0	398.9	34.3%
B21-1569	LDW21-GT13-GB-31-32.5 ft	208.7	1100.3	893.6	206.7	684.9	30.2%
B21-1570	LDW21-GT19-GB-0-1.5 ft	234.8	863.2	678.6	184.6	443.8	41.6%
B21-1571	LDW21-GT19-GB-0-6.9 ft	222.1	761.3	524.7	236.6	302.6	78.2%
B21-1572	LDW21-GT19-GB-6.9-8.5 ft	233.1	1713.9	1391.1	322.8	1158.0	27.9%
B21-1573	LDW21-GT19-GB-8.5-10 ft	220.2	954.0	779.7	174.3	559.5	31.2%
B21-1574	LDW21-GT19-GB-8.5-18.5 ft	224.3	805.4	688.5	116.9	464.2	25.2%
B21-1575	LDW21-GT19-GB-18.5-20 ft	229.6	1121.9	927.8	194.1	698.2	27.8%
B21-1576	LDW21-GT19-GB-18.5-28.5 ft	215.7	1329.2	1088.0	241.2	872.3	27.7%
B21-1577	LDW21-GT19-GB-28.5-30 ft	225.2	725.0	616.3	108.7	391.1	27.8%
		+					

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 1, 2021	Tested by: A. Eifrig

Sample # B21-1564	Location LDW21-GT13-GB-0-11 ft	Tare 378.85	Dry Soil + Tare 431.72	Mass of Dry Soil 52.9	Pycno ID TSA-016	Mass of Pycno 197.2	Volume of Pycno 499.5	Density of Water @ Tx 0.99747	Mass of Pycno filled w/ water & soils 728.02	Mass of	Water, 0.1 *C		Factor	Corrected SpG 2.6068253
B21-1568	LDW21-GT13-GB-21-31 ft	394.06	438.75	44.7	TSA-012	180.4	499.5	0.99752	706.18	678.65		2.6041054		2.6023085
B21-1571	LDW21-GT19-GB-0-6.9 ft	429.62	462.35	32.7	TSA-014	192.3	499.5	0.99752	710.77	690.55		2.6160217		2.6142167
B21-1574	LDW21-GT19-GB-8.5-18.5 ft	415.36	464.91	49.6	TSA-013	184.0	499.7	0.99754	712.79	682.43		2.5819681		2.5802382
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT13-GB-0-11 ft

Sample#: B21-1564

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 1-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.008 \\ \textbf{D}_{(10)} = 0.019 \\ \textbf{D}_{(15)} = 0.053 \\ \textbf{D}_{(30)} = 0.121 \\ \textbf{D}_{(50)} = 0.244 \\ \textbf{D}_{(60)} = 0.301 \\ \textbf{D}_{(90)} = 1.175 \\ \textbf{Partice} = 26(87) \end{array}$ mm % Gravel = 0.4% % Sand = 75.2% mm % Silt & Clay = 24.4% mm mm Liquid Limit = 0.0% Plasticity Index = 0.0% mm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 2.52$ Coeff. of Uniformity, $C_U = 15.71$ Fineness Modulus = 1.34

Plastic Limit = 0.0% Moisture %, as sampled = 38.2% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face =

						st Ratio = 26/87	Fracture %, 2+ Faces = n/a	Req'd Fracture %, 2+ Faces =
		Actual	Interpolated	AS	STM C136, AST	M D6913, ASTM C117		
		Cumulative				/	Grain Size Distribution	
6.	G.			6			₹	
Sieve		Percent	Percent	Specs	Specs	8; G	2.7. 2.7. 1.7. 1.7. 1.7. 1.7. 1.7. 1.7.	82458
US	Metric	Passing	Passing	Max	Min	100%	*-*,**,*******************************	100.0%
12.00"	300.00		100%	100.0%	0.0%	 		
10.00"	250.00		100%	100.0%	0.0%		\text{\tint{\text{\tint{\text{\tint{\text{\tint{\text{\tint{\text{\tint{\text{\text{\tint{\tint{\tint{\tint{\tint{\tint{\tint{\text{\tint{\text{\text{\tint{\text{\tinit}\text{\text{\text{\text{\text{\text{\tinit}\tint{\text{\text{\text{\tinit}\\ \tint{\text{\text{\text{\text{\tinit}}\\ \tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tinit}\tint{\text{\text{\text{\text{\text{\tinit}\tint{\tinithtet{\text{\tinit}}\\ \tint{\text{\tinithtet{\text{\tinithtet{\text{\tinit}\text{\text{\texi}\tint{\tint{\tint}\tint{\tinithtet{\tinithtet{\tinithtet{\tinithtet{\tinithtet{\tinithtet{	90.0%
8.00"	200.00		100%	100.0%	0.0%	90%		70.0%
6.00"	150.00		100%	100.0%	0.0%			
4.00"	100.00		100%	100.0%	0.0%	80%		80.0%
3.00"	75.00		100%	100.0%	0.0%		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
2.50"	63.00		100%	100.0%	0.0%	[]		
2.00"	50.00	100%	100%	100.0%	0.0%	70%		70.0%
1.75"	45.00		100%	100.0%	0.0%			
1.50"	37.50		100%	100.0%	0.0%			
1.25"	31.50		100%	100.0%	0.0%	60%		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	0		g
3/4"	19.00	100%	100%	100.0%	0.0%	00 Uiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		50.0%
5/8"	16.00		100%	100.0%	0.0%	50% 50%		50.0% %
1/2"	12.50	100%	100%	100.0%	0.0%			V
3/8"	9.50	100%	100%	100.0%	0.0%	40%		40.0%
1/4"	6.30		100%	100.0%	0.0%			1
#4	4.75	100%	100%	100.0%	0.0%	ł I		\
#8	2.36		99%	100.0%	0.0%	30%		30.0%
#10	2.00	99%	99%	100.0%	0.0%			
#16	1.18		90%	100.0%	0.0%			17
#20	0.850		86%	100.0%	0.0%	20%		20.0%
#30	0.600		84%	100.0%	0.0%			
#40	0.425	82%	82%	100.0%	0.0%	10%		10.0%
#50	0.300	0270	60%	100.0%	0.0%	10%		1 10.0%
#60	0.250		51%	100.0%	0.0%			
#80	0.180		39%	100.0%	0.0%	0%		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
#80 #100	0.150	34%	34%	100.0%	0.0%		100.000 10.000 1.000	0.100 0.010 0.001
		34%					Particle Size (mm)	
#140	0.106		28%	100.0%	0.0%			
#170	0.090	24.40/	26%	100.0%	0.0%	_		
#200	0.075	24.4%	24.4%	100.0%	0.0%	+ Sieve Sizes	—▲ — Max Specs — ● — Min	Specs Sieve Results
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Reviewed by: _



Hydrometer Report

Project:	Q.C Lower	Duwamish Wa	terway Date Recei	ved: 29-Jul-21	Unified Soil Cl	assification Sys	stem, ASTM-2487
Project #:	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 1-Sep-21	Sample Color		
Source:	LDW21-GT1	3-GB-0-11 ft	Tested	By: C. Kriss	brown		
Sample#:				•			
		, HYDROMI	ETER ANALYSI	S		ASTM	D6913
Sp Gr :	2.61						analysis
Sample Weight:	100.15	grams					Distribution
Hydroscopic Moist.:	0.83%	C			Sieve	Percent	Soils Particle
Adj. Sample Wgt :	99.33	grams		ACCREDITED	Size	Passing	Diameter
		8		Certificate #: 1366.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	14.5	14.6%	0.0519 mm		1.0"	100%	25.000 mm
2	13	13.1%	0.0369 mm		3/4"	100%	19.000 mm
5	11.5	11.6%	0.0236 mm		5/8"	100%	16.000 mm
15	8	8.1%	0.0139 mm		1/2"	100%	12.500 mm
30	6.5	6.6%	0.0099 mm		3/8"	100%	9.500 mm
60	4	4.0%	0.0071 mm		1/4"	100%	6.300 mm
240	1	1.0%	0.0036 mm		#4	100%	4.750 mm
1440	1	1.0%	0.0015 mm		#10	99%	2.000 mm
					#20	86%	0.850 mm
% Gravel:	0.4%	L	iquid Limit: 0.0 %		#40	82%	0.425 mm
% Sand:	75.2%	P	lastic Limit: 0.0 %		#100	34%	0.150 mm
% Silt:	22.2%	Plas	ticity Index: 0.0 %		#200	24.4%	0.075 mm
% Clay:	2.2%				Silts	24.0%	0.074 mm
						14.6%	0.050 mm
						10.3%	0.020 mm
					Clays	2.2%	0.005 mm
						1.0%	0.002 mm
					Colloids	0.7%	0.001 mm
	USDA S	oil Textural (Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mm	1				
% Clay:		< 0.002 mm					
·							
	USDA S	oil Textural (Classification				
		Loamy Sand					
All results apply only to actual location regarding our reports is reserved pend			clients, the public and ourselves,	all reports are submitted as the con	fidential property of clients,	and authorization for public	ation of statements, conclusions or extracts from or
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Reviewed by:	0	\mathcal{C}					
· ·	Meghan Blodgett	-Carrillo	·				

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1564
Sample Date:	7/12/2021
Test Date:	9/20/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT13-GB-0-11 ft

 Visual Soil Description:
 brown sand with silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

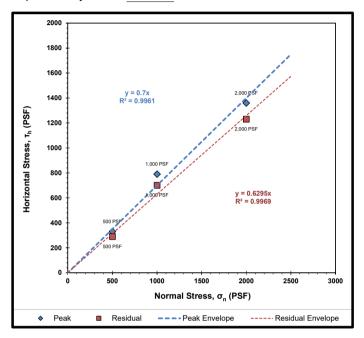
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	32.6	
	Initial	Post-Consolidation
Dry Density (PCF):	104.7	106.1
Void Ratio:	0.608	0.589
Porosity (%):	37.8	37.0
Degree of Saturation (%):	saturated	saturated

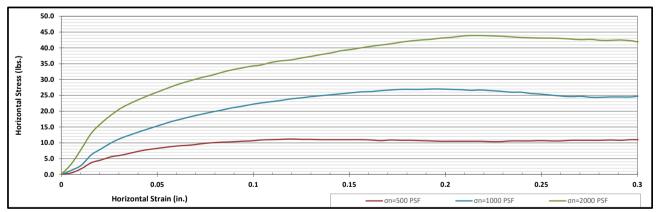
Summary of Sampl	e Data:	σ _n =1000 PSF				
Initial Moisture Content (%):	30.5					
	Initial	Post-Consolidation				
Dry Density (PCF):	105.5	108.0				
Void Ratio:	0.597	0.560				
Porosity (%):	37.4	35.9				
Degree of Saturation (%):	saturated	saturated				

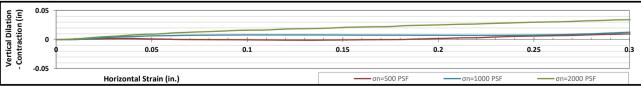
Summary of Sample	Data:	σ _n =2000 PSF
Initial Moisture Content (%):	31.4	
	Initial	Post-Consolidation
Dry Density (PCF):	105.7	113.8
Void Ratio:	0.595	0.481
Porosity (%):	37.3	32.5
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS											
	PEAK	RESIDUAL									
Angle of Internal Friction, φ (°):	35	32									
Cohesion (PSF):	0	0									



Failure Envelope Test Values:											
Normal Stress, σ _n (PSF):	500	1000	2000								
Peak Horizontal Stress, τ _h (PSF):	330	790	1360								
Residual Horizontal Stress, τ _h (PSF):	290	700	1230								





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Comments:

Source: LDW21-GT13-GB-11-21 ft Sample#: B21-1566

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 1-Sep-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.020 \\ \textbf{D}_{(10)} = 0.040 \\ \textbf{D}_{(15)} = 0.060 \\ \textbf{D}_{(30)} = 0.107 \\ \textbf{D}_{(50)} = 0.177 \\ \textbf{D}_{(60)} = 0.230 \\ \textbf{D}_{(90)} = 0.388 \\ \textbf{D}_{(90)} = 0.388 \end{array}$ mm % Gravel = 0.3% % Sand = 81.0% mm % Silt & Clay = 18.7% mm mm Liquid Limit = n/a Plasticity Index = n/amm

Sand Equivalent = n/a mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.25$ Coeff. of Uniformity, $C_U = 5.74$ Fineness Modulus = 0.87

Plastic Limit = n/a Moisture %, as sampled = 36.0% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face =

					D	ust Ratio = $17/88$	111111	1	racture	%, 2+ F					Fractur			
				AS		FM D6913, ASTM	C117											
		1	Interpolated Cumulative		,					Size Distrib	ution							
Sieve US	Size Metric	Percent Passing	Percent Passing	Specs Max	Specs Min			4 8 8	5/8° 7′ 7′ 7′ 7′ 7′ 7′ 7′ 7′ 7′ 7′ 7′ 7′ 7′	3/8"	© ° €	1 2 2 4 4 5 5	8 8 8 8 8 9	88				100.00
12.00"	300.00	rassing	100%	100.0%	0.0%	-	0%	-			*						TT	100.0%
10.00"	250.00		100%	100.0%	0.0%							1					1	
8.00"	200.00		100%	100.0%	0.0%		0%										$\perp \perp \downarrow$	90.0%
6.00"	150.00		100%	100.0%	0.0%												1	
4.00"	100.00		100%	100.0%	0.0%							1						
3.00"	75.00		100%	100.0%	0.0%	1	0%	-11111								+++	+++	80.0%
2.50"	63.00		100%	100.0%	0.0%												1 1	
2.00"	50.00	100%	100%	100.0%	0.0%		0%	ЩШ						ШШ		ШШ	<u> </u>	70.0%
1.75"	45.00		100%	100.0%	0.0%	1	·						1				1 1	70.070
1.50"	37.50		100%	100.0%	0.0%		- [1				1 1	
1.25"	31.50		100%	100.0%	0.0%		0%				+-+		\sqcup			++++	+	60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	p p							1				- 1	g
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing							I I				- 1	180
5/8"	16.00		100%	100.0%	0.0%	86	0%						Ĭ				1 1	50.0% 8
1/2"	12.50	100%	100%	100.0%	0.0%								}				1	
3/8"	9.50	100%	100%	100.0%	0.0%		0%											40.0%
1/4"	6.30		100%	100.0%	0.0%		1											
#4	4.75	100%	100%	100.0%	0.0%		H						\				1 1	
#8	2.36		99%	100.0%	0.0%	;	0%				+-+					+++	+	30.0%
#10	2.00	99%	99%	100.0%	0.0%		[]											
#16	1.18		98%	100.0%	0.0%		0%							1			1 1	20.0%
#20	0.850		98%	100.0%	0.0%	1	U%							*			11	20.0%
#30	0.600		97%	100.0%	0.0%												11	
#40	0.425	97%	97%	100.0%	0.0%		0%									\mathbb{H}		10.0%
#50	0.300		73%	100.0%	0.0%													
#60	0.250		64%	100.0%	0.0%													
#80	0.180		51%	100.0%	0.0%		0%	00.000	10	.000	1.00	jibid q O	00-00- 0	00	0.01		0.00	0.0%
#100	0.150	45%	45%	100.0%	0.0%								0.1		2.01		2.00	
#140	0.106		30%	100.0%	0.0%					Particle Si	e (mm)							
#170	0.090		24%	100.0%	0.0%													
#200	0.075	18.7%	18.7%	100.0%	0.0%	+ Sie	ve Sizes	_	— ма	x Specs	_	N	Min Specs			Sieve Resu	ults	
Copyright	Spears Engineering & Tec	hnical Services PS, 1996-9	98															

Reviewed by: _ Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT13-GB-21-31 ft Sample#: B21-1568

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 1-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

mm

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Spece

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ D_{(5)} = 0.021 \\ D_{(10)} = 0.042 \\ D_{(15)} = 0.063 \\ D_{(30)} = 0.109 \\ D_{(50)} = 0.177 \\ D_{(60)} = 0.229 \\ D_{(90)} = 0.385 \\ D_{(50)} = 13771 \\ \end{array}$ mm % Gravel = 0.1% % Sand = 82.1% mm % Silt & Clay = 17.9% mm mm Liquid Limit = n/a Plasticity Index = n/amm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.23$ Coeff. of Uniformity, $C_U = 5.46$ Fineness Modulus = 0.85

Plastic Limit = n/a Moisture %, as sampled = 34.3% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

						ust Ratio = 13/71	C11-		Fra	acture '	%, 2+	races	= n/	a		Keq'o	d Fract	ure %	o, 2+ F	aces =
		Actual	Interpolated	AS	TM C136, AS	TM D6913, ASTM	C117													
		Cumulative				ľ				Grain S	Size Distr	ibution								
Sieve	C:		Percent	C	C	-			5	٠,										
US	Metric	Percent		Specs Max	Specs Min		jo jo	- 5 - ₹ 8	5 z s %"	. %	3/8	∞ <u>Q</u> ##	\$ # 19 # 20 # 30	9 8 9	888	8				
12.00"	300.00	Passing	Passing 100%	100.0%	0.0%	1	00%				*****	7**	4	1	- 44 44	•	TT	ППП	TTT	T 100.0%
			100%	100.0%			ł							Ĭ						1
10.00"	250.00				0.0%		10%							Ш						90.0%
8.00"	200.00		100%	100.0%	0.0%		10% T													70.0%
6.00"	150.00		100%	100.0%	0.0%															-1
4.00"	100.00		100%	100.0%	0.0%		30%							Ш		Ш.			444	80.0%
3.00"	75.00		100%	100.0%	0.0%															1
2.50"	63.00		100%	100.0%	0.0%		ł							1						1
2.00"	50.00	100%	100%	100.0%	0.0%		70%			-			-##	++	-	₩₩	+		+++	70.0%
1.75"	45.00		100%	100.0%	0.0%		F													- 1
1.50"	37.50		100%	100.0%	0.0%															-1
1.25"	31.50		100%	100.0%	0.0%		50%							***		mm		11111		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	D									1					1 .
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%						Ш	Ш	•	ШШ		ШШ		50.0%
5/8"	16.00		100%	100.0%	0.0%	84									1					00.070
1/2"	12.50	100%	100%	100.0%	0.0%		F								1					1
3/8"	9.50	100%	100%	100.0%	0.0%		10%						-##		+	₩₩				40.0%
1/4"	6.30		100%	100.0%	0.0%										1					-1
#4	4.75	100%	100%	100.0%	0.0%										1					1
#8	2.36		100%	100.0%	0.0%	:	30%		+++			++		###		###	+ + -	-11111	+++	30.0%
#10	2.00	100%	100%	100.0%	0.0%		ł								1					1
#16	1.18		99%	100.0%	0.0%		20%													20.0%
#20	0.850		98%	100.0%	0.0%		20%									*				20.0%
#30	0.600		98%	100.0%	0.0%		-													1
#40	0.425	98%	98%	100.0%	0.0%		10%			<u> </u>				444	-	Ш		-11111	444	10.0%
#50	0.300		74%	100.0%	0.0%															1
#60	0.250		64%	100.0%	0.0%															1
#80	0.180		51%	100.0%	0.0%		0%	100.00		0000	000		1.000	-60	0.10	لللق		0.010		0.0%
#100	0.150	45%	45%	100.0%	0.0%			100.00	,,,	10.	.000		1.000		0.10					0.001
#140	0.106		29%	100.0%	0.0%						Particle	Size (mm	n)							
#170	0.090		23%	100.0%	0.0%															
#200	0.075	17.9%	17.9%	100.0%	0.0%	+ Sie	ve Sizes		_	<u>—</u> Мох	Specs		_ .	— Min	Specs			- Sieve	Results	
		hnical Services PS, 1996-9		1001070	0.070						,									

Comments:	-	
	Migh Clasget and lo	
Reviewed by:	n:	



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT19-GB-0-6.9 ft

Sample#: B21-1571

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 1-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

ML, Silt with Sand Sample Color:

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Meghan Blodgett-Carrillo

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.004 \\ \textbf{D}_{(10)} = 0.007 \\ \textbf{D}_{(15)} = 0.009 \\ \textbf{D}_{(30)} = 0.019 \\ \textbf{D}_{(50)} = 0.051 \\ \textbf{D}_{(60)} = 0.062 \\ \textbf{D}_{(90)} = 0.186 \\ \textbf{Partice} = 59/79 \\ \end{array}$ mm % Gravel = 1.2% % Sand = 27.1% mm % Silt & Clay = 71.7% mm mm Liquid Limit = 0.0% Plasticity Index = 0.0% mm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 0.88$ Coeff. of Uniformity, $C_U = 9.46$ Fineness Modulus = 0.29

Plastic Limit = 0.0% Moisture %, as sampled = 78.2%

Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Di	ust Ratio = 59/			5, 2+ Faces			d Fracture	%, 2+ F	
				AS	TM C136, AST	ΓM D6913, AS	TM C117							
		Actual	Interpolated					Grain Siz	e Distribution					
		1	Cumulative					==						
Sieve		Percent	Percent	Specs	Specs		70 18 19 14	2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	7. 4 80 E	8 8 8 8 8	88458			
US	Metric	Passing	Passing	Max	Min		100%	**********	ALTH		****			T 100.0%
12.00"	300.00		100%	100.0%	0.0%					*****				1
10.00"	250.00		100%	100.0%	0.0%					III N.				1
8.00"	200.00		100%	100.0%	0.0%		90%			***************************************	•		****	90.0%
6.00"	150.00		100%	100.0%	0.0%		ł I II				1			1
4.00"	100.00		100%	100.0%	0.0%		80%				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			80.0%
3.00"	75.00		100%	100.0%	0.0%		00% F				1			00.0%
2.50"	63.00		100%	100.0%	0.0%						1			1
2.00"	50.00	100%	100%	100.0%	0.0%		70%							70.0%
1.75"	45.00		100%	100.0%	0.0%									1
1.50"	37.50		100%	100.0%	0.0%						\ \ \			1
1.25"	31.50		100%	100.0%	0.0%		60%						HHHH	60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	2	H				*			2
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%							50.0% _b g
5/8"	16.00		100%	100.0%	0.0%	96	50%					(50.0% 80
1/2"	12.50	100%	100%	100.0%	0.0%							\		1
3/8"	9.50	100%	100%	100.0%	0.0%		40%					1		40.0%
1/4"	6.30		99%	100.0%	0.0%							\		1
#4	4.75	99%	99%	100.0%	0.0%							1 / II		1
#8	2.36		98%	100.0%	0.0%		30%	 				$+$ \uparrow $ \parallel$		30.0%
#10	2.00	98%	98%	100.0%	0.0%		F I II							1
#16	1.18		97%	100.0%	0.0%									1
#20	0.850		96%	100.0%	0.0%		20%					\top		20.0%
#30	0.600		96%	100.0%	0.0%							N		-1
#40	0.425	96%	96%	100.0%	0.0%		10%						NIII.	10.0%
#50	0.300		93%	100.0%	0.0%									1
#60	0.250		92%	100.0%	0.0%								*	
#80	0.180		90%	100.0%	0.0%		0%	000 10.00	// 40 / 466/	.000	0.100	0.010	шитт	0.0%
#100	0.150	89%	89%	100.0%	0.0%		100.0	10.00	~ Ι	.000	0.100	0.010		0.001
#140	0.106		79%	100.0%	0.0%			F	Particle Size (mm)					
#170	0.090		75%	100.0%	0.0%									
#200	0.075	71.7%	71.7%	100.0%	0.0%		Sieve Sizes	— Max S	pecs -	Min	Specs	s	ieve Results	
		hnical Services PS, 1996-9	ļ	100.070	0.070	<u> </u>		40x3			.,			
				and ourselves, all reports are	submitted as the confide	ntial property of clients	and authorization for	nublication of stateme	ents conclusions	er extracts from	or regarding on	r renorts is res	erved nending	our written appr

Reviewed by: _

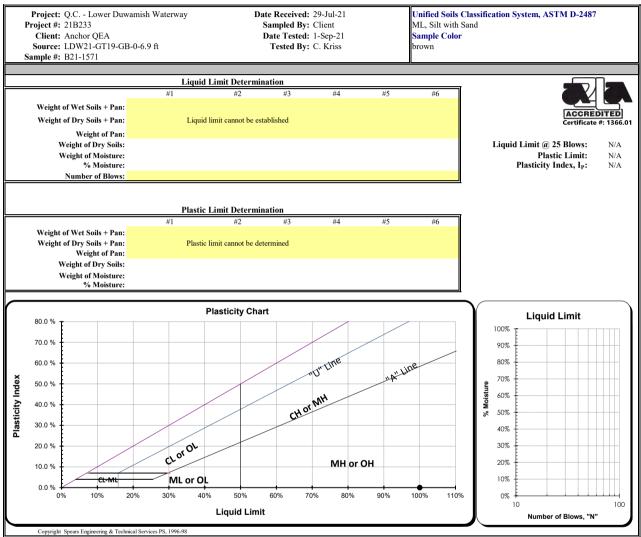


Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soil Classification System, ASTM-2487 **Project #:** 21B233 ML, Silt with Sand Sampled By: Client Client: Anchor QEA Date Tested: 1-Sep-21 Sample Color Source: LDW21-GT19-GB-0-6.9 ft Tested By: C. Kriss brown Sample#: B21-1571 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp Gr: Sieve Analysis 2.61 Sample Weight: 50.97 **Grain Size Distribution** Hydroscopic Moist .: 2.35% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 49.80 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Percent 100% 37.500 mm Corrected Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 0.0488 mm 24.5 48.4% 1.0" 100% 19.5 38.6% $0.0356 \ mm$ 3/4" 100% 19.000 mm 17.5 34.6% 0.0228 mm 5/8" 100% 16.000 mm 23.7% 0.0135 mm 1/2" 100% 12.500 mm 30 17.8% 0.0097 mm 3/8" 100% 9.500 mm 0.0070 mm 60 5.5 10.9% 1/4" 99% 6.300 mm 240 4.9% 0.0036 mm 99% 4.750 mm 2.5 #4 2.0% 0.0015 mm #10 98% 2.000 mm 1440 0.850 mm #20 96% 1.2% Liquid Limit: 0.0 % % Gravel: #40 96% 0.425 mm % Sand: 27.1% Plastic Limit: 0.0 % #100 89% 0.150 mm % Silt: 64.3% Plasticity Index: 0.0 % #200 71.7% 0.075 mm 0.074 mm % Clay: 7.4% Silts 70.8% 56.9% 0.050 mm 0.020 mm 31.3% 7.4% 0.005 mm Clays 2.7% $0.002 \ mm$ Colloids 1.3% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:** Reviewed by:



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils



All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT19-GB-6.9-8.5 ft

Sample#: B21-1572

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 1-Sep-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.068 \\ \textbf{D}_{(10)} = 0.168 \\ \textbf{D}_{(15)} = 0.215 \\ \textbf{D}_{(30)} = 0.356 \\ \textbf{D}_{(50)} = 0.749 \\ \textbf{D}_{(60)} = 1.006 \\ \textbf{D}_{(90)} = 1.777 \\ \textbf{Partice} = 9/61 \\ \end{array}$ mm % Gravel = 0.3% % Sand = 94.2% mm % Silt & Clay = 5.5% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 0.75$ Coeff. of Uniformity, $C_U = 5.98$

Fineness Modulus = 2.59 Plastic Limit = n/a Moisture %, as sampled = 27.9% Req'd Sand Equivalent =
Req'd Fracture %, 1 Face =

recquire 70, 1 ruce	
Req'd Fracture %, 2+ Faces =	

							9/61		Fractu	re %, 2+	Faces	= n/a		Req'd	Fractu	re %, 2	2+ Fac	es =
				AS	STM C136, AS	FM D6913,	ASTM C117											
		Actual	Interpolated						Gro	ain Size Dist	ibution							
			Cumulative	_	1 -	4			Ę.									
Sieve		Percent	Percent	Specs	Specs		. d	0 fe fe fo	2%	3/8" 2/8"	∞ <u>Q</u>	2883	8888	28				
US	Metric	Passing	Passing	Max	Min	4	100%				+**		++++	II TTT	T	TITT	T	I 100.0%
12.00"	300.00		100%	100.0%	0.0%		1				1							}
10.00"	250.00		100%	100.0%	0.0%		90%											90.0%
8.00"	200.00		100%	100.0%	0.0%		90%									mm		90.0%
6.00"	150.00		100%	100.0%	0.0%		1											1
4.00"	100.00		100%	100.0%	0.0%		80%				\bot							80.0%
3.00"	75.00		100%	100.0%	0.0%		į.											1
2.50"	63.00		100%	100.0%	0.0%		ŀ											1
2.00"	50.00	100%	100%	100.0%	0.0%		70%								-	₩₩	-	70.0%
1.75"	45.00		100%	100.0%	0.0%		ŀ											}
1.50"	37.50		100%	100.0%	0.0%		60%					\						60.0%
1.25"	31.50		100%	100.0%	0.0%		60%					V				mm		1
1.00"	25.00	100%	100%	100.0%	0.0%	guig	1					Ì						guis
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%									ШШ		50.0%
5/8"	16.00		100%	100.0%	0.0%	81						1						1
1/2"	12.50	100%	100%	100.0%	0.0%		ŀ					111						1
3/8"	9.50	100%	100%	100.0%	0.0%		40%									₩₩	 	40.0%
1/4"	6.30		100%	100.0%	0.0%		F					ì						}
#4	4.75	100%	100%	100.0%	0.0%		1											1
#8	2.36		99%	100.0%	0.0%		30%						\			mm		30.0%
#10	2.00	99%	99%	100.0%	0.0%		1						•					1
#16	1.18		67%	100.0%	0.0%		20%						1			ШШ		20.0%
#20	0.850		54%	100.0%	0.0%								1					1
#30	0.600		44%	100.0%	0.0%		ŀ						1					1
#40	0.425	37%	37%	100.0%	0.0%		10%		+++-+			╢╫╫	+1	++++		₩₩	-	10.0%
#50	0.300		24%	100.0%	0.0%		1						1 7	•				}
#60	0.250		19%	100.0%	0.0%								L L .					1
#80	0.180		11%	100.0%	0.0%		0%	100.000	D40000-01	10.000	-00-	1.000	0.1	00	0.0	10	0.	♣ 0.0% 001
#100	0.150	8%	8%	100.0%	0.0%													
#140	0.106		7%	100.0%	0.0%					Particle	Size (mm)							
#170	0.090		6%	100.0%	0.0%													
#200	0.075	5.5%	5.5%	100.0%	0.0%		+ Sieve Sizes			Max Specs		 -	Min Specs			Sieve Re	sults	
Copyright	Spears Engineering & Tech	nnical Services PS, 1996-9	8															

Reviewed by: Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT19-GB-8.5-18.5 ft

Sample#: B21-1574

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 1-Sep-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

mm

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.103 \\ \textbf{D}_{(10)} = 0.155 \\ \textbf{D}_{(15)} = 0.177 \\ \textbf{D}_{(30)} = 0.242 \\ \textbf{D}_{(50)} = 0.328 \\ \textbf{D}_{(60)} = 0.372 \\ \textbf{D}_{(90)} = 1.435 \\ \textbf{D}_{(50)} = 0.262 \\ \textbf{D}_{(50)} = 0.372 \\ \textbf{D}_{(90)} = 1.435 \\ \textbf{D}_{(50)} = 0.262 \\ \textbf{D}_{(50)} = 0.372 \\ \textbf{D}_{(90)} = 0.372 \\ \textbf$ mm % Gravel = 0.0% % Sand = 97.3% mm % Silt & Clay = 2.7% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.01$ Coeff. of Uniformity, $C_U = 2.40$ Fineness Modulus = 1.87 Plastic Limit = n/a

Moisture %, as sampled = 25.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Di	$D_{(90)} = 1.453$ ist Ratio = 2/53	111111	Fracture %	. 2+ Face	s = n/a	I		cture %		
				AS		M D6913, ASTM	C117		,			7	/ 0		
			Interpolated Cumulative		,				e Distributio						
Sieve US	Size Metric	Percent Passing	Percent Passing	Specs Max	Specs Min		5 % % 4	3/8° 17. 3		#16 #20 #30 #40	888888888888888888888888888888888888888				
12.00"	300.00	rassing	100%	100.0%	0.0%	1	00%			***	###				T 100.0%
10.00"	250.00		100%	100.0%	0.0%				,						1
8.00"	200.00		100%	100.0%	0.0%		90%			\					90.0%
6.00"	150.00		100%	100.0%	0.0%		1			\					1
4.00"	100.00		100%	100.0%	0.0%		-			1					1
3.00"	75.00		100%	100.0%	0.0%		30%			- <u>\</u>					80.0%
2.50"	63.00		100%	100.0%	0.0%					N.					1
2.00"	50.00	100%	100%	100.0%	0.0%										1
		100%	100%	100.0%			70%				11-11				70.0%
1.75"	45.00				0.0%										1
1.50"	37.50		100%	100.0%	0.0%		50%								60.0%
1.25"	31.50	1000/	100%	100.0%	0.0%										-
1.00"	25.00	100%	100%	100.0%	0.0%	Sing									Sing
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%								50.0%
5/8"	16.00		100%	100.0%	0.0%										1 "
1/2"	12.50	100%	100%	100.0%	0.0%										1
3/8"	9.50	100%	100%	100.0%	0.0%		40%								40.0%
1/4"	6.30		100%	100.0%	0.0%										1
#4	4.75	100%	100%	100.0%	0.0%										1
#8	2.36		100%	100.0%	0.0%		30%				11 11				30.0%
#10	2.00	100%	100%	100.0%	0.0%						 				1
#16	1.18		86%	100.0%	0.0%		20%								20.0%
#20	0.850		80%	100.0%	0.0%										1 20.000
#30	0.600		75%	100.0%	0.0%						i i				1
#40	0.425	72%	72%	100.0%	0.0%		10%				++1	\square			10.0%
#50	0.300		43%	100.0%	0.0%										1
#60	0.250		32%	100.0%	0.0%										1
#80	0.180		16%	100.0%	0.0%		0%	10 10.00	n U	1.000	0.100	ننىن	0.010		♣ 0.0% I.001
#100	0.150	9%	9%	100.0%	0.0%		.50.00	10.00	-		5.100		3.010	0	
#140	0.106		5%	100.0%	0.0%			F	article Size (m	ım)					
#170	0.090		4%	100.0%	0.0%										
#200	0.075	2.7%	2.7%	100.0%	0.0%	+ Si	eve Sizes	Max S	pecs		Min Specs	_	Sieve	Results	
	Spears Engineering & Tec		1			l									

Comments: Reviewed by: _

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1574
Sample Date:	7/13/2021
Test Date:	9/21/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT19-GB-8.5-18.5 ft

 Visual Soil Description:
 brown sand with silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

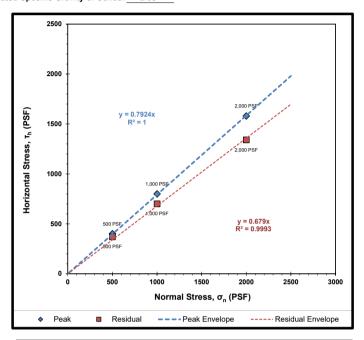
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	27.5	
	Initial	Post-Consolidation
Dry Density (PCF):	106.2	107.3
Void Ratio:	0.586	0.570
Porosity (%):	37.0	36.3
Degree of Saturation (%):	saturated	saturated

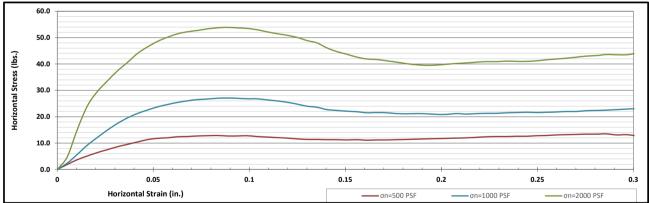
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	26.1	
	Initial	Post-Consolidation
Dry Density (PCF):	108.0	109.7
Void Ratio:	0.560	0.536
Porosity (%):	35.9	34.9
Degree of Saturation (%):	saturated	saturated

Summary of Samp	le Data:	σ _n =2000 PSF
Initial Moisture Content (%):	24.7	
	Initial	Post-Consolidation
Dry Density (PCF):	109.2	111.5
Void Ratio:	0.543	0.511
Porosity (%):	35.2	33.8
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS									
PEAK RESIDUAL									
Angle of Internal Friction, φ (°):	38	34							
Cohesion (PSF):	0	0							



Failure Envelope Test Values:										
Normal Stress, σ _n (PSF):	500	1000	2000							
Peak Horizontal Stress, τ _h (PSF):	400	800	1580							
Residual Horizontal Stress, τ _h (PSF):	370	700	1340							





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT19-GB-18.5-28.5 ft

Sample#: B21-1576

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 1-Sep-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color:

mm

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

 $D_{(90)} = 0.882$

Specifications

No Specs

Meghan Blodgett-Carrillo

Sample Meets Specs? N/A

 $\begin{array}{c} \textbf{ASTM D43} \\ D_{(5)} = 0.058 \\ D_{(10)} = 0.092 \\ D_{(15)} = 0.117 \\ D_{(30)} = 0.185 \\ D_{(50)} = 0.271 \\ D_{(60)} = 0.314 \\ D_{(50)} = 0.882 \end{array}$ mm % Gravel = 0.0% % Sand = 93.6% mm % Silt & Clay = 6.4% mm mm Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.18$ Coeff. of Uniformity, $C_U = 3.40$ Fineness Modulus = 1.41 Plastic Limit = n/a

Moisture %, as sampled = 27.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	ust Ratio =	5/67		Fra	cture %	, 2+ Fa	aces =	n/a		F	Req'd I	Fractu	ıre %,	2+ Fa	aces =
				AS	TM C136, AS	ΓM D6913, A	STM C11	7												
		Actual	Interpolated							Grain Size	e Distribu	ıtion								
		Cumulative																		
Sieve		Percent	Percent	Specs	Specs		ь	90 go g4 go	<u>څ</u> . پکټي	5/8′′′	E+ 4	2 Qu	888	888	8458	3				
US	Metric	Passing	Passing	Max	Min		100% 🕵		• (0 0 0	- N. W.	A T	*** ****** ±	1	+++				ппт		T 100.0%
12.00"	300.00		100%	100.0%	0.0%							\								1
10.00"	250.00		100%	100.0%	0.0%							1								1
8.00"	200.00		100%	100.0%	0.0%		90%			1 1		-	Ŷ.		-#		-	Ш		90.0%
6.00"	150.00		100%	100.0%	0.0%		1													1
4.00"	100.00		100%	100.0%	0.0%		80%													80.0%
3.00"	75.00		100%	100.0%	0.0%		00%													00.078
2.50"	63.00		100%	100.0%	0.0%															1
2.00"	50.00	100%	100%	100.0%	0.0%		70%		HHH		++++			4	#	HHH		₩.		70.0%
1.75"	45.00		100%	100.0%	0.0%															1
1.50"	37.50		100%	100.0%	0.0%		1													1
1.25"	31.50		100%	100.0%	0.0%		60%		++++		++++	+		+	-#	++++	-	+++		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	0	ŀ							i						2
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%													50.0%
5/8"	16.00		100%	100.0%	0.0%	P6	30%													30.0% 80
1/2"	12.50	100%	100%	100.0%	0.0%		-							ì						1
3/8"	9.50	100%	100%	100.0%	0.0%		40%				++++					\mathbb{H}		Ш		40.0%
1/4"	6.30		100%	100.0%	0.0%									I						1
#4	4.75	100%	100%	100.0%	0.0%		1							1						1
#8	2.36		100%	100.0%	0.0%		30%	+-++	++++		++++	+		1		Ш	-	Ш		30.0%
#10	2.00	100%	100%	100.0%	0.0%		ŀ								\					1
#16	1.18		93%	100.0%	0.0%		20%								۱ II					20.0%
#20	0.850		90%	100.0%	0.0%		20%								M					20.0%
#30	0.600		87%	100.0%	0.0%		-								Ž.					1
#40	0.425	86%	86%	100.0%	0.0%		10%				++++				- \		_	###		10.0%
#50	0.300		57%	100.0%	0.0%															1
#60	0.250		45%	100.0%	0.0%															1
#80	0.180		29%	100.0%	0.0%		0%	100.000		10.000	1 6 6 1 1	00-0	000	-00-0	0.100	نننز	0.0	010		0.0%
#100	0.150	22%	22%	100.0%	0.0%							1.0	-		250		0.0			
#140	0.106		13%	100.0%	0.0%					P	article Siz	e (mm)								
#170	0.090		10%	100.0%	0.0%															
#200	0.075	6.4%	6.4%	100.0%	0.0%		+ Sieve Size	s		— Max Sp	oecs	_		Min Spe	ecs	_		Sieve F	Results	
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ente annly only to a	ctual locations and material	s tested. As a mutual prote	ction to clients, the public :	and ourselves, all reports are s	submitted as the confide	ntial property of clie	inter and authoris	ation for nu	blication	of statemen	nts conclu	rione or	extracts	from or	r ragardi	ing our p	and in	racarrad	li	

Comments: Reviewed by:



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As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results	Test(s) Performed:		Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 13, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1693	LDW21-GT37-GB-0-1.5 ft	233.7	583.3	440.8	142.5	207.1	68.8%
B21-1694	LDW21-GT37-GB-10-11.5 ft	302.0	688.9	534.6	154.3	232.6	66.3%
B21-1695	LDW21-GT37-GB-10-20 ft	234.3	678.9	534.1	144.8	299.8	48.3%
B21-1696	LDW21-GT37-GB-20-21.5 ft	341.8	864.9	644.8	220.1	303.0	72.6%
B21-1697	LDW21-GT37-GB-20-30 ft	316.0	945.0	766.3	178.7	450.3	39.7%
B21-1698	LDW21-GT37-GB-30-31.5 ft	346.9	1041.2	892.0	149.2	545.1	27.4%
B21-1699	LDW21-GT18-GB-0-1.5 ft	360.3	577.1	507.3	69.8	147.0	47.5%
B21-1700	LDW21-GT18-GB-0-6.5 ft	233.5	726.8	590.5	136.3	357.0	38.2%
B21-1701	LDW21-GT18-GB-6.5-8 ft	357.0	752.8	656.6	96.2	299.6	32.1%
B21-1702	LDW21-GT18-GB-6.5-16.5 ft	217.3	795.2	684.7	110.5	467.4	23.6%
B21-1703	LDW21-GT18-GB-16.5-18 ft	354.3	1016.0	893.3	122.7	539.0	22.8%
B21-1704	LDW21-GT18-GB-16.5-21.4 ft	10.2	159.2	118.5	40.7	108.3	37.6%
B21-1705	LDW21-GT18-GB-21.4-26.5 ft	690.5	1366.5	1179.1	187.4	488.6	38.4%
B21-1706	LDW21-GT18-GB-26.5-28 ft	359.5	929.9	801.2	128.7	441.7	29.1%
					1		

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 13, 2021	Tested by: A. Eifrig

I	l	I						I	Mass of	I	I	I	I	1 1
										Mass of			Temp.	1
				Mass of Dry		Mass of	Volume of		w/ water &					Corrected
Sample #	Location	Tare	Tare	Soil	Pycno ID	Pycno	Pycno	Water @ Tx		w/ water	*C	Soils	Factor	SpG
B21-1695	LDW21-GT37-GB-10-20 ft	493.21	568.13	74.9	TSA-013	184.0	499.7	0.99756	728.81	682.44				2.6224169
B21-1697	LDW21-GT37-GB-20-30 ft	497.94	575.45	77.5	TSA-011	190.3	499.5	0.99752	736.61	688.63	23.1	2.624687		2.6228759
B21-1700	LDW21-GT18-GB-0-6.5 ft	600.24	700.15	99.9	TSA-020	195.0	499.5	0.99752	753.52	693.28		2.5184539		2.5167161
B21-1702	LDW21-GT18-GB-6.5-16.5 ft	510.32	612.20	101.9	TSA-010	180.3	499.5	0.99754	742.28	678.62				2.6637535
B21-1705	LDW21-GT18-GB-21.4-26.5 ft	501.27	576.59	75.3	TSA-021	183.4	499.4	0.99745	727.11	681.56	23.4	2.5303609	0.99924	2.5284379
		<u> </u>												
		<u> </u>												
														igsquare
														
														
														
														
														
		1							-					
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT37-GB-10-20 ft

Sample#: B21-1695

#140

#170

#200

0.106

0.090

0.075

41.7%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 13-Sep-21 Tested By: C. Kriss Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs ? N/A

Coeff. of Curvature, $C_C = 3.61$ Coeff. of Uniformity, $C_U = 17.03$ Fineness Modulus = 0.59 Plastic Limit = 0.0%

Moisture %, as sampled = 48.3% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.386$	mm	i	Fracture	·%, 1 ł	face = 1	n/a
					D	Oust Ratio = $21/47$	'	Fr	acture %	, 2+ Fa	aces = 1	n/a
				AS	STM C136, AS	TM D6913, AST	M C117					
		Actual	Interpolated						Grain Size	e Distribi	ution	
			Cumulative		T				E.			
Sieve		Percent	Percent	Specs	Specs		io i₀	2 4 6 4 6 6 €		4.2	<u>∞</u> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	8 5
US	Metric	Passing	Passing	Max	Min	4	100%	••-•••••••••••••••••••••••••••••••••••	••••	nêzê T	ê 📥	1
12.00"	300.00		100%	100.0%	0.0%						1	Ш
10.00"	250.00		100%	100.0%	0.0%		90%					
8.00"	200.00		100%	100.0%	0.0%		90%					Ш
6.00"	150.00		100%	100.0%	0.0%							
4.00"	100.00		100%	100.0%	0.0%		80%			44444	_	Щ
3.00"	75.00		100%	100.0%	0.0%							
2.50"	63.00		100%	100.0%	0.0%		ł l					
2.00"	50.00	100%	100%	100.0%	0.0%		70%		+	HHHH	-	Ж
1.75"	45.00		100%	100.0%	0.0%		- [
1.50"	37.50		100%	100.0%	0.0%							
1.25"	31.50		100%	100.0%	0.0%		60%			mm		Ш
1.00"	25.00	100%	100%	100.0%	0.0%	D Lie						
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%			ШШ		Ш
5/8"	16.00		100%	100.0%	0.0%	Bc.						
1/2"	12.50	100%	100%	100.0%	0.0%		H					
3/8"	9.50	100%	100%	100.0%	0.0%		40%			+++++		#
1/4"	6.30		100%	100.0%	0.0%							
#4	4.75	99%	99%	100.0%	0.0%		11					
#8	2.36		99%	100.0%	0.0%		30%			HHHH		Ш
#10	2.00	99%	99%	100.0%	0.0%		<u> </u>					
#16	1.18		96%	100.0%	0.0%		20%			ШШ		Ш
#20	0.850		95%	100.0%	0.0%		20,0					
#30	0.600		94%	100.0%	0.0%							
#40	0.425	93%	93%	100.0%	0.0%		10%		+	+++++		#
#50	0.300		83%	100.0%	0.0%		-					
#60	0.250		78%	100.0%	0.0%							
#80	0.180		72%	100.0%	0.0%		0%	100.000	10.00	10 10	1.000	40 i (
#100	0.150	69%	69%	100.0%	0.0%							

100.0%

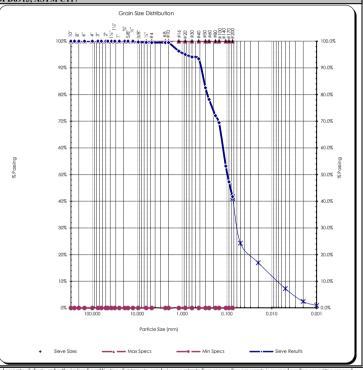
100.0%

100.0%

53%

47%

41.7%



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It is usual source for to actual locations and materials is level. As a mutual protection to clients, the oublic and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments:

| Mayh Chilget and book | Reviewed by:

0.0%

0.0%

0.0%



Hydrometer Report

Project:	Q.C Lower	Duwamish Wat	erway Date Recei			assification Sys	stem, ASTM-2487
Project #: 1	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 13-Sep-21	Sample Color		
Source:	LDW21-GT3	7-GB-10-20 ft	Tested E	By: C. Kriss	brown		
Sample#:	B21-1695			•			
A	STM D7928	3. HYDROME	TER ANALYSI	S		ASTM	D6913
Sp Gr :	2.62	-				Sieve A	
Sample Weight:	74.76	grams				Grain Size	•
Hydroscopic Moist.:	2.84%				Sieve	Percent	Soils Particle
Adj. Sample Wgt :	72.70	grams		ACCREDITED	Size	Passing	Diameter
and a market wight	7-77	8		Certificate #: 1366.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	18.5	25.6%	0.0505 mm		1.0"	100%	25.000 mm
2	15.5	21.4%	0.0364 mm		3/4"	100%	19.000 mm
5	13.5	18.7%	0.0234 mm		5/8"	100%	16.000 mm
15	10	13.8%	0.0137 mm		1/2"	100%	12.500 mm
30	9	12.4%	0.0097 mm		3/8"	100%	9.500 mm
60	7	9.7%	0.0097 mm		1/4"	100%	6.300 mm
240	4	5.5%	0.0070 mm		#4	99%	4.750 mm
	1						
1440	1	1.4%	0.0015 mm		#10	99%	2.000 mm
N/ G 1	0.50/				#20	95%	0.850 mm
% Gravel:	0.5%		iquid Limit: 0.0 %		#40	93%	0.425 mm
% Sand:	57.8%		lastic Limit: 0.0 %		#100	69%	0.150 mm
% Silt:	34.4%	Plas	ticity Index: 0.0 %		#200	41.7%	0.075 mm
% Clay:	7.3%				Silts	41.1%	0.074 mm
						24.3%	0.050 mm
						17.0%	0.020 mm
					Clays	7.3%	0.005 mm
						2.5%	0.002 mm
					Colloids	0.9%	0.001 mm
	USDA S	oil Textural C	Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mm	L				
% Clay:		< 0.002 mm					

	USDA S	oil Textural C	lassification				
		Loamy Sand					
All security and you have a street to contract to	us and matarials **- 4	As a mutual mustace:	aliants the multis and ar	all concerts are submitted as 41	fidential moneuty of disease	and authorization for LE-	ation of statements, conclusions or extracts from or
regarding our reports is reserved pend			chenis, the public and ourselves,	an reports are submitted as the con	indential property of chems,	and addiorization for public	ation of statements, conclusions of extracts from of
Comments:							
	4	1. 11					
	Worth Ash	abget arillo					
Davioused by	11/	1					
Reviewed by:	Manhan Dla 1	t Camilla					

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1695
Sample Date:	7/14/2021
Test Date:	9/16/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT37-GB-10-20 ft

 Visual Soil Description:
 brown silty sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

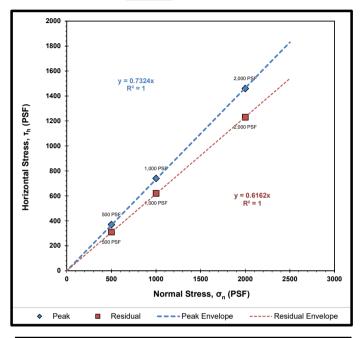
 Specimen Diameter (in):
 2.5

Summary of Sample	σ _n =500 PSF	
Initial Moisture Content (%):	35.3	
	Initial	Post-Consolidation
Dry Density (PCF):	100.7	102.8
Void Ratio:	0.673	0.639
Porosity (%):	40.2	39.0
Degree of Saturation (%):	saturated	saturated

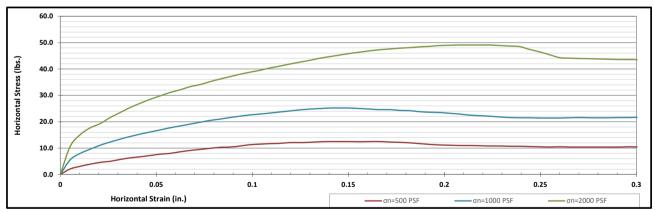
Summary of Sample	σ _n =1000 PSF	
Initial Moisture Content (%):	36.0	
	Initial	Post-Consolidation
Dry Density (PCF):	100.9	110.5
Void Ratio:	0.670	0.525
Porosity (%):	40.1	34.4
Degree of Saturation (%):	saturated	saturated

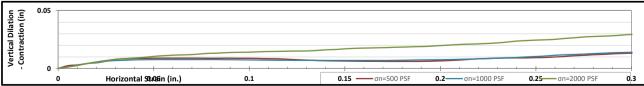
Summary of Sample	σ _n =2000 PSF	
Initial Moisture Content (%):	35.4	
	Initial	Post-Consolidation
Dry Density (PCF):	101.4	114.5
Void Ratio:	0.662	0.471
Porosity (%):	39.8	32.0
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS						
	PEAK	RESIDUAL				
Angle of Internal Friction, φ (°):	36	32				
Cohesion (PSF):	0	0				



Failure Envelope Test Values:								
Normal Stress, σ _n (PSF):	500	1000	2000					
Peak Horizontal Stress, τ _h (PSF):	370	740	1460					
Residual Horizontal Stress, τ _h (PSF):	310	620	1230					





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT37-GB-20-30 ft

Sample#: B21-1697

#140

#170

#200

0.106

0.090

0.075

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 13-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.013 \\ D_{(10)} = 0.025 \\ D_{(15)} = 0.038 \\ D_{(30)} = 0.077 \\ D_{(50)} = 0.165 \\ \end{array}$ mm % Gravel = 0.2% % Sand = 70.3% mm % Silt & Clay = 29.5% mm mm Liquid Limit = 0.0% mm Plasticity Index = 0.0% $D_{(60)} = 0.234$ mm Sand Equivalent = n/a

Face = n/a ces = n/a

Coeff. of Curvature, $C_C = 1.00$ Coeff. of Uniformity, $C_U = 9.20$ Fineness Modulus = 1.03

Plastic Limit = 0.0% Moisture %, as sampled = 39.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.767$	mm	Fra	cture %,	, 1 Fac
					D	ust Ratio = 1/3		Fracti	ure %, 2+	+ Fac
				AS	STM C136, AS	TM D6913, ASTN	A C117			
		Actual	Interpolated					Gr	rain Size Dis	stributio
		Cumulative	Cumulative							
	e Size	Percent	Percent	Specs	Specs		b 10 10	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	\$6 . \$0 .* 4	- ∞2
US	Metric	Passing	Passing	Max	Min		100%	-0,00.000.0	10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	, ##
12.00"	300.00		100%	100.0%	0.0%					
10.00"	250.00		100%	100.0%	0.0%					
8.00"	200.00		100%	100.0%	0.0%		90%			+++
6.00"	150.00		100%	100.0%	0.0%					
4.00"	100.00		100%	100.0%	0.0%		80%			
3.00"	75.00		100%	100.0%	0.0%		00%			
2.50"	63.00		100%	100.0%	0.0%					
2.00"	50.00	100%	100%	100.0%	0.0%		70%			+++
1.75"	45.00		100%	100.0%	0.0%					
1.50"	37.50		100%	100.0%	0.0%					
1.25"	31.50		100%	100.0%	0.0%		60%			+++
1.00"	25.00	100%	100%	100.0%	0.0%	D.				
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%			
5/8"	16.00		100%	100.0%	0.0%	96	50%			
1/2"	12.50	100%	100%	100.0%	0.0%					
3/8"	9.50	100%	100%	100.0%	0.0%		40%			+
1/4"	6.30		100%	100.0%	0.0%					
#4	4.75	100%	100%	100.0%	0.0%					
#8	2.36		98%	100.0%	0.0%		30%			+++
#10	2.00	98%	98%	100.0%	0.0%					
#16	1.18		93%	100.0%	0.0%		20%			
#20	0.850		91%	100.0%	0.0%		20,0			
#30	0.600		89%	100.0%	0.0%					
#40	0.425	88%	88%	100.0%	0.0%		10%	+		+
#50	0.300		70%	100.0%	0.0%					
#60	0.250		62%	100.0%	0.0%					
#80	0.180		52%	100.0%	0.0%		0%	00.000	10.000	, <u></u>
#100	0.150	48%	48%	100.0%	0.0%					
		1				II			D-4-1	- Ci I-

100.0%

100.0%

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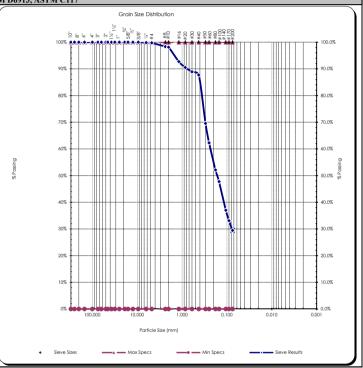
37%

33%

29.5%

29.5%

Meghan Blodgett-Carrillo



Comments: Reviewed by:

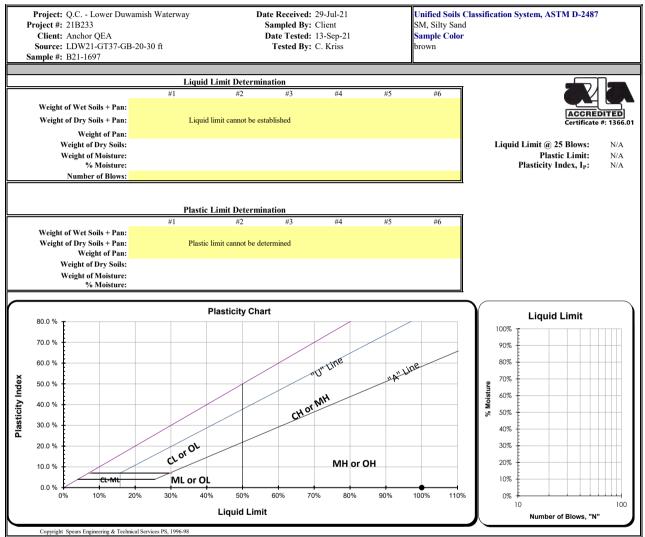
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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils



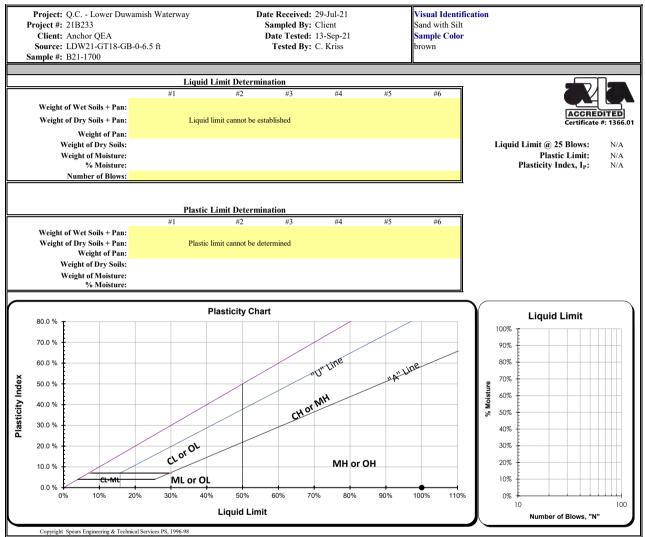
All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils



All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT18-GB-6.5-16.5 ft

Sample#: B21-1702

#170

#200

0.090

0.075

Meghan Blodgett-Carrillo

1.3%

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 13-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.136 \\ D_{(10)} = 0.168 \\ D_{(15)} = 0.190 \\ D_{(30)} = 0.255 \\ D_{(50)} = 0.342 \\ \end{array}$ mm % Gravel = 0.0% % Sand = 98.7% mm % Silt & Clay = 1.3% mm mm Liquid Limit = n/a Plasticity Index = n/a $D_{(60)} = 0.385$ mm Sand Equivalent = n/a

n/a

Coeff. of Curvature, $C_C = 1.00$ Coeff. of Uniformity, $C_U = 2.29$ Fineness Modulus = 1.97 Plastic Limit = n/a

Moisture %, as sampled = 23.6% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

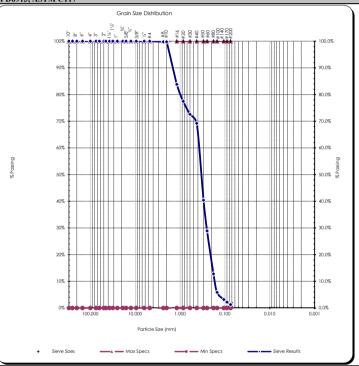
						$D_{(90)} = 1.497$	mm	F	racture %,	, 1 Fac	ce = 1	1/
					D	oust Ratio = 1/54		Fra	cture %, 2-	+ Fac	es = r	1/
				AS	STM C136, AS	TM D6913, ASTM	C117					
		Actual	Interpolated						Grain Size Dis	stributio	on	
	~•	7	Cumulative			4		54	_			
Sieve		Percent	Percent	Specs	Specs			. 4 % % 4 . 	3/8"	- «ºº	2 2 8	2
US 12.00"	Metric 300.00	Passing	Passing 100%	Max 100.0%	Min 0.0%		100%			7	-	Ħ
10.00"	250.00		100%	100.0%	0.0%		l l				\	
8.00"	200.00		100%	100.0%	0.0%		90%					
6.00"	150.00		100%	100.0%	0.0%		70,70				. \	
4.00"	100.00		100%	100.0%	0.0%		- [1	
3.00"	75.00		100%	100.0%	0.0%		80%			+++	-\	Н
2.50"	63.00		100%	100.0%	0.0%						ň	ı
2.00"	50.00	100%	100%	100.0%	0.0%							١
1.75"	45.00	10076	100%	100.0%	0.0%		70%			111		Ħ
1.73	37.50		100%	100.0%	0.0%						. 111	
1.25"	31.50		100%	100.0%	0.0%		60%				Щ	Ц
1.23	25.00	100%	100%	100.0%	0.0%						.	
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	ł I					
5/8"	16.00	10076	100%	100.0%	0.0%	86 Q.	50%			+++		Н
1/2"	12.50	100%	100%	100.0%	0.0%		- []					
3/8"	9.50	100%	100%	100.0%	0.0%		40%					
1/4"	6.30	10070	100%	100.0%	0.0%		40%					Ħ
#4	4.75	100%	100%	100.0%	0.0%						.	
#8	2.36	10070	100%	100.0%	0.0%		30%			$+\!\!+\!\!-\!\!+$		Щ
#10	2.00	100%	100%	100.0%	0.0%							
#16	1.18	10070	84%	100.0%	0.0%							
#20	0.850	1	77%	100.0%	0.0%		20%			+++		Ħ
#30	0.600		73%	100.0%	0.0%						. 111	
#40	0.425	69%	69%	100.0%	0.0%		10%				Ш	Ш
#50	0.300	3770	40%	100.0%	0.0%		.5%					I
#60	0.250		29%	100.0%	0.0%		- []				. 11	
#80	0.180		13%	100.0%	0.0%		0%			ووللر		4
#100	0.150	6%	6%	100.0%	0.0%			100.000	10.000		1.000	
#140	0.106	370	3%	100.0%	0.0%				Partic	le Size (n	mm)	
#1 7 0	0.100		370	100.070	0.070							

100.0%

100.0%

2%

1.3%



Comments:	
	1 . 201 A. II
Reviewed by:	Nagh Chilget aille

0.0%

0.0%



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT18-GB-16.5-21.4 ft

Sample#: B21-1704

#140

#170

#200

0.106

0.090

0.075

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 13-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

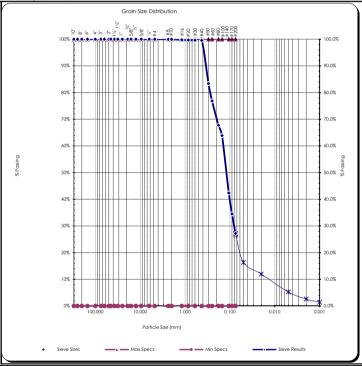
 $\begin{array}{l} \textbf{AS IM D43} \\ \textbf{D}_{(5)} = 0.005 \\ \textbf{D}_{(10)} = 0.014 \\ \textbf{D}_{(15)} = 0.038 \\ \textbf{D}_{(30)} = 0.081 \\ \textbf{D}_{(50)} = 0.122 \\ \textbf{D}_{(60)} = 0.142 \\ \textbf{D}_{(90)} = 0.351 \end{array}$ mm % Gravel = 0.0% % Sand = 72.8% mm % Silt & Clay = 27.2% mm mm Liquid Limit = 0.0% mm Plasticity Index = 0.0% mm Sand Equivalent = n/a mm

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 3.31$ Coeff. of Uniformity, $C_U = 10.24$ Fineness Modulus = 0.53

Plastic Limit = 0.0% Moisture %, as sampled = 37.6% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.351$	mm		racture %		
						ust Ratio = 3/11			cture %, 2	+ Fa	ces
				AS	TM C136, AS	FM D6913, ASTM	I C117				
		Actual	Interpolated			ľ			Grain Size D	istribut	ion
61	GI.	_	Cumulative	-							
Sieve		Percent	Percent	Specs	Specs		io io	6 6 7 8 8 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	_ % %	4 8	2
US 12.00"	Metric	Passing	Passing 100%	Max	Min 0.0%	4	100%			·T	•
10.00"	300.00 250.00		100%	100.0% 100.0%	0.0%		l l				
							90%				
8.00"	200.00		100%	100.0%	0.0%		/0/8 F				T
6.00"	150.00		100%	100.0%	0.0%						
4.00"	100.00		100%	100.0%	0.0%		80%				+-
3.00"	75.00		100%	100.0%	0.0%						
2.50"	63.00	1000/	100%	100.0%	0.0%		t I				
2.00"	50.00	100%	100%	100.0%	0.0%		70%			+++-	+-
1.75"	45.00		100%	100.0%	0.0%						
1.50"	37.50		100%	100.0%	0.0%						
1.25"	31.50		100%	100.0%	0.0%		60%				T
1.00"	25.00	100%	100%	100.0%	0.0%	- E	11				
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%			Ш	1
5/8"	16.00		100%	100.0%	0.0%	6.					
1/2"	12.50	100%	100%	100.0%	0.0%		- H				
3/8"	9.50	100%	100%	100.0%	0.0%		40%				+-
1/4"	6.30		100%	100.0%	0.0%						
#4	4.75	100%	100%	100.0%	0.0%		11				
#8	2.36		100%	100.0%	0.0%		30%			++	+
#10	2.00	100%	100%	100.0%	0.0%		l l				
#16	1.18		100%	100.0%	0.0%		20%			Ш	┸
#20	0.850		100%	100.0%	0.0%		20%				
#30	0.600		100%	100.0%	0.0%		- []				
#40	0.425	100%	100%	100.0%	0.0%		10%				+-
#50	0.300		83%	100.0%	0.0%						
#60	0.250		77%	100.0%	0.0%						
#80	0.180		68%	100.0%	0.0%		0%	100.000	10.000		
#100	0.150	64%	64%	100.0%	0.0%						
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Comments: Reviewed by:

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27.2%

27.2%



Hydrometer Report

		Duwamish Wat	terway Date Recei			assification Syst	tem, ASTM-2487
Project #: 2	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 1-Sep-21	Sample Color		
Source:	LDW21-GT1	8-GB-16.5-21.4	ft Tested	By: C. Kriss	brown		
Sample#: 1	B21-1704			•			
		HADDOWE	ETER ANALYSI	9		ASTM	D6013
Sp Gr :	2.53	, III DROMI	TER ANALISI			Sieve A	
-							•
Sample Weight:	99.41	grams				Grain Size D	
Hydroscopic Moist.:	2.98%				Sieve	Percent	Soils Particle
Adj. Sample Wgt :	96.53	grams		Certificate #: 1366.01	Size	Passing	Diameter
				Certificate #. 1500.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	17	18.1%	0.0526 mm		1.0"	100%	25.000 mm
2	14	14.9%	0.0379 mm		3/4"	100%	19.000 mm
5	12.5	13.3%	0.0242 mm		5/8"	100%	16.000 mm
15	9.5	10.1%	0.0142 mm		1/2"	100%	12.500 mm
30	8	8.5%	0.0101 mm		3/8"	100%	9.500 mm
60	6.5	6.9%	0.0072 mm		1/4"	100%	6.300 mm
240	4	4.3%	0.0036 mm		#4	100%	4.750 mm
1440	2	2.1%	0.0015 mm		#10	100%	2.000 mm
a/ G 1	0.00/				#20	100%	0.850 mm
% Gravel:	0.0%		iquid Limit: 0.0 %		#40	100%	0.425 mm
% Sand:	72.8%		lastic Limit: 0.0 %		#100	64%	0.150 mm
% Silt:	21.9%	Plas	ticity Index: 0.0 %		#200	27.2%	0.075 mm
% Clay:	5.3%				Silts	26.8%	0.074 mm
						16.4%	0.050 mm
					CI.	12.0%	0.020 mm
					Clays	5.3%	0.005 mm
					6 11 11	2.6%	0.002 mm
					Colloids	1.4%	0.001 mm
	USDA S	oil Textural (Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mm	1				
% Clay:		< 0.002 mm					
	USDA S	oil Textural C	Classification				
		Loamy Sand					
All results apply only to actual location regarding our reports is reserved pend			clients, the public and ourselves,	all reports are submitted as the co	nfidential property of clients,	and authorization for publica	tion of statements, conclusions or extracts from or
	0 11						
Comments:							
	1 10	adjet arillo					
	(Yogh the	reget and to					
Reviewed by:		0					
	Meghan Blodgett	t-Carrillo					

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1704
Sample Date:	7/14/2021
Test Date:	9/17/2021
Technician:	M. Carrillo

LDW21-GT18-GB-16.5-21.4 ft Sample Source: Visual Soil Description: brown silty sand Type of Specimen: Specimen Diameter (in): Remolded Cylindrical Shear Box

2.5

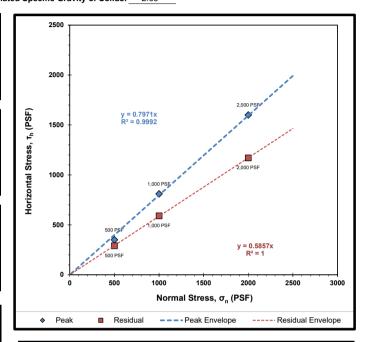
Specimen Height (in): Rate of Strain (in/min): 0.0208 Estimated Specific Gravity of Solids: 2.65

Summary of Sample	Data:	σ _n =500 PSF		
Initial Moisture Content (%):	29.4			
	Initial	Post-Consolidation		
Dry Density (PCF):	107.0	107.9		
Void Ratio:	0.575	0.562		
Porosity (%):	36.5	36.0		
Degree of Saturation (%):	saturated	saturated		

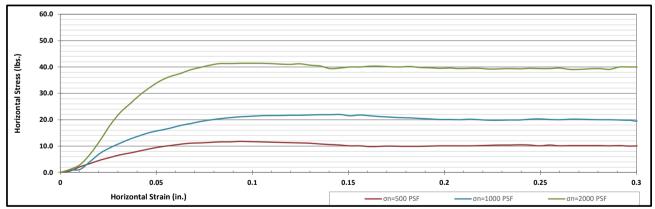
Summary of Sample	Data:	σ _n =1000 PSF			
Initial Moisture Content (%):	28.3				
	Initial	Post-Consolidation			
Dry Density (PCF):	107.4	109.9			
Void Ratio:	0.569	0.533			
Porosity (%):	36.3	34.8			
Degree of Saturation (%):	saturated	saturated			

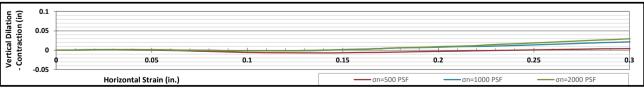
Summary of Sample	e Data:	σ _n =2000 PSF		
Initial Moisture Content (%):	29.0			
	Initial	Post-Consolidation		
Dry Density (PCF):	106.9	110.5		
Void Ratio:	0.576	0.525		
Porosity (%):	36.5	34.4		
Degree of Saturation (%):	saturated	saturated		

ESTIMATED STRENGTH PARAMETERS							
	PEAK	RESIDUAL					
Angle of Internal Friction, φ (°):	39	30					
Cohesion (PSF):	0	0					



Failure Envelope Test Values:						
Normal Stress, σ _n (PSF):	500	1000	2000			
Peak Horizontal Stress, τ _h (PSF):	350	810	1600			
Residual Horizontal Stress, τ _h (PSF):	290	590	1170			





Corporate • 777 Chrysler Drive • Burlington, WA 98233 • Phone 360.755.1990 • Fax 360.755.1980 SW Region • 2118 Black Lake Blvd. S.W.• Olympia, WA 98512 • Phone 360.534.9777 • Fax 360.534.9779 NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111 Kitsap Region • 5451 N.W. Newberry Hill Road, Suite 101 • Silverdale, WA 98383 • Phone/Fax 360.698.6787



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT18-GB-21.4-26.5 ft

Sample#: B21-1705

Reviewed by:

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 13-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color: brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.013 \\ \textbf{D}_{(10)} = 0.025 \\ \textbf{D}_{(15)} = 0.038 \\ \textbf{D}_{(30)} = 0.076 \\ \textbf{D}_{(50)} = 0.128 \\ \textbf{D}_{(60)} = 0.162 \\ \textbf{D}_{(90)} = 0.393 \\ \textbf{Patic} = 23/73 \end{array}$ mm % Gravel = 0.7% % Sand = 69.6% mm % Silt & Clay = 29.7% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

Fineness Modulus = 0.74 Plastic Limit = n/a Moisture %, as sampled = 38.4% Req'd Sand Equivalent =

Coeff. of Curvature, $C_C = 1.41$ Coeff. of Uniformity, $C_U = 6.40$

mm Fracture %, 1 Face = n/a

Req a Fracture %, 1 Face =									
Rec	d' Fracture %, 2+ Faces =								

					Dust Ratio = 23/73			Fracti	are %, 2	2+ Fac	es = n	/a	ŀ	Req'd I	Fracture	2 %, 2∃	Faces	s =
		Antual	Interpolated	AS	STM C136, AS	FM D6913, ASTM C11	7											
		Actual				Y		Gr	rain Size E	Distributi	on							
G.	G.	1	Cumulative	6	6			š .										
Sieve		Percent	Percent	Specs	Specs	<u>.</u>	9 4 4 9	2 1/2 1/2	3/8"	4 00	2 2 8	8 4 8 8	88458	3				
US	Metric	Passing	Passing	Max	Min		•			*	A	+ + +	** ***		Т	TITT	Т Т	100.0%
12.00"	300.00		100%	100.0%	0.0%												1 1	
10.00"	250.00		100%	100.0%	0.0%	0077						I					1 1	00.00
8.00"	200.00		100%	100.0%	0.0%	90% -				$^{\rm III}$						mm	17	90.0%
6.00"	150.00		100%	100.0%	0.0%							1						
4.00"	100.00		100%	100.0%	0.0%	80% -				Ш		Ш		ЩЩ		ШШ	11	80.0%
3.00"	75.00		100%	100.0%	0.0%							1					1 1	
2.50"	63.00		100%	100.0%	0.0%							 					1 1	
2.00"	50.00	100%	100%	100.0%	0.0%	70% -												70.0%
1.75"	45.00		100%	100.0%	0.0%							'	\				1 1	
1.50"	37.50		100%	100.0%	0.0%								À III					
1.25"	31.50		100%	100.0%	0.0%	60% -		####		++-		###	\			++++	$\pm \pm$	60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	<u>e</u>							111				1 1	
3/4"	19.00	100%	100%	100.0%	0.0%	00 - 50% -											╧	50.0%
5/8"	16.00		100%	100.0%	0.0%	P6 20/e											1	30.076 B
1/2"	12.50	100%	100%	100.0%	0.0%								\				1 1	
3/8"	9.50	100%	100%	100.0%	0.0%	40%							1	\mathbb{H}		++++		40.0%
1/4"	6.30		100%	100.0%	0.0%								l 1					
#4	4.75	99%	99%	100.0%	0.0%								l 1					
#8	2.36		99%	100.0%	0.0%	30%		+++-+		++-		###	*	}	+	++++	+	30.0%
#10	2.00	99%	99%	100.0%	0.0%												1 1	
#16	1.18		96%	100.0%	0.0%	0077											1 1	00.00
#20	0.850		95%	100.0%	0.0%	20% -											1	20.0%
#30	0.600		95%	100.0%	0.0%												1	
#40	0.425	94%	94%	100.0%	0.0%	10% -				+++			4	HHH	44	++++		10.0%
#50	0.300		78%	100.0%	0.0%													
#60	0.250		71%	100.0%	0.0%													
#80	0.180		62%	100.0%	0.0%	0%	100.000		10.000	وننو	1.000	6 6 6 0	0.100	سلسنو	0.010		0.00	0.0%
#100	0.150	58%	58%	100.0%	0.0%		100.000		10.000		1.000		0.100		0.010		0.00	
#140	0.106	****	42%	100.0%	0.0%				Part	ticle Size (mm)							
#170	0.090		35%	100.0%	0.0%													
#200	0.075	29.7%	29.7%	100.0%	0.0%	+ Sieve Siz	95		• Max Spec	os o	_	— Min	Specs	_		iieve Resu	ts	
Copyright		hnical Services PS, 1996-9	ļ															

Comments:



Client:	Anchor QEA	Date:	October 6, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-1787-1803
Revised on:		Date sampled:	7-12-21 & 7-14-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	-
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 20, 2021	Tested by: A. Eifrig

Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
LDW21-GT15-GB-0-7.5 ft	233.4	1016.2	787.2	229.0	553.8	41.4%
LDW21-GT15-GB-7.5-9 ft	306.7	450.8	422.5	28.3	115.8	24.4%
LDW21-GT15-GB-7.5-15 ft	236.2	1288.2	1043.0	245.2	806.8	30.4%
LDW21-GT15-GB-15-17.5 ft	303.3	997.2	810.9	186.3	507.6	36.7%
LDW21-GT15-GB-17.5-19 ft	311.1	465.1	434.0	31.1	122.9	25.3%
LDW21-GT15-GB-17.5-25.4 ft	270.2	882.6	747.4	135.2	477.2	28.3%
LDW21-GT15-GB-25.4-27.5 ft	260.6	1270.0	1036.1	233.9	775.5	30.2%
LDW21-GT15-GB-27.5-29 ft	222.9	616.1	520.8	95.3	297.9	32.0%
LDW21-GT29-GB-0-1.5 ft	225.1	949.8	644.5	305.3	419.4	72.8%
LDW21-GT29-GB-0-10.6 ft	221.7	746.6	548.6	198.0	326.9	60.6%
LDW21-GT29-GB-11-12.5 ft	221.4	1082.5	801.0	281.5	579.6	48.6%
LDW21-GT29-GB-11-21 ft	224.4	738.0	646.6	91.4	422.2	21.6%
LDW21-GT29-GB-21-22.5 ft	222.3	408.6	349.3	59.3	127.0	46.7%
LDW21-GT29-GB-21-26 ft	233.8	1031.7	903.6	128.1	669.8	19.1%
LDW21-GT29-GB-26-28.9 ft	229.1	776.5	629.0	147.5	399.9	36.9%
LDW21-GT29-GB-28.9-31 ft	188.4	1285.9	988.6	297.3	800.2	37.2%
LDW21-GT29-GB-31-32.5 ft	225.3	925.7	756.5	169.2	531.2	31.9%
	_		-			
	LDW21-GT15-GB-0-7.5 ft LDW21-GT15-GB-7.5-9 ft LDW21-GT15-GB-7.5-15 ft LDW21-GT15-GB-15-17.5 ft LDW21-GT15-GB-17.5-19 ft LDW21-GT15-GB-17.5-25.4 ft LDW21-GT15-GB-25.4-27.5 ft LDW21-GT15-GB-25.4-27.5 ft LDW21-GT29-GB-0-1.5 ft LDW21-GT29-GB-0-10.6 ft LDW21-GT29-GB-11-21 ft LDW21-GT29-GB-11-21 ft LDW21-GT29-GB-21-22.5 ft LDW21-GT29-GB-21-26 ft LDW21-GT29-GB-28-21-26 ft LDW21-GT29-GB-26-28.9 ft LDW21-GT29-GB-28-9-31 ft	LDW21-GT15-GB-0-7.5 ft 233.4 LDW21-GT15-GB-7.5-9 ft 306.7 LDW21-GT15-GB-7.5-15 ft 236.2 LDW21-GT15-GB-15-17.5 ft 303.3 LDW21-GT15-GB-17.5-19 ft 311.1 LDW21-GT15-GB-17.5-25.4 ft 270.2 LDW21-GT15-GB-27.5-29 ft 222.9 LDW21-GT15-GB-27.5-29 ft 222.9 LDW21-GT29-GB-0-1.5 ft 225.1 LDW21-GT29-GB-0-10.6 ft 221.7 LDW21-GT29-GB-11-12.5 ft 224.4 LDW21-GT29-GB-11-21 ft 224.4 LDW21-GT29-GB-21-22.5 ft 222.3 LDW21-GT29-GB-21-26 ft 233.8 LDW21-GT29-GB-26-28.9 ft 229.1 LDW21-GT29-GB-28-9-31 ft 188.4	LDW21-GT15-GB-0-7.5 ft 233.4 1016.2 LDW21-GT15-GB-7.5-9 ft 306.7 450.8 LDW21-GT15-GB-7.5-15 ft 236.2 1288.2 LDW21-GT15-GB-15-17.5 ft 303.3 997.2 LDW21-GT15-GB-17.5-19 ft 311.1 465.1 LDW21-GT15-GB-17.5-25.4 ft 270.2 882.6 LDW21-GT15-GB-25.4-27.5 ft 260.6 1270.0 LDW21-GT15-GB-27.5-29 ft 222.9 616.1 LDW21-GT29-GB-0-1.5 ft 225.1 949.8 LDW21-GT29-GB-0-10.6 ft 221.7 746.6 LDW21-GT29-GB-11-12.5 ft 221.4 1082.5 LDW21-GT29-GB-11-21 ft 224.4 738.0 LDW21-GT29-GB-21-22.5 ft 222.3 408.6 LDW21-GT29-GB-21-22.5 ft 233.8 1031.7 LDW21-GT29-GB-26-28.9 ft 229.1 776.5 LDW21-GT29-GB-28-9-31 ft 188.4 1285.9	LDW21-GT15-GB-0-7.5 ft 233.4 1016.2 787.2 LDW21-GT15-GB-7.5-9 ft 306.7 450.8 422.5 LDW21-GT15-GB-7.5-15 ft 236.2 1288.2 1043.0 LDW21-GT15-GB-15-17.5 ft 303.3 997.2 810.9 LDW21-GT15-GB-17.5-19 ft 311.1 465.1 434.0 LDW21-GT15-GB-17.5-25.4 ft 270.2 882.6 747.4 LDW21-GT15-GB-25.4-27.5 ft 260.6 1270.0 1036.1 LDW21-GT15-GB-27.5-29 ft 222.9 616.1 520.8 LDW21-GT29-GB-0-1.5 ft 225.1 949.8 644.5 LDW21-GT29-GB-0-10.6 ft 221.7 746.6 548.6 LDW21-GT29-GB-11-12.5 ft 221.4 1082.5 801.0 LDW21-GT29-GB-21-22.5 ft 222.3 408.6 349.3 LDW21-GT29-GB-21-22.5 ft 222.3 408.6 349.3 LDW21-GT29-GB-26-28.9 ft 229.1 776.5 629.0 LDW21-GT29-GB-26-28.9 ft 188.4 1285.9 988.6	LDW21-GT15-GB-0-7.5 ft 233.4 1016.2 787.2 229.0 LDW21-GT15-GB-7.5-9 ft 306.7 450.8 422.5 28.3 LDW21-GT15-GB-7.5-15 ft 236.2 1288.2 1043.0 245.2 LDW21-GT15-GB-15-17.5 ft 303.3 997.2 810.9 186.3 LDW21-GT15-GB-17.5-19 ft 311.1 465.1 434.0 31.1 LDW21-GT15-GB-17.5-25.4 ft 270.2 882.6 747.4 135.2 LDW21-GT15-GB-25.4-27.5 ft 260.6 1270.0 1036.1 233.9 LDW21-GT15-GB-27.5-29 ft 222.9 616.1 520.8 95.3 LDW21-GT29-GB-0-1.5 ft 225.1 949.8 644.5 305.3 LDW21-GT29-GB-0-10.6 ft 221.7 746.6 548.6 198.0 LDW21-GT29-GB-11-12.5 ft 221.4 1082.5 801.0 281.5 LDW21-GT29-GB-21-22.5 ft 222.3 408.6 349.3 59.3 LDW21-GT29-GB-21-26 ft 233.8 1031.7 903.6 128.1 LDW21-GT29-GB-26-28.9 ft	LDW21-GT15-GB-0-7.5 ft 233.4 1016.2 787.2 229.0 553.8 LDW21-GT15-GB-7.5-9 ft 306.7 450.8 422.5 28.3 115.8 LDW21-GT15-GB-7.5-15 ft 236.2 1288.2 1043.0 245.2 806.8 LDW21-GT15-GB-15-17.5 ft 303.3 997.2 810.9 186.3 507.6 LDW21-GT15-GB-17.5-19 ft 311.1 465.1 434.0 31.1 122.9 LDW21-GT15-GB-17.5-25.4 ft 270.2 882.6 747.4 135.2 477.2 LDW21-GT15-GB-25.4-27.5 ft 260.6 1270.0 1036.1 233.9 775.5 LDW21-GT15-GB-27.5-29 ft 222.9 616.1 520.8 95.3 297.9 LDW21-GT29-GB-0-1.5 ft 225.1 949.8 644.5 305.3 419.4 LDW21-GT29-GB-0-10.6 ft 221.7 746.6 548.6 198.0 326.9 LDW21-GT29-GB-11-21 ft 224.4 738.0 646.6 91.4 422.2 LDW21-GT29-GB-21-22.5 ft 222.3 408.6 349.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 20, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Tare	Mass of Dry Soil	Pycno ID	Mass of Pycno	Volume of Pycno	Water @ Tx	w/ water & soils	w/ water	Water, 0.1 *C	SpG of Soils	Factor	Corrected SpG
B21-1787	LDW21-GT15-GB-0-7.5 ft	584.26	658.50	74.2	TSA-014	192.3	499.5	0.99749	735.04	690.54	23.2	2.4966051	0.99929	2.4948325
B21-1792	LDW21-GT15-GB-17.5-25.4 ft	493.62	594.11	100.5	TSA-016	197.2	499.5	0.99754	757.82	695.45	23.0	2.6360571	0.99933	2.634291
B21-1793	LDW21-GT15-GB-25.4-27.5 ft	500.82	575.98	75.2	TSA-022	198.0	499.5	0.99749	740.87	696.19	23.2	2.4661721	0.99929	2.4644211
B21-1796	LDW21-GT29-GB-0-10.6 ft	600.79	675.86	75.1	TSA-012	180.4	499.5	0.99752	722.04	678.65	23.1	2.3695318		2.3678968
B21-1798	LDW21-GT29-GB-11-21 ft	584.33	685.35	101.0	TSA-017	187.9	499.4	0.99749	749.71	686.04	23.2	2.7049457	0.99929	2.7030252
														.
														
														
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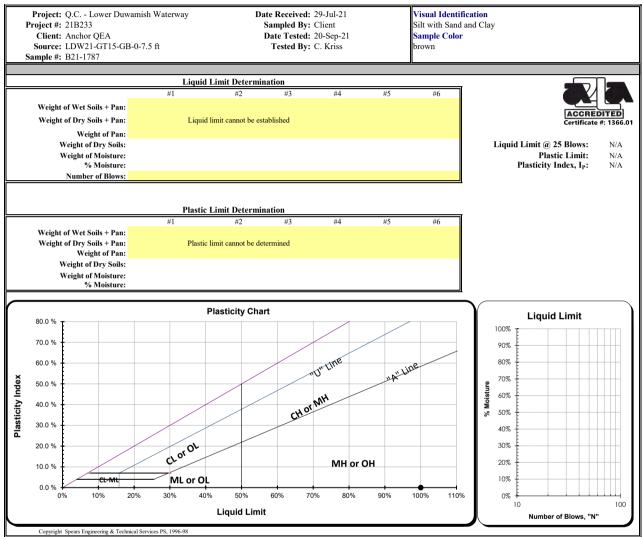
All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils



All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Comments: Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit cup without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT15-GB-7.5-15 ft

Sample#: B21-1789

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 20-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.076 \\ \textbf{D}_{(10)} = 0.113 \\ \textbf{D}_{(15)} = 0.150 \\ \textbf{D}_{(30)} = 0.220 \\ \textbf{D}_{(50)} = 0.313 \\ \textbf{D}_{(60)} = 0.359 \\ \textbf{D}_{(90)} = 1.522 \\ \textbf{Partice} = 2/31 \\ \textbf{D}_{(40)} = 2/31 \\ \textbf{D$ mm % Gravel = 1.6% % Sand = 93.6% mm % Silt & Clay = 4.8% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.19$ Coeff. of Uniformity, $C_U = 3.17$ Fineness Modulus = 1.81

Plastic Limit = n/a Moisture %, as sampled = 30.4% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	oust Ratio = 2/31	Fracture %, 2+ Faces = n/a Req'd Fracture %, 2+ Faces =
				AS	TM C136, AS	TM D6913, ASTM C11	7
			Interpolated				Grain Size Distribution
		Cumulative			T		54
Sieve		Percent	Percent	Specs	Specs	è	# # # # # # # # # # # # # # # # # # #
US	Metric	Passing	Passing	Max	Min	100%	
12.00"	300.00		100%	100.0%	0.0%		
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%	90%	90.0%
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%	80%	80.0%
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%	70%	70.0%
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%	60%	60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	D	
3/4"	19.00	100%	100%	100.0%	0.0%	D)	50.0%
5/8"	16.00		99%	100.0%	0.0%	P6 20%	33.5% %
1/2"	12.50	99%	99%	100.0%	0.0%		
3/8"	9.50	99%	99%	100.0%	0.0%	40%	40.0%
1/4"	6.30		99%	100.0%	0.0%		
#4	4.75	98%	98%	100.0%	0.0%		
#8	2.36		97%	100.0%	0.0%	30%	30.0%
#10	2.00	97%	97%	100.0%	0.0%		
#16	1.18		85%	100.0%	0.0%	20%	20.0%
#20	0.850		80%	100.0%	0.0%	20%	20.0%
#30	0.600		77%	100.0%	0.0%		
#40	0.425	74%	74%	100.0%	0.0%	10%	10.0%
#50	0.300		47%	100.0%	0.0%		
#60	0.250		37%	100.0%	0.0%		
#80	0.180		21%	100.0%	0.0%	0%	0.0% 100.000 10.000 1.000 0.100 0.010 0.001
#100	0.150	15%	15%	100.0%	0.0%		1,000 0,100 0,000
#140	0.106		9%	100.0%	0.0%		Particle Size (mm)
#170	0.090		7%	100.0%	0.0%		
#200	0.075	4.8%	4.8%	100.0%	0.0%	+ Sieve Siz	es — Max Specs — Min Specs — Sieve Results
	Spears Engineering & Tec			100.070	0.073		,
Copyright				and ourselves, all reports are	submitted as the confid		

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1789
Sample Date:	7/12/2021
Test Date:	9/28/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT15-GB-7.5-15 ft

 Visual Soil Description:
 brown sand with silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

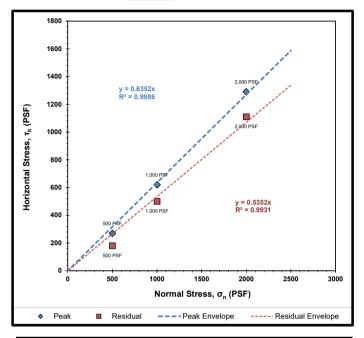
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	e Data:	σ _n =500 PSF		
Initial Moisture Content (%):	26.1			
	Initial	Post-Consolidation		
Dry Density (PCF):	109.2	110.2		
Void Ratio:	0.543	0.528		
Porosity (%):	35.2	34.6		
Degree of Saturation (%):	saturated	saturated		

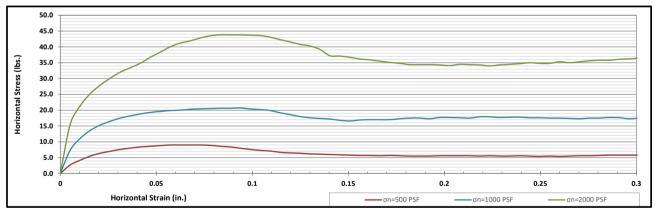
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	25.9	
	Initial	Post-Consolidation
Dry Density (PCF):	108.7	110.2
Void Ratio:	0.550	0.529
Porosity (%):	35.5	34.6
Degree of Saturation (%):	saturated	saturated

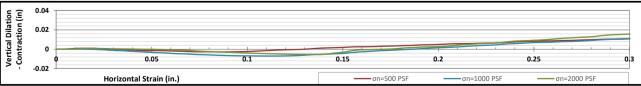
Summary of Sample	σ _n =2000 PSF	
Initial Moisture Content (%):	25.9	
	Initial	Post-Consolidation
Dry Density (PCF):	110.0	114.4
Void Ratio:	0.532	0.473
Porosity (%):	34.7	32.1
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS							
PEAK RESIDUAL							
Angle of Internal Friction, φ (°):	32	28					
Cohesion (PSF):	0	0					



Failure Envelope Test Values:									
Normal Stress, σ _n (PSF):	500	1000	2000						
Peak Horizontal Stress, τ _h (PSF):	270	620	1290						
Residual Horizontal Stress, τ _h (PSF):	180	500	1110						





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT15-GB-15-17.5 ft

Sample#: B21-1790

#140

#170

#200

0.106

0.090

0.075

57.1%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21 Tested By: C. Kriss

Visual Identification Sandy Silt with Clay Sample Color: brown

mm



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.004 \\ D_{(10)} = 0.006 \\ D_{(15)} = 0.012 \\ D_{(30)} = 0.039 \\ D_{(50)} = 0.067 \\ \end{array}$ mm % Gravel = 1.3% % Sand = 41.6% mm % Silt & Clay = 57.1% mm mm Liquid Limit = n/a mm Plasticity Index = n/a $D_{(60)} = 0.082$ $D_{(60)} = 0.193$ mm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 2.92$ Coeff. of Uniformity, $C_U = 12.63$ Fineness Modulus = 0.29

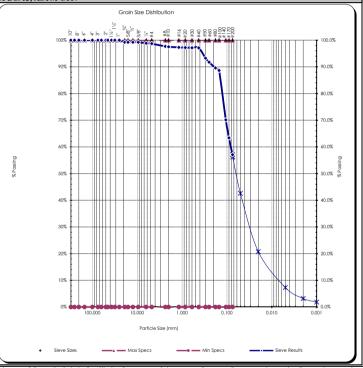
Plastic Limit = n/a Moisture %, as sampled = 36.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.193$	mm		racture %	*	
						ist Ratio = 47/80		Fra	cture %, 2	2+ Faces	š
		Actual	Interpolated	AS	STM C136, AST	TM D6913, ASTM	C117				
			Cumulative			ľ			Grain Size D)istribution	ı
C:	e Size	Percent	Percent	C	C	1					
US	Metric	Percent	Passing	Specs Max	Specs Min			2 3 4 6 2 3 4 6	. 38. 58. 7	# ## 200	
12.00"	300.00	rassing	100%	100.0%	0.0%	-	100%	*-* ** ***	****	***	-
10.00"	250.00		100%	100.0%	0.0%						
8.00"	200.00		100%	100.0%	0.0%		90%			$\bot \bot \bot \bot$	
6.00"	150.00		100%	100.0%	0.0%						
4.00"	100.00		100%	100.0%	0.0%						
3.00"	75.00		100%	100.0%	0.0%		80%			+++-	
2.50"	63.00		100%	100.0%	0.0%		Н				
2.00"	50.00	100%	100%	100.0%	0.0%		70%				
1.75"	45.00		100%	100.0%	0.0%		/0/8 F				
1.50"	37.50		100%	100.0%	0.0%		F				
1.25"	31.50		100%	100.0%	0.0%		60%			++++	
1.00"	25.00	100%	100%	100.0%	0.0%	p p					
3/4"	19.00	99%	99%	100.0%	0.0%	% Possing	-				
5/8"	16.00		99%	100.0%	0.0%	*	50%			+++	_
1/2"	12.50	99%	99%	100.0%	0.0%						
3/8"	9.50	99%	99%	100.0%	0.0%		40%			$\bot \bot \bot \bot$	
1/4"	6.30		99%	100.0%	0.0%		11				
#4	4.75	99%	99%	100.0%	0.0%						
#8	2.36		98%	100.0%	0.0%		30%			++++	
#10	2.00	98%	98%	100.0%	0.0%		ł I				
#16	1.18		97%	100.0%	0.0%		20%				
#20	0.850		97%	100.0%	0.0%		20,0				
#30	0.600		97%	100.0%	0.0%		F				
#40	0.425	97%	97%	100.0%	0.0%		10%			+++-	
#50	0.300		93%	100.0%	0.0%		11				
#60	0.250		92%	100.0%	0.0%		11				
#80	0.180		90%	100.0%	0.0%		0%	100.000	10.000		7
#100	0.150	89%	89%	100.0%	0.0%						

70%

63%

57.1%



0.0%

0.0%

0.0%

Comments: Reviewed by:

100.0%

100.0%

100.0%



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification **Project #:** 21B233 Sandy Silt with Clay Sampled By: Client Client: Anchor QEA Date Tested: 20-Sep-21 Sample Color Source: LDW21-GT15-GB-15-17.5 ft Tested By: C. Kriss brown Sample#: B21-1790 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: Sieve Analysis 2.65 Sample Weight: 75.02 **Grain Size Distribution** Hydroscopic Moist .: 1.96% Percent Soils Particle Sieve ACCREDITED Adj. Sample Wgt: 73.58 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 33.8% 0.0477 mm 25.5 1.0" 100% 2 21 27.8% $0.0347 \ mm$ 3/4" 99% 19.000 mm 22.5% 0.0224 mm 5/8" 99% 16.000 mm 15.9% 0.0133 mm 1/2" 99% 12.500 mm 30 13.3% 0.0096 mm 3/8" 99% 9.500 mm 10 60 10.6% 0.0068 mm 1/4" 99% 6.300 mm 240 4.6% 0.0035 mm 99% 4.750 mm 3.5 #4 2.7% 0.0014 mm #10 98% 2.000 mm 1440 #20 97% 0.850 mm Liquid Limit: n/a 97% % Gravel: 1.3% #40 0.425 mm % Sand: 41.6% Plastic Limit: n/a #100 89% 0.150 mm % Silt: 49.7% Plasticity Index: n/a #200 57.1% 0.075 mm 0.074 mm % Clay: 7.3% Silts 56.2% 42.6% 0.050 mm 0.020 mm 20.8% $0.005\ mm$ Clays 7.3% 3.2% $0.002\ mm$ Colloids 1.8% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or

Comments:		
Daviewed by	Magh Bhilgott and b	
Reviewed by:	Meghan Blodgett-Carrillo	



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT15-GB-17.5-19 ft

Sample#: B21-1791

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21 Tested By: C. Kriss

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Meghan Blodgett-Carrillo

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.007 \\ \textbf{D}_{(10)} = 0.056 \\ \textbf{D}_{(15)} = 0.073 \\ \textbf{D}_{(30)} = 0.142 \\ \textbf{D}_{(50)} = 0.287 \\ \textbf{D}_{(60)} = 0.362 \\ \textbf{D}_{(90)} = 1.662 \\ \textbf{P}_{(90)} = 2.297 \\ \textbf{D}_{(90)} = 2.297 \\ \textbf{$ mm % Gravel = 2.2% % Sand = 82.3% mm % Silt & Clay = 15.5% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 0.98$ Coeff. of Uniformity, $C_U = 6.42$ Fineness Modulus = 1.71

Plastic Limit = n/a Moisture %, as sampled = 25.3% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

				1.0		Ratio = 22/97	Fracture %, 2+ Face	s = n/a	Req'd Fracture	%, 2+ Face	es =
		Actual	Interpolated	AS	TM C136, ASTM	D6913, ASTM C117					
		Cumulative			ľ		Grain Size Distribution				
Sieve	Size	Percent	Percent	Specs	Specs		ž	001	00		
US	Metric	Passing	Passing	Max	Min			# # # # # # # # # # # # # # # # # # #	83 ##		
12.00"	300.00	1 assing	100%	100.0%	0.0%	100%		****	*		100.0%
10.00"	250.00		100%	100.0%	0.0%						1
8.00"	200.00		100%	100.0%	0.0%	90%	<u> </u>				90.0%
6.00"	150.00		100%	100.0%	0.0%						
4.00"	100.00		100%	100.0%	0.0%	<u> </u>		\			
3.00"	75.00		100%	100.0%	0.0%	80%		-			80.0%
2.50"	63.00		100%	100.0%	0.0%			N. III			
2.00"	50.00	100%	100%	100.0%	0.0%			N. III			1
1.75"	45.00	100%	100%	100.0%	0.0%	70%					70.0%
1.50"	37.50		100%	100.0%	0.0%	60%					60.0%
1.25"	31.50	1000/	100%	100.0%	0.0%						
1.00"	25.00	100%	100%	100.0%	0.0%	in Silving					- 50.0%
3/4"	19.00	100%	100%	100.0%	0.0%	Di					50.0%
5/8"	16.00		100%	100.0%	0.0%						
1/2"	12.50	100%	100%	100.0%	0.0%	11		- III II I			
3/8"	9.50	98%	98%	100.0%	0.0%	40%					40.0%
1/4"	6.30		98%	100.0%	0.0%	<u> </u>					
#4	4.75	98%	98%	100.0%	0.0%	30%		- III II I I I I I I I I I I I I I I I			30.0%
#8	2.36		96%	100.0%	0.0%	30%		- III II II II N			30.0%
#10	2.00	96%	96%	100.0%	0.0%			- IIIII I I I N			1
#16	1.18		82%	100.0%	0.0%	20%					20.0%
#20	0.850		76%	100.0%	0.0%						
#30	0.600		71%	100.0%	0.0%	<u> </u>			M III		
#40	0.425	68%	68%	100.0%	0.0%	10%			H *		10.0%
#50	0.300		52%	100.0%	0.0%	[]					
#60	0.250		45%	100.0%	0.0%				ШПППППП	* *	
#80	0.180		36%	100.0%	0.0%	0% 000 0 -	0.000 10.000	1.000 0.1	00 0.010	0.0	0.0%
#100	0.150	32%	32%	100.0%	0.0%						
#140	0.106		22%	100.0%	0.0%		Particle Size (mi	n)			
#170	0.090		19%	100.0%	0.0%						
#200	0.075	15.5%	15.5%	100.0%	0.0%	+ Sieve Sizes	— Max Specs	Min Specs	s	eve Results	
Copyright	Spears Engineering & Tec	hnical Services PS, 1996-98									

Reviewed by: _



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soils Classification System, ASTM D-2487 Sampled By: Client Project #: 21B233 SM, Silty Sand Client: Anchor QEA Date Tested: 20-Sep-21 Sample Color Source: LDW21-GT15-GB-17.5-19 ft Tested By: C. Kriss brown Sample#: B21-1791 ASTM D7928, HYDROMETER ANALYSIS **ASTM D6913** Assumed Sp Gr: Sieve Analysis 2.65 Sample Weight: 74.97 **Grain Size Distribution** Hydroscopic Moist .: Soils Particle 1.06% Sieve Percent ACCREDITED Adj. Sample Wgt: 74.18 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle Reading Corrected Percent 1.5" 100% 37.500 mm Minutes Reading 1.25" 100% 31.500 mm Passing Diameter 0.0532 mm 9.1% 1.0" 100% 25.000 mm 3/4" 9.1% 0.0376 mm 100% 19.000 mm 7.8% 0.0239 mm 5/8" 100% 16.000 mm 6.5% 0.0139 mm 1/2" 100% 12.500 mm 30 5.8% 0.0098 mm 3/8" 98% 9.500 mm 4.5 0.0070 mm 60 5.2% 1/4" 98% 6.300 mm 240 0.0035 mm 98% 4.750 mm 1.3% #4 1 3% 0.0014 mm #10 96% 2.000 mm 1440 0.850 mm #20 76% 2.2% Liquid Limit: n/a % Gravel: #40 68% $0.425 \ mm$ % Sand: 82.3% Plastic Limit: n/a #100 32% 0.150 mm % Silt: 12.6% Plasticity Index: n/a #200 15.5% 0.075 mm 15.2% 0.074 mm % Clav: 3.0% Silts 10.2% 0.050 mm 0.020 mm 7.3% 3.0% 0.005 mm Clays 1.3% $0.002\ mm$ Colloids 0.9% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or Comments:

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT15-GB-17.5-25.4 ft

Sample#: B21-1792

#140

#170

#200

Reviewed by:

0.106

0.090

0.075

16.4%

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.023 \\ D_{(10)} = 0.046 \\ D_{(15)} = 0.069 \\ D_{(30)} = 0.125 \\ D_{(50)} = 0.234 \\ \end{array}$ mm % Gravel = 8.2% % Sand = 75.4% mm % Silt & Clay = 16.4% mm mm Liquid Limit = n/a mm Plasticity Index = n/a $D_{(60)} = 0.299$ $D_{(60)} = 1.927$ mm Sand Equivalent = n/a racture %, 1 Face = n/a

Faces = n/a

Coeff. of Curvature, $C_C = 1.13$ Coeff. of Uniformity, $C_U = 6.52$ Fineness Modulus = 1.71 Plastic Limit = n/a

Moisture %, as sampled = 28.3% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 1.92$	7 mn	n	Fra	cture %	6, 1	I
					D	ust Ratio = 7/3	4		Fracti	ure %, 2	2+ I	B
				AS	TM C136, AS	TM D6913, AST	M C117	7				
		Actual	Interpolated						G	rain Size [Distrik	٦I
			Cumulative	_	1	1						
	e Size	Percent	Percent	Specs	Specs		ъ;	9 4 4 9 9		3/8"	. 4	
US	Metric	Passing	Passing	Max	Min	_	100%	**	-	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	_
12.00"	300.00		100%	100.0%	0.0%						Ш	l
10.00"	250.00		100%	100.0%	0.0%						7	
8.00"	200.00		100%	100.0%	0.0%		90%				HF	Ī
6.00"	150.00		100%	100.0%	0.0%		ŀ				Ш	l
4.00"	100.00		100%	100.0%	0.0%		80%				Ш	l
3.00"	75.00		100%	100.0%	0.0%		00%				Ш	Ī
2.50"	63.00		100%	100.0%	0.0%		F				Ш	l
2.00"	50.00	100%	100%	100.0%	0.0%		70%		++-		₩-	ļ
1.75"	45.00		98%	100.0%	0.0%						Ш	l
1.50"	37.50		96%	100.0%	0.0%							l
1.25"	31.50		94%	100.0%	0.0%		60%				#	t
1.00"	25.00	92%	92%	100.0%	0.0%		ŀ				Ш	l
3/4"	19.00	92%	92%	100.0%	0.0%	% Possing	50%				Ш	l
5/8"	16.00		92%	100.0%	0.0%	96	30%				Ш	Ī
1/2"	12.50	92%	92%	100.0%	0.0%		F				Ш	l
3/8"	9.50	92%	92%	100.0%	0.0%		40%		HHH		-	ļ
1/4"	6.30		92%	100.0%	0.0%						Ш	l
#4	4.75	92%	92%	100.0%	0.0%						Ш	l
#8	2.36		91%	100.0%	0.0%		30%		+		#	t
#10	2.00	91%	91%	100.0%	0.0%		ŀ					l
#16	1.18		85%	100.0%	0.0%		20%				Ш	l
#20	0.850		83%	100.0%	0.0%		20,0				Ш	l
#30	0.600		81%	100.0%	0.0%		-				Ш	ı
#40	0.425	80%	80%	100.0%	0.0%		10%		+		₩	ł
#50	0.300		60%	100.0%	0.0%		- 1					
#60	0.250		52%	100.0%	0.0%		- 1					
#80	0.180		42%	100.0%	0.0%		0%	100,000	3000	10.000	-	4
#100	0.150	37%	37%	100.0%	0.0%							

100.0%

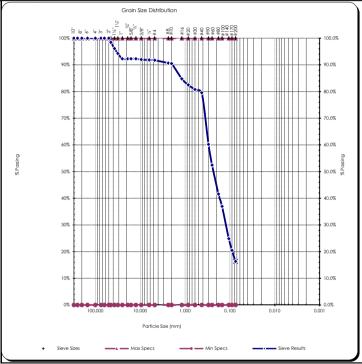
100.0%

100.0%

25%

20%

16.4%



Comments:

0.0%

0.0%

0.0%



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT15-GB-25.4-27.5 ft

Sample#: B21-1793

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21 Tested By: C. Kriss

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.006 \\ \textbf{D}_{(10)} = 0.010 \\ \textbf{D}_{(15)} = 0.022 \\ \textbf{D}_{(30)} = 0.066 \\ \textbf{D}_{(50)} = 0.104 \\ \textbf{D}_{(60)} = 0.125 \\ \textbf{D}_{(90)} = 0.331 \\ \textbf{D}_{(80)} = 0.331 \\ \textbf{$ mm % Gravel = 0.0% % Sand = 63.6% mm % Silt & Clay = 36.4% mm mm Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a mm

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 3.56$ Coeff. of Uniformity, $C_U = 12.70$ Fineness Modulus = 0.42

Plastic Limit = n/a Moisture %, as sampled = 30.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

Faces =

80.0%

70.0%

30.0%

						$D_{(90)} = 0.551$		111		icture /						ccq u i			
						ust Ratio = $29/79$			Fract	ure %,	2+ Fa	ces = 1	1/a		Req	ı'd Frac	ture 9	6, 2	+ F
				AS	TM C136, AST	TM D6913, AST	M C11	7											
		Actual	Interpolated			r ———			G	rain Size I	Distributi	ion							
		_	Cumulative		ı														
	Size	Percent	Percent	Specs	Specs		ь	90 pg 44 pg	ž :	3/8"	. 4 8	2 28	8 8 8	8888	28				
US	Metric	Passing	Passing	Max	Min	1	100% 👲			**************************************	· ·	•-••	***		Hinton.	TTT		ттт	
12.00"	300.00		100%	100.0%	0.0%		- [1						
10.00"	250.00		100%	100.0%	0.0%		- 1						111						
8.00"	200.00		100%	100.0%	0.0%		90%		###		HH	$+-\parallel$	₩,	_	****	+++	-	ĦĦ	+
6.00"	150.00		100%	100.0%	0.0%		ŀ						11111						
4.00"	100.00		100%	100.0%	0.0%		80%							1					
3.00"	75.00		100%	100.0%	0.0%		°°° F				Ш			1				Ш	Т
2.50"	63.00		100%	100.0%	0.0%									٨					
2.00"	50.00	100%	100%	100.0%	0.0%		70%		₩₩		###		++++	\dashv i	###	444		Ш	4
1.75"	45.00		100%	100.0%	0.0%														
1.50"	37.50		100%	100.0%	0.0%									.					
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1.00"	25.00	100%	100%	100.0%	0.0%	Di Li	ŀ							.					
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%							. !					
5/8"	16.00		100%	100.0%	0.0%	96	50%												
1/2"	12.50	100%	100%	100.0%	0.0%														
3/8"	9.50	100%	100%	100.0%	0.0%		40%		444		###		++++	_	$+\!\!\!+\!\!\!\!+\!\!\!\!+$	44		Ш	4
1/4"	6.30		100%	100.0%	0.0%		- 1												
#4	4.75	100%	100%	100.0%	0.0%		t								Ш				
#8	2.36		100%	100.0%	0.0%		30%		+++-		+++	$+-\parallel$		_		+++	-##	ttt	+
#10	2.00	100%	100%	100.0%	0.0%		ŀ								\mathbb{I}				
#16	1.18		100%	100.0%	0.0%		20%								*				
#20	0.850		99%	100.0%	0.0%		20% T				Ш							Ш	Т
#30	0.600		99%	100.0%	0.0%														
#40	0.425	99%	99%	100.0%	0.0%		10%				###			_		44	$\downarrow \downarrow \downarrow \downarrow$	Ш	_
#50	0.300		87%	100.0%	0.0%		-										N		
#60	0.250		82%	100.0%	0.0%		t											*-	-*
#80	0.180		75%	100.0%	0.0%		0%	100.000	-	10.000	-	1,000	-	10-100-1	100		0.010		_
#100	0.150	72%	72%	100.0%	0.0%							500		0.					
#140	0.106		51%	100.0%	0.0%					Par	ticle Size	(mm)							
#170	0.090		44%	100.0%	0.0%														
#200	0.075	36.4%	36.4%	100.0%	0.0%	+	Sieve Size	s		- Max Spe	cs	_	— м	lin Specs			Siev	e Resu	ults
		1				lk .													

Comments: Reviewed by:



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soils Classification System, ASTM D-2487 Sampled By: Client Project #: 21B233 SM, Silty Sand Client: Anchor QEA Date Tested: 20-Sep-21 Sample Color Source: LDW21-GT15-GB-25.4-27.5 ft Tested By: C. Kriss brown Sample#: B21-1793 ASTM D7928, HYDROMETER ANALYSIS **ASTM D6913** Sp Gr: Sieve Analysis 2.46 Sample Weight: 76.16 **Grain Size Distribution** 4.72% Hydroscopic Moist .: Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 72.73 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle Reading Corrected Percent 1.5" 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 0.0541 mm 21.7% 1.0" 100% 25.000 mm 15 19.5% 0.0388 mm 3/4" 13.5 100% 19.000 mm 11 15.9% 0.0248 mm 5/8" 100% 16.000 mm 13.0% 0.0145 mm 1/2" 100% 12.500 mm 30 7.5 10.8% 0.0104 mm 3/8" 100% 9.500 mm 0.0074 mm 60 4.5 6.5% 1/4" 100% 6.300 mm 240 0.0038 mm 100% 4.750 mm 3.6% 2.5 #4 2.000 mm 0.0015 mm #10 100% 1440 2.2% 0.850 mm 99% #20 0.0% Liquid Limit: n/a 99% % Gravel: #40 $0.425 \ mm$ % Sand: 63.6% Plastic Limit: n/a #100 72% 0.150 mm % Silt: 31.8% Plasticity Index: n/a #200 36.4% 0.075 mm 35.7% 0.074 mm % Clav: 4.6% Silts 22.4% 0.050 mm 0.020 mm 14.5% 0.005 mm Clays 4.6% 2.5% $0.002\ mm$ Colloids 1.4% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** Loamy Sand All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or Comments:

Reviewed by:

Materials Testing & Consulting, Inc. Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C Lower Du Project #: 21B233 Client: Anchor QEA Source: LDW21-GT29-0- Sample #: B21-1796	te Received: Sampled By: Date Tested: Tested By:	Client 21-Sep-21		Visual Identific Silt Sample Color brown	cation		
	Liquid	Limit Determi	ination			_	
	#1	#2	#3	#4	#5	#6	
Weight of Wet Soils + Pan:	32.74	33.79	36.07				
Weight of Dry Soils + Pan:	28.61	29.18	30.52				
Weight of Pan:		19.73	19.61				
Weight of Dry Soils:		9.45	10.91				Liquid Limit @ 25 Blows: 47 %
Weight of Moisture:		4.61	5.55				Plastic Limit: N/A
% Moisture: Number of Blows:		48.8 % 16	50.9 % 11				Plasticity Index, I_P: N/A
Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	Plastic I	imit cannot be det	ermined				ACCREDITED Certificate #: 1366.01, 1366.02 & 1366.04
70 % 60 % 50 % 40 % 10 % CL-MIL 0 % 0% 10 % 2	(L) or Ol (L) or	L	Ct ¹ M 60% 70	H or OH	90%	100% 110%	Liquid Limit 50% 40% 20% 10% Number of Blows, "N"

Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic. Comments:

Reviewed by:

Meghan Blodgett-Carrillo

 $Corporate \sim 777\ Chrysler\ Drive \quad \bullet \quad Burlington,\ WA\ 98233 \quad \bullet \quad Phone\ (360)\ 755-1990 \quad \bullet \quad Fax\ (360)\ 755-1980$ **Regional Offices:** Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

Visit our website: www.mtc-inc.net



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT29-GB-11-21 ft

Sample#: B21-1798

Reviewed by:

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21 Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

mm

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.156 \\ \textbf{D}_{(10)} = 0.197 \\ \textbf{D}_{(15)} = 0.237 \\ \textbf{D}_{(30)} = 0.358 \\ \textbf{D}_{(50)} = 0.737 \\ \textbf{D}_{(60)} = 1.003 \\ \textbf{D}_{(90)} = 1.801 \\ \textbf{Retio} = 3/56 \end{array}$ mm % Gravel = 0.5% % Sand = 97.4% mm % Silt & Clay = 2.0% mm mm Liquid Limit = n/a Plasticity Index = n/amm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 0.65$ Coeff. of Uniformity, $C_U = 5.10$ Fineness Modulus = 2.64 Plastic Limit = n/a

Moisture %, as sampled = 21.6% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

						oust Ratio = 1			Fractu	e %, 2+	Face	s = n/s	a	R	eq'd F	ractur	e %, 2	+ Face	es =
				AS	TM C136, AS	TM D6913, A	STM C11	7											
		Actual	Interpolated						Gra	in Size Dis	tribution	1							
	CI.		Cumulative	~	-	-			₹.										
Sieve		Percent	Percent	Specs	Specs		<u>.</u> 0	9 4 4 90 dd	7 %	3/8".	e0 ###	28 5	888	83558					
US	Metric	Passing	Passing	Max	Min	_	100%	****	• (0 • • • •		-	***	4	** ***	ППТ	Т		Т.	I 100.0%
12.00"	300.00		100%	100.0%	0.0%		-				l "i								}
10.00"	250.00		100%	100.0%	0.0%						111								90.0%
8.00"	200.00		100%	100.0%	0.0%		90%								H				90.0%
6.00"	150.00		100%	100.0%	0.0%		į.												1
4.00"	100.00		100%	100.0%	0.0%		80%	1			Ш		ШШ		Ш				80.0%
3.00"	75.00		100%	100.0%	0.0%							\							1
2.50"	63.00		100%	100.0%	0.0%		ł					1							1
2.00"	50.00	100%	100%	100.0%	0.0%		70%				++-+	4##	++-		-				70.0%
1.75"	45.00		100%	100.0%	0.0%		1					1							1
1.50"	37.50		100%	100.0%	0.0%							\							1
1.25"	31.50		100%	100.0%	0.0%		60%	+				₩	+++-		HH				60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	D.	ŀ					Ņ							.B
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%					1							50.0%
5/8"	16.00		100%	100.0%	0.0%	96	30% T					I							30.0% %
1/2"	12.50	100%	100%	100.0%	0.0%		-												1
3/8"	9.50	100%	100%	100.0%	0.0%		40%				++-+		\		-				40.0%
1/4"	6.30		100%	100.0%	0.0%		ļ						i						1
#4	4.75	99%	99%	100.0%	0.0%		t						1						1
#8	2.36		98%	100.0%	0.0%		30%				+++		+		+++				30.0%
#10	2.00	97%	97%	100.0%	0.0%		ŀ						1						1
#16	1.18		67%	100.0%	0.0%		20%						1						20.0%
#20	0.850		54%	100.0%	0.0%		20% T						ı İ						20.0%
#30	0.600		45%	100.0%	0.0%		-						\ <u>\</u>						1
#40	0.425	38%	38%	100.0%	0.0%		10%	111					+++	Щ.	Ш.				10.0%
#50	0.300		23%	100.0%	0.0%		ţ							\					1
#60	0.250		17%	100.0%	0.0%		ŀ												1
#80	0.180		8%	100.0%	0.0%		0%	100.000		10.000	-	1.000	40-00-	0.100		0.010		1 00	0.0%
#100	0.150	4%	4%	100.0%	0.0%			100:000		10.000		1.000		0.100		0.010	,	0.0	001
#140	0.106		3%	100.0%	0.0%					Particl	e Size (m	m)							
#170	0.090		2%	100.0%	0.0%														
#200	0.075	2.0%	2.0%	100.0%	0.0%		 Sieve Size 			Max Specs			- Min S	pecs	_	:	Sieve Resi	ults	
	Spears Engineering & Tec		1	100.070	0.073	.				.,									



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT29-GB-21-26 ft

Sample#: B21-1800

#100

#140

#170

#200

Comments:

0.150

0.106

0.090

0.075

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

Sample Color:

gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.153 \\ D_{(10)} = 0.185 \\ D_{(15)} = 0.218 \\ D_{(30)} = 0.314 \\ D_{(50)} = 0.527 \\ D_{(50)} = 0.823 \\ D_{(50)$ mm % Gravel = 4.9% % Sand = 93.3% mm % Silt & Clay = 1.8% mm mm Liquid Limit = n/a Plasticity Index = n/a $D_{(60)} = 0.883$ mm Sand Equivalent = n/a

 $D_{(90)} = 1.952$ mm Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a 3/80

Coeff. of Curvature, $C_C = 0.60$ Coeff. of Uniformity, C_U = 4.77

Fineness Modulus = 2.67 Plastic Limit = n/a Moisture %, as sampled = 18.8% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

					Б	D ₍₉₀₎
				A 6	TM C136, AS	Oust Ratio
		Actual Cumulative	Interpolated Cumulative	A	51W C130, AS	1 10 10091
Sieve	Size	Percent	Percent	Specs	Specs	
US	Metric	Passing	Passing	Max	Min	
2.00"	300.00		100%	100.0%	0.0%	1
0.00"	250.00		100%	100.0%	0.0%	
8.00"	200.00		100%	100.0%	0.0%	
6.00"	150.00		100%	100.0%	0.0%	
4.00"	100.00		100%	100.0%	0.0%	
3.00"	75.00		100%	100.0%	0.0%	
2.50"	63.00		100%	100.0%	0.0%	
2.00"	50.00	100%	100%	100.0%	0.0%	
1.75"	45.00		100%	100.0%	0.0%	
1.50"	37.50		100%	100.0%	0.0%	
1.25"	31.50		100%	100.0%	0.0%	
1.00"	25.00	100%	100%	100.0%	0.0%	2
3/4"	19.00	97%	97%	100.0%	0.0%	% Possing
5/8"	16.00		97%	100.0%	0.0%	96
1/2"	12.50	97%	97%	100.0%	0.0%	
3/8"	9.50	96%	96%	100.0%	0.0%	
1/4"	6.30		95%	100.0%	0.0%	
#4	4.75	95%	95%	100.0%	0.0%	
#8	2.36		92%	100.0%	0.0%	
#10	2.00	91%	91%	100.0%	0.0%	
#16	1.18		68%	100.0%	0.0%	
#20	0.850		59%	100.0%	0.0%	
#30	0.600		52%	100.0%	0.0%	
#40	0.425	47%	47%	100.0%	0.0%	
#50	0.300		28%	100.0%	0.0%	
#60	0.250		20%	100.0%	0.0%	
#80	0.180		9%	100.0%	0.0%	
			1	1	1	II .

5%

3%

2%

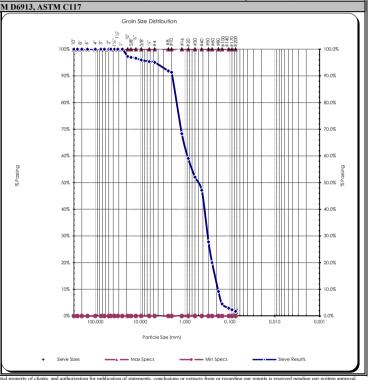
1.8%

100.0%

100.0%

100.0%

100.0%



0.0%

0.0%

0.0%

0.0%

Reviewed by: Meghan Blodgett-Carrillo

1.8%

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1800
Sample Date:	7/14/2021
Test Date:	9/29/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT29-GB-21-26 ft

 Visual Soil Description:
 gray sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

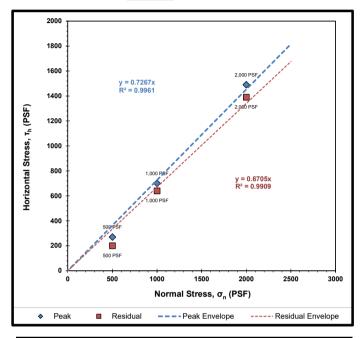
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	23.0	
	Initial	Post-Consolidation
Dry Density (PCF):	107.5	108.1
Void Ratio:	0.567	0.558
Porosity (%):	36.2	35.8
Degree of Saturation (%):	saturated	saturated

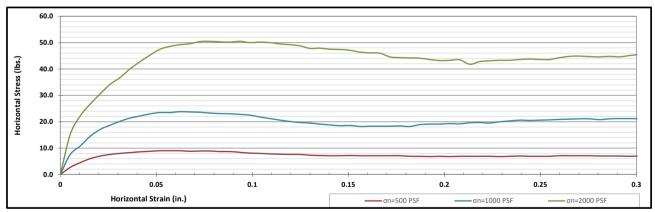
Summary of Sample	Data:	σ _n =1000 PSF					
Initial Moisture Content (%):	22.3						
	Initial	Post-Consolidation					
Dry Density (PCF):	107.1	108.5					
Void Ratio:	0.572	0.552					
Porosity (%):	36.4	35.6					
Degree of Saturation (%):	saturated	saturated					

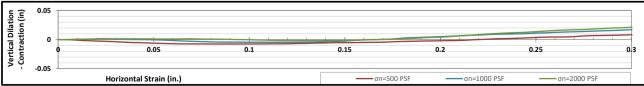
Summary of Sample	e Data:	σ _n =2000 PSF			
Initial Moisture Content (%):	21.8				
	Initial	Post-Consolidation			
Dry Density (PCF):	108.8	110.9			
Void Ratio:	0.548	0.519			
Porosity (%):	35.4	34.2			
Degree of Saturation (%):	saturated	saturated			

ESTIMATED STRI	ENGTH PARA	METERS
	PEAK	RESIDUAL
Angle of Internal Friction, φ (°):	36	34
Cohesion (PSF):	0	0



Failure Envelope Test Values:						
Normal Stress, σ _n (PSF):	500	1000	2000			
Peak Horizontal Stress, τ _h (PSF):	270	700	1490			
Residual Horizontal Stress, τ _h (PSF):	200	640	1390			





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT29-GB-26-28.9 ft

Sample#: B21-1801

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21 Tested By: C. Kriss

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.008 \\ \textbf{D}_{(10)} = 0.040 \\ \textbf{D}_{(15)} = 0.061 \\ \textbf{D}_{(30)} = 0.094 \\ \textbf{D}_{(50)} = 0.135 \\ \textbf{D}_{(60)} = 0.167 \\ \textbf{D}_{(60)} = 0.275 \end{array}$ mm % Gravel = 0.0% % Sand = 79.4% mm % Silt & Clay = 20.6% mm mm Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a $D_{(90)} = 0.375$ mm

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.33$ Coeff. of Uniformity, $C_U = 4.18$ Fineness Modulus = 0.67

Plastic Limit = n/a Moisture %, as sampled = 36.9% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					2(9)			11404410 70, 1						
					Dust Ratio			Fracture %, 2+ F	aces = n/a	R	teq'd F	racture of	%, 2+	Faces =
				AS	STM C136, ASTM D69	13, ASTM C1	17							
		Actual	Interpolated					Grain Size Distrib	ution					
		_	Cumulative					E+						
Sieve		Percent	Percent	Specs	Specs	ğ	5 90 90 44 90 5 90 90 54 90	7.27 1.27 1.28 1.27 1.27 1.27 1.27 1.27 1.27 1.27 1.27	85 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	388858				
US	Metric	Passing	Passing	Max	Min	100%	***	<u> </u>	****		т	T	ПТТ	T 100.0
12.00"	300.00		100%	100.0%	0.0%									1 1
10.00"	250.00		100%	100.0%	0.0%				1					1 1
8.00"	200.00		100%	100.0%	0.0%	90% -					MTT			90.09
6.00"	150.00		100%	100.0%	0.0%									
4.00"	100.00		100%	100.0%	0.0%	80% -				ЩШ	ШШ			80.09
3.00"	75.00		100%	100.0%	0.0%					1				
2.50"	63.00		100%	100.0%	0.0%									1 1
2.00"	50.00	100%	100%	100.0%	0.0%	70% -				1	-	+-+++++++++++++++++++++++++++++++++++	+++	70.09
1.75"	45.00		100%	100.0%	0.0%					1				1 1
1.50"	37.50		100%	100.0%	0.0%									1 1
1.25"	31.50		100%	100.0%	0.0%	60% -				1, 11	Ш			60.05
1.00"	25.00	100%	100%	100.0%	0.0%					1 1 1				1 1
3/4"	19.00	100%	100%	100.0%	0.0%	50% -				шш	Ш			50.05
5/8"	16.00		100%	100.0%	0.076									1
1/2"	12.50	100%	100%	100.0%	0.0%									1 1
3/8"	9.50	100%	100%	100.0%	0.0%	40%					+++-			40.09
1/4"	6.30		100%	100.0%	0.0%									1 1
#4	4.75	100%	100%	100.0%	0.0%					1 1				1 1
#8	2.36		100%	100.0%	0.0%	30% -						1 1111	.†††	30.09
#10	2.00	100%	100%	100.0%	0.0%					1				1 1
#16	1.18		99%	100.0%	0.0%	20% -					Ш.			20.09
#20	0.850		98%	100.0%	0.0%						A			
#30	0.600		98%	100.0%	0.0%						XIIII			1 1
#40	0.425	97%	97%	100.0%	0.0%	10% -				++	*	*		10.09
#50	0.300		79%	100.0%	0.0%									1 1
#60	0.250		72%	100.0%	0.0%								*-	*
#80	0.180		62%	100.0%	0.0%	0%	100.000	10.000	1.000	0.100		0.010		0.0%
#100	0.150	58%	58%	100.0%	0.0%									
#140	0.106		36%	100.0%	0.0%			Particle Siz	te (mm)					
#170	0.090		28%	100.0%	0.0%									
#200	0.075	20.6%	20.6%	100.0%	0.0%	+ Sieve Si	zes •	—▲ — Max Specs		Min Specs	_	Siev	√e Result	is

Comments: Reviewed by:



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soils Classification System, ASTM D-2487 Sampled By: Client Project #: 21B233 SM, Silty Sand Client: Anchor QEA Date Tested: 20-Sep-21 Sample Color Source: LDW21-GT29-GB-26-28.9 ft Tested By: C. Kriss brown Sample#: B21-1801 ASTM D7928, HYDROMETER ANALYSIS **ASTM D6913** Assumed Sp Gr: Sieve Analysis 2.65 Sample Weight: 100.10 **Grain Size Distribution** Hydroscopic Moist .: 1.34% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 98.78 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle Reading Corrected Percent 1.5" 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 0.0520 mm 11.5 11.6% 1.0" 100% 25.000 mm 3/4" 2 9.5 9.6% 0.0371 mm 100% 19.000 mm 9 9.1% 0.0235 mm 5/8" 100% 16.000 mm 8.1% 0.0137 mm 1/2" 100% 12.500 mm 30 6.1% 0.0097 mm 3/8" 100% 9.500 mm 6 0.0070 mm 60 4.0% 1/4" 100% 6.300 mm 240 3.5% 0.0035 mm 100% 4.750 mm 3.5 #4 1.5% 0.0014 mm #10 100% 2.000 mm 1440 0.850 mm 98% #20 0.0% Liquid Limit: n/a 97% % Gravel: #40 $0.425 \ mm$ % Sand: 79.4% Plastic Limit: n/a #100 58% 0.150 mm % Silt: 16.8% Plasticity Index: n/a #200 20.6% 0.075 mm 20.2% 0.074 mm % Clav: 3.8% Silts 10.1% 0.050 mm 0.020 mm 8.7% 3.8% 0.005 mm Clays 2.1% $0.002\ mm$ Colloids 1.1% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or Comments:

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233

Source: LDW21-GT29-GB-28.9-31 ft Sample#: B21-1802

Client: Anchor QEA

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 20-Sep-21

Tested By: C. Kriss

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color: brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.009 \\ \textbf{D}_{(10)} = 0.019 \\ \textbf{D}_{(15)} = 0.028 \\ \textbf{D}_{(30)} = 0.057 \\ \textbf{D}_{(50)} = 0.092 \\ \textbf{D}_{(60)} = 0.109 \\ \textbf{D}_{(90)} = 0.249 \\ \textbf{D}_{(50)} = 0.249 \\ \textbf{$ mm % Gravel = 0.0%% Sand = 60.4% mm % Silt & Clay = 39.6% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.57$ Coeff. of Uniformity, $C_U = 5.75$ Fineness Modulus = 0.24

Plastic Limit = n/a Moisture %, as sampled = 37.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	ust Ratio = $2/5$	111111	Fracture %, 2+ Fa			acture %, 2+	
				AS		FM D6913, ASTM	I C117	11000010 70, 2 10		Requii	actare 70, 21	1 4000
		Actual	Interpolated	AS	71W1 C130, A3	V Doylo, Asiv	1 (11)					
		Cumulative	Cumulative					Grain Size Distribu	tion			
Sieve	Size	Percent	Percent	Specs	Specs		b	3.5 2.7 1.1 1.7 1.1 1.7 1.7 1.7 1.4 1.4	£ \$284888	3888		
US	Metric	Passing	Passing	Max	Min		100%	***	E E E E E E E E E			T 100.0%
12.00"	300.00		100%	100.0%	0.0%				1 1111111			
10.00"	250.00		100%	100.0%	0.0%		!		<u> </u>			
8.00"	200.00		100%	100.0%	0.0%		90%		+\			90.0%
6.00"	150.00		100%	100.0%	0.0%		ł l					1 1
4.00"	100.00		100%	100.0%	0.0%		80%					80.0%
3.00"	75.00		100%	100.0%	0.0%		⁰⁰ / ₆					80.0%
2.50"	63.00		100%	100.0%	0.0%							1 1
2.00"	50.00	100%	100%	100.0%	0.0%		70%					70.0%
1.75"	45.00		100%	100.0%	0.0%							
1.50"	37.50		100%	100.0%	0.0%		11			NIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		
1.25"	31.50		100%	100.0%	0.0%		60%		+	<u> </u>		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	<u>0</u>	H			1		0
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%					50.0% kg
5/8"	16.00		100%	100.0%	0.0%	₽€	50%			•		50.0% _{BR}
1/2"	12.50	100%	100%	100.0%	0.0%							1 1
3/8"	9.50	100%	100%	100.0%	0.0%		40%			<u></u>		40.0%
1/4"	6.30		100%	100.0%	0.0%							
#4	4.75	100%	100%	100.0%	0.0%							
#8	2.36		100%	100.0%	0.0%		30%		+			30.0%
#10	2.00	100%	100%	100.0%	0.0%		ł I					1 1
#16	1.18		100%	100.0%	0.0%		20%					20.0%
#20	0.850		99%	100.0%	0.0%		20%					20.0%
#30	0.600		99%	100.0%	0.0%							1 1
#40	0.425	99%	99%	100.0%	0.0%		10%					10.0%
#50	0.300		93%	100.0%	0.0%							1
#60	0.250		90%	100.0%	0.0%							
#80	0.180		86%	100.0%	0.0%		0%	0,000 10,000	1.000	0.100	0.010	0.0%
#100	0.150	85%	85%	100.0%	0.0%					.		
#140	0.106		58%	100.0%	0.0%			Particle Size	(mm)			
#170	0.090		49%	100.0%	0.0%							
#200	0.075	39.6%	39.6%	100.0%	0.0%	+ :	Sieve Sizes	—▲ — Max Specs	- Min Spe	cs —	Sieve Result	s
Copyright	Spears Engineering & Tec	hnical Services PS, 1996-	98									

Reviewed by:



Client: Anchor QEA Date: October 14, 2021	
Address: 21328 2nd Drive SE Project: Q.C Lower Duwamish Wa	aterway
Bothell, WA 98021 Project #: 21B233	
Attn: Garrett Timm Sample #: B21-1812 - 1832	
Revised on: Date sampled: July 15, 2021	

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 23, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1812	LDW21-GT25-GB-0-1.5 ft	233.7	903.3	628.8	274.5	395.1	69.5%
B21-1813	LDW21-GT25-GB-0-8.5 ft	260.6	578.9	450.1	128.8	189.5	68.0%
B21-1814	LDW21-GT25-GB-8.5-10 ft	306.5	1244.3	1034.1	210.2	727.6	28.9%
B21-1815	LDW21-GT25-GB-8.5-16.2 ft	234.4	975.8	829.1	146.7	594.7	24.7%
B21-1816	LDW21-GT25-GB-16.2-18.5 ft	301.0	1029.3	834.6	194.7	533.6	36.5%
B21-1817	LDW21-GT25-GB-18.5-20 ft	311.0	1016.3	872.1	144.2	561.1	25.7%
B21-1818	LDW21-GT25-GB-18.5-24.4 ft	182.5	963.7	746.1	217.6	563.6	38.6%
B21-1819	LDW21-GT25-GB-24.4-26ft	268.9	846.8	702.0	144.8	433.1	33.4%
B21-1820	LDW21-GT25-GB-26-28.5 ft	229.0	653.6	545.0	108.6	316.0	34.4%
B21-1821	LDW21-GT25-GB-28.5-30 ft	221.8	847.9	689.3	158.6	467.5	33.9%
B21-1822	LDW21-GT33-GB-0-1.5 ft	223.1	962.3	671.6	290.7	448.5	64.8%
B21-1823	LDW21-GT33-GB-0-10.4 ft	225.2	643.8	515.2	128.6	290.0	44.3%
B21-1824	LDW21-GT33-GB-11-12.5 ft	221.3	1042.8	776.6	266.2	555.3	47.9%
B21-1825	LDW21-GT33-GB-11-18.5 ft	225.3	614.1	543.5	70.6	318.2	22.2%
B21-1826	LDW21-GT33-GB-18.3-21 ft	215.8	753.3	613.6	139.7	397.8	35.1%
B21-1827	LDW21-GT33-GB-21-22.5 ft	220.8	673.2	554.6	118.6	333.8	35.5%
B21-1828	LDW21-GT33-GB-21-26.8 ft	217.3	766.4	626.0	140.4	408.7	34.4%
B21-1829	LDW21-GT33-GB-26.8-28.8 ft	233.1	799.7	630.2	169.5	397.1	42.7%
B21-1830	LDW21-GT33-GB-28.8-29.5 ft	223.1	1026.1	824.1	202.0	601.0	33.6%
B21-1831	LDW21-GT33-GB-29.5-31 ft	221.8	989.1	767.9	221.2	546.1	40.5%
B21-1832	LDW21-GT33-GB-31-32.5 ft	208.9	577.5	479.9	97.6	271.0	36.0%
		Ī		1			
	_						•

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is

Reviewed by:



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 20, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Tare	Mass of Dry Soil	Pycno ID		Volume of Pycno	Water @ Tx		Pycno filled w/ water	Water, 0.1 *C	SpG of Soils	Factor	Corrected SpG
B21-1813	LDW21-GT25-GB-0-8.5 ft	498.19	565.01	66.8	TSA-022	198.0	499.5	0.99759	737.17	696.24		2.5812856		2.5796852
B21-1820	LDW21-GT25-GB-26-28.5 ft	510.35	585.58	75.2	TSA-015	187.6	499.5	0.99780	732.43	686.00	21.9	2.612047		2.6109761
B21-1825	LDW21-GT33-GB-11-18.5 ft	502.55	602.33	99.8	TSA-023	163.9	498.7	0.99786	723.74	661.59	21.6	2.6514178	0.99966	2.6505163
														Ļ
														
				1				1					1	1
				1										

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc. Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C Lower Duwami Project #: 21B233	sh Waterway		te Received: 29	lient		Visual Identifica Silt with Clay	ation	
Client: Anchor QEA, LLC Source: LDW21-GT25-GB-0-1 Sample #: B21-1813	8.5 ft	:	Date Tested: 2: Tested By: K			Sample Color brown		
	I iid I	imit Determin	-4:					
	#1	#2	#3	#4	#5	#6		
Weight of Wet Soils + Pan:	29.60	25.42	26.01	T1-1	π5	#0		
~								
Weight of Dry Soils + Pan:	25.96	21.62	21.93					
Weight of Pan: Weight of Dry Soils:	19.65 6.31	15.20 6.42	15.00 6.93				Liquid Limit @ 25 Blows: 58	8 %
Weight of Moisture:	3.64	3.80	4.08				•	5%
% Moisture:	57.7 %	59.2 %	58.9 %					3 %
Number of Blows:	28	22	17				•	
		imit Determin						
W. I. I. AW. (O. H.) T	#1	#2	#3	#4	#5	#6		
Weight of Wet Soils + Pan:	35.15	34.29						
Weight of Dry Soils + Pan: Weight of Pan:	33.00 28.27	32.39 28.20						
Weight of Dry Soils:	4.73	4.19						
Weight of Moisture:	2.15	1.90					Certificate #: 1366.01, 1366.02 & 1366.04	
% Moisture:	45.5 %	45.4 %						
	Pla	asticity Chart						_
70 % T		Jonony Grian					Liquid Limit	
60 %			"Un	LINE	سعمنيد.		60%	
50 %			CH o	OH	THE PARTY OF THE P		50%	
40 %			CH.				Worstune 40%	
30 %							% 30%	
40 %	ClorOL						30%	
	\Q_		■ MH	or OH			20%	T
10 %	ML or OL						10%	-
CL-ML	- IVIL OF OL							
0 % CL-ML 20%	30% 40%	50%	60% 70%	80%	90% 10	00% 110%	0%	Ц
0 %	30% 40%	50% Liquid Limit	60% 70%	80%	90% 10	00% 110%	0% 10 Number of Blows, "N"	100

our reports is reserved pending our written approval.

Comments:	
	a 22. A. //
	Magh Galget willo
Reviewed by:	

Meghan Blodgett-Carrillo

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974 Visit our website: www.mtc-inc.net



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT25-GB-8.5-16.2 ft

Sample#: B21-1815

#140

#170

#200

0.106

0.090

0.075

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 25-Sep-21 Tested By: K. Mendez Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

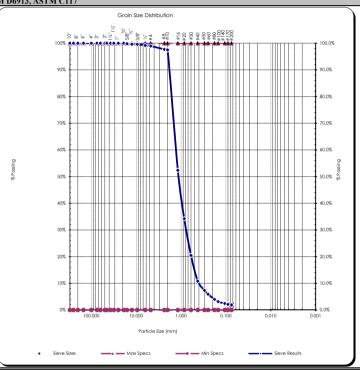
 $\begin{array}{c} \textbf{ASTM D43} \\ \textbf{D}_{(5)} = 0.216 \\ \textbf{D}_{(10)} = 0.395 \\ \textbf{D}_{(15)} = 0.501 \\ \textbf{D}_{(30)} = 0.773 \\ \textbf{D}_{(50)} = 1.137 \\ \textbf{D}_{(60)} = 1.318 \\ \textbf{D}_{(60)} = 1.318 \end{array}$ mm % Gravel = 1.1% % Sand = 97.0% mm % Silt & Clay = 1.9% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm Sand Equivalent = n/a

acture %, 1 Face = n/a ture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.15$ Coeff. of Uniformity, $C_U = 3.34$ Fineness Modulus = 3.20

Plastic Limit = n/a Moisture %, as sampled = 24.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 1.864$	mm		Fı	ract
					D	ust Ratio = 17/97			Frac	tur
				AS	STM C136, AS	TM D6913, ASTM	I C117			
		Actual	Interpolated						-	Grai
		7	Cumulative			1				
Sieve		Percent	Percent	Specs	Specs		b 1:	5 4 h i	, ž	%.
US	Metric	Passing	Passing	Max	Min	4	100%		0.0.0	(c)
12.00"	300.00		100%	100.0%	0.0%					
10.00"	250.00		100%	100.0%	0.0%		11			
8.00"	200.00		100%	100.0%	0.0%		90%		m	+
6.00"	150.00		100%	100.0%	0.0%		<u> </u>			
4.00"	100.00		100%	100.0%	0.0%		80%		ш	
3.00"	75.00		100%	100.0%	0.0%		00%			
2.50"	63.00		100%	100.0%	0.0%		- []			
2.00"	50.00	100%	100%	100.0%	0.0%		70%		1	-
1.75"	45.00		100%	100.0%	0.0%					
1.50"	37.50		100%	100.0%	0.0%					
1.25"	31.50		100%	100.0%	0.0%		60%		HH	+-
1.00"	25.00	100%	100%	100.0%	0.0%	<u>0</u>	H			
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%			
5/8"	16.00		100%	100.0%	0.0%	₽€	50%		П	
1/2"	12.50	100%	100%	100.0%	0.0%		11			
3/8"	9.50	100%	100%	100.0%	0.0%		40%		Ш.	
1/4"	6.30		99%	100.0%	0.0%					
#4	4.75	99%	99%	100.0%	0.0%					
#8	2.36		98%	100.0%	0.0%		30%		HH	+-
#10	2.00	97%	97%	100.0%	0.0%		- 1			
#16	1.18		52%	100.0%	0.0%		20%			
#20	0.850		34%	100.0%	0.0%		20%		Ш	
#30	0.600		20%	100.0%	0.0%					
#40	0.425	11%	11%	100.0%	0.0%		10%		ш	_
#50	0.300		7%	100.0%	0.0%					
#60	0.250		6%	100.0%	0.0%		- 1			
#80	0.180		4%	100.0%	0.0%		0%	100.000	1000	100
#100	0.150	3%	3%	100.0%	0.0%			100.000		
100	0.100	1 2.0	1 2.0	100.075	0.070	II				



0.0%

0.0%

0.0%

Comments: Reviewed by:

100.0%

100.0%

100.0%

2%

2%

1.9%

1.9%

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1815
Sample Date:	7/15/2021
Test Date:	9/30/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT25-GB-8.5-16.2 ft

 Visual Soil Description:
 brown sand with silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

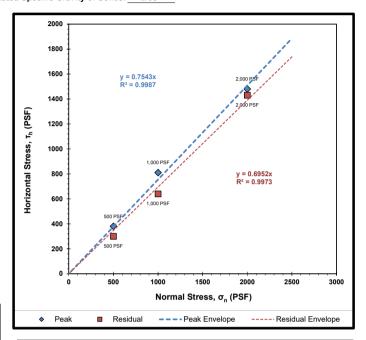
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	25.1	
	Initial	Post-Consolidation
Dry Density (PCF):	108.7	109.7
Void Ratio:	0.550	0.536
Porosity (%):	35.5	34.9
Degree of Saturation (%):	saturated	saturated

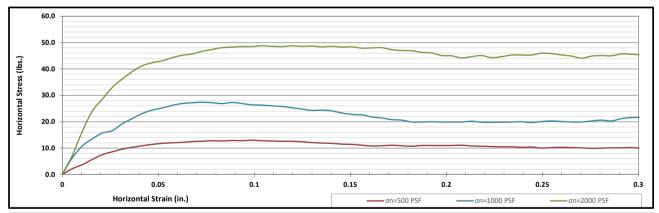
Summary of Samp	σ _n =1000 PSF	
Initial Moisture Content (%):	24.7	
	Initial	Post-Consolidation
Dry Density (PCF):	107.3	108.8
Void Ratio:	0.571	0.549
Porosity (%):	36.3	35.4
Degree of Saturation (%):	saturated	saturated

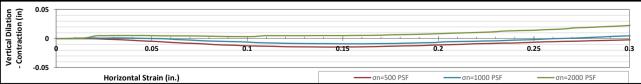
Summary of Sample	Data:	σ _n =2000 PSF
Initial Moisture Content (%):	25.6	
	Initial	Post-Consolidation
Dry Density (PCF):	107.7	110.3
Void Ratio:	0.564	0.527
Porosity (%):	36.0	34.5
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS							
	PEAK	RESIDUAL					
Angle of Internal Friction, φ (°):	37	35					
Cohesion (PSF):	0	0					



Failure Envelope Test Values:									
Normal Stress, σ _n (PSF):	500	1000	2000						
Peak Horizontal Stress, τ _h (PSF):	380	810	1480						
Residual Horizontal Stress, τ _h (PSF):	300	640	1430						





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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Proje Cli Sou	ject: Q.C Lower Duw ct #: 21B233 ient: Anchor QEA, LLC rcc: LDW21-GT25-GE le #: B21-1816		:	te Received: Sampled By: Date Tested: Tested By:	Client 25-Sep-21		Visual Identific Sand Sample Color grayish-brown	cation
		Liquid Li	mit Determina	ition				
		#1	#2	#3	#4	#5	#6	
	eight of Wet Soils + Pan:							
W	eight of Dry Soils + Pan: Weight of Pan:	Unabl	e to esablish liqui	d limit				
	Weight of Dry Soils:							Liquid Limit @ 25 Blows: N/A
	Weight of Moisture: % Moisture:							Plastic Limit: N/A Plasticity Index, I _P : N/A
	Number of Blows:							r lasticity flucx, ip. 18/A
			imit Determina					
We	eight of Wet Soils + Pan:	#1	#2	#3	#4	#5	#6	
	eight of Dry Soils + Pan:	Cannot	determined plast	ic limit				
	Weight of Pan: Weight of Dry Soils:							ACCREDITED
	Weight of Moisture:							Certificate #: 1366.01, 1366.02 & 1366.04
	% Moisture:							
7	0% +	Pla	sticity Chart					Liquid Limit
			8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					100%
6	0 % [tine	, Lipe		90%
	0 % 🖠				OH	MARKE		80%
Plasticity Index	0 % -			CA	or OH			nts 60%
<u>i</u>	0 %							w 50%
astic		OL OL						40%
<u>a</u> 2	0%	CLorOL		М	H or OH			30%
1	0 %				7			20%
	0 % CL-ML	ML or OL				_	•	10%
	0% 10% 2	20% 30% 40%	50% Liquid Limit	60% 70%	80%	90%	100% 110%	0% 10 100
	pyright Spears Engineering & Techr		Liquiu Liinit					Number of Blows, "N"

Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Pi	Project: Q.C Lower Duwar roject #: 21B233 Client: Anchor QEA, LLC Source: LDW21-GT25-GB- ample #: B21-1818	·	Date Received: 29-Jul-2 Sampled By: Client Date Tested: 25-Sep- Tested By: K. Meno	21	Visual Identificat Sand Sample Color grayish-brown	ion	
		Liquid Limit Dete	rmination				
		#1 #2	#3 #4	#5	#6		
	Weight of Wet Soils + Pan:						
	Weight of Dry Soils + Pan:	Unable to esablis	sh liquid limit				
	Weight of Pan:						
	Weight of Dry Soils:					Liquid Limit @ 25 Blows: N/A	
	Weight of Moisture: % Moisture:					Plastic Limit: N/A Plasticity Index, I _P : N/A	
	Number of Blows:						
	Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	Plastic Limit Dete #1 #2 Cannot determine	#3 #4	#5	#6	ACCREDITED Certificate #: 1366.01, 1366.02 & 1366.04	
	70 % 🕶	Plasticity C	Chart			Liquid Limit)
Plasticity Index	60 % 50 % 40 % 30 % 20 % 10 % CL-Ml 0 % 20	Liquid Li	CH or OH WH or C 60% 70% 80	PΗ	00% 110%	90%	0
All recult-	Copyright Spears Engineering & Technica		and ourselves, all reports are subiti	the confidential property of all	iante and authorization for	publication of statements, conclusions or extracts from or regard	ling
	apply only to actual locations and materials to s is reserved pending our written approval.	sacca. As a mutual protection to chems, the public	and ourseives, an reports are submitted as	ane communities property of cit	icino, and authorization for p	profice the first statements, conclusions of extracts from or regard	шg

Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT25-GB-26-28.5 ft Sample#: B21-1820

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 25-Sep-21 Tested By: K. Mendez

Visual Identification Sandy Silt with Clay Sample Color: brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.003 \\ \textbf{D}_{(10)} = 0.008 \\ \textbf{D}_{(15)} = 0.013 \\ \textbf{D}_{(30)} = 0.043 \\ \textbf{D}_{(50)} = 0.065 \\ \textbf{D}_{(60)} = 0.074 \\ \textbf{D}_{(90)} = 0.167 \\ \textbf{Partice} = 11/18 \end{array}$ mm % Gravel = 0.0% % Sand = 39.1% mm % Silt & Clay = 60.9% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm Sand Equivalent = n/a mm

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 3.28$ Coeff. of Uniformity, $C_U = 9.69$ Fineness Modulus = 0.16 Plastic Limit = n/a

Moisture %, as sampled = 34.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	oust Ratio = 11		Fractu	re %, 2+ Face	es = n/a		Fracture %	6, 2+ Fac	
				AS	TM C136, AS	TM D6913, AS	TM C117							
		Actual	Interpolated					Gro	ain Size Distributio	n				
		7	Cumulative			_								
	Size	Percent	Percent	Specs	Specs		5 16 16	% ≦. : ½ % % # .	3/8" *** ## #4	≈ 8 8 8 8 8 8 8	88458			
US	Metric	Passing	Passing	Max	Min	_	100%			- • • • • • • • • • • • • • • • • • • •	****		пттт	T 100.0%
12.00"	300.00		100%	100.0%	0.0%		F			IIIII N				1
10.00"	250.00		100%	100.0%	0.0%		1 1			-				1
8.00"	200.00		100%	100.0%	0.0%		90%				1			90.0%
6.00"	150.00		100%	100.0%	0.0%									1
4.00"	100.00		100%	100.0%	0.0%		80%							80.0%
3.00"	75.00		100%	100.0%	0.0%		- I				 			00.070
2.50"	63.00		100%	100.0%	0.0%		F I				l IIII			1
2.00"	50.00	100%	100%	100.0%	0.0%		70%				1			70.0%
1.75"	45.00		100%	100.0%	0.0%		F				1			1
1.50"	37.50		100%	100.0%	0.0%		1				l M			1
1.25"	31.50		100%	100.0%	0.0%		60%				i irii			60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	D C	t I							assing
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%							50.0%
5/8"	16.00		100%	100.0%	0.0%	₽6	30,0							7 30.0% 80
1/2"	12.50	100%	100%	100.0%	0.0%		F				1			1
3/8"	9.50	100%	100%	100.0%	0.0%		40%							40.0%
1/4"	6.30		100%	100.0%	0.0%		 				\\			1
#4	4.75	100%	100%	100.0%	0.0%		!							1
#8	2.36		100%	100.0%	0.0%		30%				/			30.0%
#10	2.00	100%	100%	100.0%	0.0%		t l					\		1
#16	1.18		100%	100.0%	0.0%		20%					*		20.0%
#20	0.850		100%	100.0%	0.0%		20%							20.0%
#30	0.600		100%	100.0%	0.0%		F							1
#40	0.425	100%	100%	100.0%	0.0%		10%					—— N		10.0%
#50	0.300		95%	100.0%	0.0%		 						K. I	1
#60	0.250		93%	100.0%	0.0%		!						*	*
#80	0.180	1	90%	100.0%	0.0%		0%	100.000	10.000	1.000	0.100	0.010		- 1 0.0% 0.001
#100	0.150	89%	89%	100.0%	0.0%							2.010	,	
#140	0.106		73%	100.0%	0.0%				Particle Size (n	nnn)				
#170	0.090		67%	100.0%	0.0%									
#200	0.075	60.9%	60.9%	100.0%	0.0%		Sieve Sizes		Max Specs		Specs -	Sieve	e Results	
	t Spears Engineering & Tec	l .	1											
				and ourselves, all reports are	submitted as the confiden	ential property of client	s and authorization	for publication of	tatements conclusio	ns or extracts from	or regarding our p	enorts is reserve	ad panding o	ur written annro

Comments:			
	March Bladget anillo		
Reviewed by:			



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Sandy Silt with Clay **Project #:** 21B233 Sampled By: Client Client: Anchor QEA Date Tested: 25-Sep-21 Sample Color Source: LDW21-GT25-GB-26-28.5 ft Tested By: K. Mendez brown Sample#: B21-1820 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp Gr: Sieve Analysis 2.61 Sample Weight: 75.00 **Grain Size Distribution** Hydroscopic Moist .: 10.50% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 67.87 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 32.7% 0.0494 mm 22 1.0" 100% 18 26.8% $0.0357 \ mm$ 3/4" 100% 19.000 mm 15.5 23.0% 0.0230 mm 5/8" 100% 16.000 mm 15.6% 0.0137 mm 1/2" 100% 12.500 mm 30 13.4% 0.0097 mm 3/8" 100% 9.500 mm 0.0070 mm 60 8.9% 1/4" 100% 6.300 mm 240 5.2% 0.0036 mm 100% 4.750 mm 3.5 #4 #10 0.0015 mm 100% 2.000 mm 1440 3.0% #20 100% 0.850 mm 0.0% Liquid Limit: n/a % Gravel: #40 100% 0.425 mm % Sand: 39.1% Plastic Limit: n/a #100 89% 0.150 mm % Silt: 54.1% Plasticity Index: n/a #200 60.9% 0.075 mm 0.074 mm % Clay: 6.8% Silts 59.8% 42.9% 0.050 mm 0.020 mm 20.6% 0.005 mm Clays 6.8% 3.5% $0.002 \ mm$ Colloids 2.0% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:**

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Reviewed by:

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C Lower Duwami Project #: 21B233	sh Waterway		te Received: 29			Visual Identifica Silt with Clay	ation
Client: Anchor QEA, LLC Source: LDW21-GT33-GB-0-1 Sample #: B21-1823		Date Tested: 25 Tested By: K	S-Sep-21		Sample Color brown		
Sample #. B21-1623							
	Liquid L	imit Determin	ation				
	#1	#2	#3	#4	#5	#6	
Weight of Wet Soils + Pan:	28.38	32.44	32.76				
Weight of Dry Soils + Pan:	24.50	28.64	28.74				
Weight of Pan:	15.01	19.79	19.63				
Weight of Dry Soils:	9.49	8.85	9.11				Liquid Limit @ 25 Blows: 42
Weight of Moisture: % Moisture:	3.88 40.9 %	3.80 42.9 %	4.02 44.1 %				Plastic Limit: 32 Plasticity Index, I _P : 10
% Moisture: Number of Blows:	40.9 % 32	42.9 %	15				riasticity findex, 1p: 10
rumper or biows.	32	21	15				
	Dlactic I	imit Determin	ation				
	#1	#2	#3	#4	#5	#6	
Weight of Wet Soils + Pan:	35.43	35.12	113				
Weight of Dry Soils + Pan:	33.78	33.45					
Weight of Pan:	28.65	28.27					
Weight of Dry Soils:	5.13	5.18					ACCREDITED
Weight of Moisture: % Moisture:	1.65 32.2 %	1.67 32.2 %					Certificate #: 1366.01, 1366.02 & 1366.04
% Moisture:	32.2 76	32.2 70					
70 % 🕶	Pla	asticity Chart					Liquid Limit
70 %							50% F
60 %				THE			45%
			TU"		عمنات		40%
50 %		\nearrow	CH o	04			35%
40 %			CH O	`			e 33/6
40 %							1 30% 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
30 % 🖠							30%
<u> </u>							20%
40 %	CLOOL		NAL	or OH			15%
10 %	/ Y		IVII	oi UH			10%
	* 41 01						5%
CL-ML	—∕IVIL or UI						
0%	ML or OL	500/	000/ 700/	000/	000/	1100/	
	30% 40%	50%	60% 70%	80%	90% 10	110%	0%

All results apply only to actual locations and materials our reports is reserved pending our written approval.

Comments:	
	Magh Chelzet aillo
Daviowed by	

Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT33-GB-11-18.5 ft

Sample#: B21-1825

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 25-Sep-21 Tested By: K. Mendez Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

mm

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{c} \textbf{AS IM D431} \\ D_{(5)} = 0.128 \\ D_{(10)} = 0.189 \\ D_{(15)} = 0.234 \\ D_{(30)} = 0.368 \\ D_{(50)} = 0.772 \\ D_{(60)} = 1.025 \\ D_{(90)} = 1.786 \\ \end{array}$ mm % Gravel = 0.1% % Sand = 96.5% mm % Silt & Clay = 3.4% mm mm Liquid Limit = n/a Plasticity Index = n/amm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 0.70$ Coeff. of Uniformity, $C_U = 5.43$ Fineness Modulus = 2.64

Plastic Limit = n/a Moisture %, as sampled = 22.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Di	$D_{(90)} = 1.780$ ust Ratio = 5/54	111111	Fracture %,			ī.		acture %		
				AS		FM D6913, ASTM	C117	Tracture 70,	2 · Taces	11/а	Г	coq u r i	acture /	v, 2 · 1 a	-
		Actual	Interpolated	AS	1141 C130, AS1	1	CIII								
		Cumulative	Cumulative						Distribution						
Sieve	Size	Percent	Percent	Specs	Specs	1		3/8° 1.7° 0		9000	888888				
US	Metric	Passing	Passing	Max	Min	1	∻+ ئەش⊆ • ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	> ~≦= % %	× 2 ===	± 5 5 4 ;	* * * * * * *				 100.0%
12.00"	300.00		100%	100.0%	0.0%	1			T						1
10.00"	250.00		100%	100.0%	0.0%										1
8.00"	200.00		100%	100.0%	0.0%		90%		 					+++-	90.0%
6.00"	150.00		100%	100.0%	0.0%		l l								1
4.00"	100.00		100%	100.0%	0.0%		80%		111111						80.0%
3.00"	75.00		100%	100.0%	0.0%		^{60%} F								00.0%
2.50"	63.00		100%	100.0%	0.0%		F								1
2.00"	50.00	100%	100%	100.0%	0.0%		70%				<u> </u>				70.0%
1.75"	45.00		100%	100.0%	0.0%		ļ								1
1.50"	37.50		100%	100.0%	0.0%					\					1
1.25"	31.50		100%	100.0%	0.0%		60%			₩					60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	D E	t II III			N. I					اق ا
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%			ì					50.0% %
5/8"	16.00		100%	100.0%	0.0%	PG	50%			N.					50.0% 80
1/2"	12.50	100%	100%	100.0%	0.0%		ļ			N.					1
3/8"	9.50	100%	100%	100.0%	0.0%		40%								40.0%
1/4"	6.30		100%	100.0%	0.0%					N N					1
#4	4.75	100%	100%	100.0%	0.0%					111111					1
#8	2.36		99%	100.0%	0.0%		30%								30.0%
#10	2.00	98%	98%	100.0%	0.0%		t IIII								1
#16	1.18		66%	100.0%	0.0%		20%								20.0%
#20	0.850		53%	100.0%	0.0%		^{20%} F				Ž II				20.0%
#30	0.600		43%	100.0%	0.0%						N				1
#40	0.425	36%	36%	100.0%	0.0%		10%				+I				10.0%
#50	0.300		22%	100.0%	0.0%		ļ				I V				1
#60	0.250		17%	100.0%	0.0%										1
#80	0.180		9%	100.0%	0.0%		0%	0 10.000		1.000	0.100	ننسر	0.010		→ 0.0% 0.001
#100	0.150	6%	6%	100.0%	0.0%		130.00	.0.000			5.100		0.010		
#140	0.106		4%	100.0%	0.0%			Po	rticle Size (mm)					
#170	0.090		4%	100.0%	0.0%										
#200	0.075	3.4%	3.4%	100.0%	0.0%	+ Si	eve Sizes	Max Sp	ecs .	 N	Min Specs	_	Sieve	Results	
Copyright	Spears Engineering & Tec		8												
				and ourselves, all reports are	submitted as the confide	ential property of clients, and a	uthorization for pu	iblication of statemen	s, conclusions	or extracts fi	rom or regardi	ng our repo	rts is reserve	d pending o	our written appr

Comments: Reviewed by: _

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1825
Sample Date:	7/15/2021
Test Date:	10/1/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT33-GB-11-18.5 ft

 Visual Soil Description:
 brown sand with silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

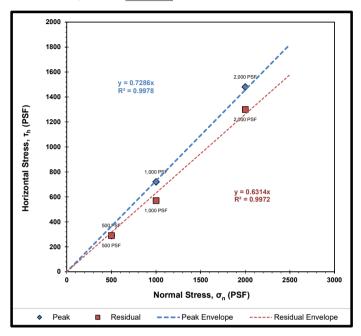
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Samp	le Data:	σ _n =500 PSF			
Initial Moisture Content (%):	27.4				
	Initial	Post-Consolidation			
Dry Density (PCF):	105.9	106.9			
Void Ratio:	0.591	0.577			
Porosity (%):	37.2	36.6			
Degree of Saturation (%):	saturated	saturated			

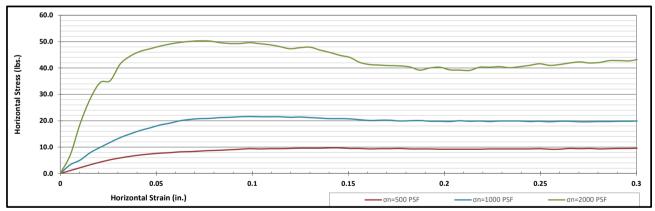
Summary of Sample	Data:	σ _n =1000 PSF			
Initial Moisture Content (%):	27.4				
	Initial	Post-Consolidation			
Dry Density (PCF):	106.2	107.7			
Void Ratio:	0.586	0.564			
Porosity (%):	36.9	36.1			
Degree of Saturation (%):	saturated	saturated			

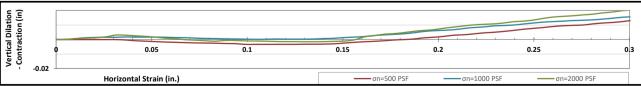
Summary of Sample	Data:	σ _n =2000 PSF			
Initial Moisture Content (%):	26.6				
	Initial	Post-Consolidation			
Dry Density (PCF):	106.1	108.6			
Void Ratio:	0.589	0.551			
Porosity (%):	37.0	35.5			
Degree of Saturation (%):	saturated	saturated			

ESTIMATED STRENGTH PARAMETERS									
	PEAK	RESIDUAL							
Angle of Internal Friction, φ (°):	38	32							
Cohesion (PSF):	0	0							



Failure Envelope Test Values:									
Normal Stress, σ _n (PSF):	500	1000	2000						
Peak Horizontal Stress, τ _h (PSF):	290	720	1480						
Residual Horizontal Stress, τ _h (PSF):	290	570	1300						



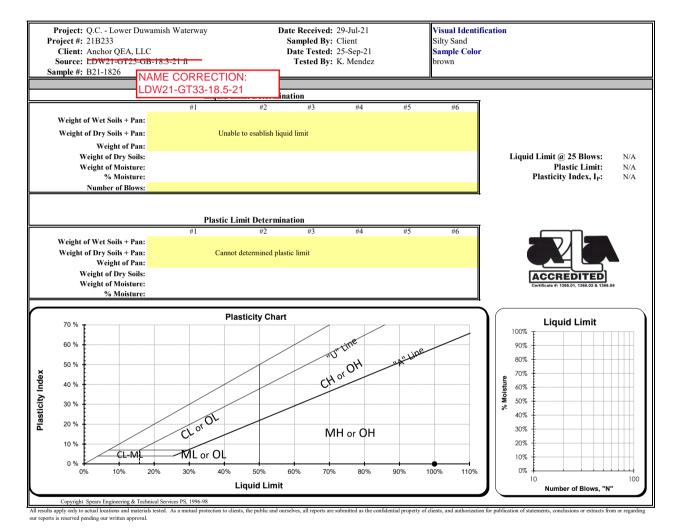


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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils



Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#100

#140

#170

#200

0.150

0.106

0.090

0.075

61.1%

Source: LDW21-GT33-GB-21-26.8 ft

Sample#: B21-1828

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 25-Sep-21 Tested By: K. Mendez Unified Soils Classification System, ASTM D-2487

ML, Sandy Silt Sample Color:

brown

43/70



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

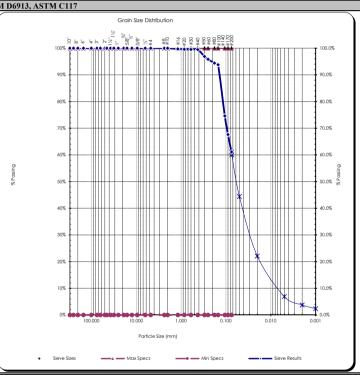
Sample Meets Specs? N/A

 $D_{(5)} = 0.004$ $D_{(10)} = 0.007$ $D_{(15)} = 0.010$ mm % Gravel = 0.0% % Sand = 38.9% mm % Silt & Clay = 61.1% mm $D_{(30)} = 0.036$ mm Liquid Limit = 0.0% $D_{(50)} = 0.064$ Plasticity Index = 0.0% $D_{(60)} = 0.074$ $D_{(60)} = 0.141$ mm Sand Equivalent = n/a Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a = 0.141 mm

Coeff. of Curvature, $C_C = 2.51$ Coeff. of Uniformity, $C_U = 10.39$ Fineness Modulus = 0.10 Plastic Limit = 0.0%

Moisture %, as sampled = 34.4% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} =$
						Oust Ratio =
		Actual	Intomoloted	AS	TM C136, AS	TM D6913,
			Interpolated Cumulative			ľ
Sieve	C:	Percent	Percent	C	C	-
US	Metric Metric	Passing	Passing	Specs Max	Specs Min	
12.00"	300.00	rassing	100%	100.0%	0.0%	-
10.00"	250.00		100%	100.0%	0.0%	
8.00"	200.00		100%	100.0%	0.0%	
6.00"	150.00		100%	100.0%	0.0%	
4.00"	100.00		100%	100.0%	0.0%	
3.00"	75.00		100%	100.0%	0.0%	
2.50"	63.00		100%	100.0%	0.0%	
2.00"	50.00	100%	100%	100.0%	0.0%	
1.75"	45.00	10070	100%	100.0%	0.0%	
1.50"	37.50		100%	100.0%	0.0%	
1.25"	31.50		100%	100.0%	0.0%	
1.00"	25.00	100%	100%	100.0%	0.0%	0
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing
5/8"	16.00	10070	100%	100.0%	0.0%	86 0
1/2"	12.50	100%	100%	100.0%	0.0%	
3/8"	9.50	100%	100%	100.0%	0.0%	
1/4"	6.30	10070	100%	100.0%	0.0%	
#4	4.75	100%	100%	100.0%	0.0%	
#8	2.36	10070	100%	100.0%	0.0%	
#10	2.00	100%	100%	100.0%	0.0%	
#16	1.18		100%	100.0%	0.0%	
#20	0.850		100%	100.0%	0.0%	
#30	0.600		100%	100.0%	0.0%	
#40	0.425	99%	99%	100.0%	0.0%	
#50	0.300		97%	100.0%	0.0%	
#60	0.250		96%	100.0%	0.0%	
#80	0.180		94%	100.0%	0.0%	



0.0%

0.0%

0.0%

0.0%

Comments: Reviewed by: Meghan Blodgett-Carrillo

100.0%

100.0%

100.0%

75%

68%

61.1%



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soils Classification System, ASTM D-2487 **Project #:** 21B233 ML. Sandy Silt Sampled By: Client Client: Anchor QEA Date Tested: 25-Sep-21 Sample Color Source: LDW21-GT33-GB-21-26.8 ft Tested By: K. Mendez brown Sample#: B21-1828 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: 2.65 Sieve Analysis Sample Weight: 75.85 **Grain Size Distribution** Hydroscopic Moist .: Soils Particle 3.68% Sieve Percent ACCREDITED Adj. Sample Wgt: 73.16 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 0.0477 mm 25 34.2% 1.0" 100% 2 21.5 29 4% $0.0347 \ mm$ 3/4" 100% 19.000 mm 17.5 23.9% 0.0224 mm 5/8" 100% 16.000 mm 17.1% 0.0133 mm 1/2" 100% 12.500 mm 30 14.4% 0.0096 mm 3/8" 100% 9.500 mm 10.5 0.0069 mm 60 9.6% 1/4" 100% 6.300 mm 240 4.8% 0.0035 mm 100% 4.750 mm 3.5 #4 3 4% 0.0014 mm #10 100% 2.000 mm 1440 100% 0.850 mm #20 Liquid Limit: 0.0 % % Gravel: 0.0% #40 99% 0.425 mm % Sand: 38.9% Plastic Limit: 0.0 % #100 94% 0.150 mm % Silt: 54.2% Plasticity Index: 0.0 % #200 61.1% 0.075 mm 0.074 mm % Clay: 6.9% Silts 60.1% 0.050 mm 44.4% 0.020 mm 22.1% 0.005 mm Clays 6.9% 3.8% $0.002 \ mm$ Colloids 2.4% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:** Reviewed by:

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Pı	Project: Q.C Lower Duwar roject #: 21B233 Client: Anchor QEA, LLC Source: LDW21-GT33-GB- ample #: B21-1828	•	Date Received: 29-Ju Sampled By: Clien Date Tested: 25-Sc Tested By: K. Mo	t ep-21	Unified Soils Cla ML, Sandy Silt Sample Color brown	ssification System, ASTM D-2487
		Liquid Limit Det	ermination			
		#1 #2		#4 #5	#6	
	Weight of Wet Soils + Pan:					
	Weight of Dry Soils + Pan:	Unable to esabl	ish liquid limit			
	Weight of Pan:					
	Weight of Dry Soils: Weight of Moisture:					Liquid Limit @ 25 Blows: N/A Plastic Limit: N/A
	% Moisture:					Plasticity Index, I _P : N/A
	Number of Blows:					-
		Plastic Limit Det		#4 #5	#6	
	Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils:	Cannot determin	ed plastic limit			
	Weight of Moisture: % Moisture:					Certificate #: 1366.01, 1366.02 & 1366.04
ſ	70 % 🕶	Plasticity	Chart			Liquid Limit
Plasticity Index	60 % 50 % 40 %		CH or O	H		100% 100% 100% 100% 100% 100% 100% 100%
Plast	20 %	CLorOL	MH or	· OH		40% - 30% - 20% -
	CL-ML	ML or OL				10%
	0% 10% 20	% 30% 40% 50% Liquid l		80% 90%	100% 110%	0% 10 100 100 Number of Blows, "N"
	Copyright Spears Engineering & Technic					
	apply only to actual locations and materials to s is reserved pending our written approval.	ested. As a mutual protection to clients, the publi	c and ourselves, all reports are submitted	d as the confidential property of	clients, and authorization for	publication of statements, conclusions or extracts from or regarding

Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C Lower Duwam Project #: 21B233 Client: Anchor QEA, LLC Source: LDW21-GT33-GB-2 Sample #: B21-1829	•	Oate Received: 29-Jul-21 Sampled By: Client Date Tested: 25-Sep-21 Tested By: K. Mendez	Visual I Silty Sa Sample brown	e Color	
	Liquid Limit Determi	nation			
	#1 #2	#3 #4	#5 #6	66	
Weight of Wet Soils + Pan:					
Weight of Dry Soils + Pan:	Unable to esablish lic	quid limit			
Weight of Pan:					
Weight of Dry Soils:				Liquid Limit @ 25 Blo Plastic Li	
Weight of Moisture: % Moisture:				Plasticity Index	
Number of Blows:				·	
Weight of Wet Soils + Pan:	Plastic Limit Determi #1 #2	#3 #4	#5 #6		
Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	Cannot determined pl	astic limit		ACCREDIT Certificate #: 1366.01, 1366.	ED 02 & 1366.04
70.0/	Plasticity Cha	rt		Liquid Lim	nit
70 % 60 % 50 % 40 % 10 % CL-M 0 % 10 % 20 %	ML or OL 30% 40% 50% Liquid Limit	CH or OH OH or OH 60% 70% 80%	90% 100%	100% 10	100
Copyright Spears Engineering & Technical		-		Number of Blo	ows, 'N"
		ourselves, all reports are submitted as the con-	fidential property of clients, and au	authorization for publication of statements, conclusions or e	extracts from or regarding

Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#140

#170

#200

0.106

0.090

0.075

Source: LDW21-GT33-GB-28.8-29.5 ft Sample#: B21-1830

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 25-Sep-21 Tested By: K. Mendez Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.010 \\ \textbf{D}_{(10)} = 0.047 \\ \textbf{D}_{(15)} = 0.061 \\ \textbf{D}_{(30)} = 0.096 \\ \textbf{D}_{(50)} = 0.158 \\ \textbf{D}_{(60)} = 0.213 \\ \textbf{D}_{(90)} = 0.378 \\ \textbf{D}_{(90)} = 0.378 \\ \textbf{D}_{(15)} = 0.213 \\ \textbf$ mm % Gravel = 0.0% % Sand = 77.0% mm % Silt & Clay = 23.0% mm mm Liquid Limit = n/a mm Plasticity Index = n/a mm mm

Sand Equivalent = n/a Fracture %, 1 Face = n/a= n/a

Coeff. of Curvature, $C_C = 0.90$ Coeff. of Uniformity, $C_U = 4.50$ Fineness Modulus = 0.78

Plastic Limit = n/a Moisture %, as sampled = 33.6% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

					_	D(90) = 0.576	111111		Tracture /		
						st Ratio = 7/30		Fra	acture %,	2+ Fac	es=
				AS	STM C136, AST	M D6913, ASTM	I C117				
		Actual	Interpolated			ľ			Grain Size I	Distributio	on
		7	Cumulative	_	_			Ę			
Sieve		Percent	Percent	Specs	Specs		5 % 5	2 4 6 6 4 e	3/8"	4 4 80E	2 2
US	Metric	Passing	Passing	Max	Min		100%	•-•,••,••	••••	TO THE	-
12.00"	300.00		100%	100.0%	0.0%						
10.00"	250.00		100%	100.0%	0.0%		90%				
8.00"	200.00		100%	100.0%	0.0%		90%				
6.00"	150.00		100%	100.0%	0.0%						
4.00"	100.00		100%	100.0%	0.0%		80%				
3.00"	75.00		100%	100.0%	0.0%						
2.50"	63.00		100%	100.0%	0.0%		- 1				
2.00"	50.00	100%	100%	100.0%	0.0%		70%				┢
1.75"	45.00		100%	100.0%	0.0%						
1.50"	37.50		100%	100.0%	0.0%						
1.25"	31.50		100%	100.0%	0.0%		60%		1-1-111	###	\vdash
1.00"	25.00	100%	100%	100.0%	0.0%	<u>0</u>	11				
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%				
5/8"	16.00		100%	100.0%	0.0%	96	50%				
1/2"	12.50	100%	100%	100.0%	0.0%						
3/8"	9.50	100%	100%	100.0%	0.0%		40%				-
1/4"	6.30		100%	100.0%	0.0%						
#4	4.75	100%	100%	100.0%	0.0%						
#8	2.36		100%	100.0%	0.0%		30%		1111111	###	
#10	2.00	100%	100%	100.0%	0.0%		1				
#16	1.18		99%	100.0%	0.0%		20%				
#20	0.850		99%	100.0%	0.0%		20%				
#30	0.600		99%	100.0%	0.0%						
#40	0.425	99%	99%	100.0%	0.0%		10%				ļ
#50	0.300		76%	100.0%	0.0%						
#60	0.250		67%	100.0%	0.0%						
#80	0.180		54%	100.0%	0.0%		0%	100.000	10.000		1.0
#100	0.150	48%	48%	100.0%	0.0%			.00.000	10.000		1.0
	0.106		2.407	100.00/	0.007	ll .			Por	rticlo Sizo I	(mana)

100.0%

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100.0%

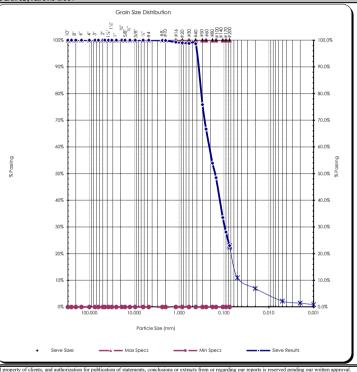
34%

28%

23.0%

23.0%

Meghan Blodgett-Carrillo



0.0%

0.0%

0.0%

Comments: Reviewed by:



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soils Classification System, ASTM D-2487 **Project #:** 21B233 Sampled By: Client SM, Silty Sand Client: Anchor QEA Date Tested: 25-Sep-21 Sample Color Source: LDW21-GT33-GB-28.8-29.5 ft Tested By: K. Mendez brown Sample#: B21-1830 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: 2.65 Sieve Analysis Sample Weight: 80.02 **Grain Size Distribution** Hydroscopic Moist .: 4.80% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 76.35 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 10.5% 0.0529 mm 1.0" 100% 9.2% $0.0376\ mm$ 3/4" 100% 19.000 mm 7.2% 0.0240 mm 5/8" 100% 16.000 mm 6.5% 0.0139 mm 1/2" 100% 12.500 mm 30 5.2% 0.0098 mm 3/8" 100% 9.500 mm 0.0070 mm 60 2.6% 1/4" 100% 6.300 mm 240 2.0% 0.0035 mm 100% 4.750 mm 1.5 #4 1.3% 0.0014 mm #10 100% 2.000 mm 1440 99% 0.850 mm #20 0.0% Liquid Limit: n/a % Gravel: #40 99% 0.425 mm % Sand: 77.0% Plastic Limit: n/a #100 48% 0.150 mm % Silt: 20.8% Plasticity Index: n/a #200 23.0% 0.075 mm 0.074 mm % Clay: 2.2% Silts 22.4% 10.9% 0.050 mm 0.020 mm 6.9% 2.2% 0.005 mm Clays 1.5% $0.002 \ mm$ Colloids 0.9% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: % Clay: < 0.002 mm **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:** Reviewed by: Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Pr	Project: Q.C Lower Duwamish V oject #: 21B233 Client: Anchor QEA, LLC Source: LDW21-GT33-GB-29.5-3 mple #: B21-1831	S: D	e Received: 29-Jul-21 ampled By: Client ate Tested: 25-Sep-21 Tested By: K. Mendez	Visual Ident Sandy Silt Sample Colo brown	
		Liquid Limit Determinat	ion		
		#1 #2	#3 #4	#5 #6	1
	Weight of Wet Soils + Pan:				
	Weight of Dry Soils + Pan:	Unable to esablish liquid	limit		
	Weight of Pan:	•			
	Weight of Dry Soils:				Liquid Limit @ 25 Blows: N/A
	Weight of Moisture:				Plastic Limit: N/A Plasticity Index, Ip: N/A
	% Moisture: Number of Blows:				Plasticity Index, I _P : N/A
	Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Pry Soils: Weight of Moisture: % Moisture:	Cannot determined plastic	#3 #4	#5 #6	ACCREDITED Cortificato #: 1366.01, 1366.02 & 1366.04
	70 % T	Plasticity Chart			Liquid Limit
Plasticity Index	60 % 50 % 40 %		CH or OH	ALLIAGE	100% 90% 80% 70% 90% 90% 90% 90% 90% 90% 90% 90% 90% 9
stici	30 %				30% 40%
Pla	20 %	CL or OL	MH or OH		30%
	10 %		IVIII OI OII		20%
	CL-ML	ML or OL			10%
	0 % 10% 20%	30% 40% 50% 60	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0% 100% 110%	
		Liquid Limit			10 100 Number of Blows, "N"

Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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Client:	Anchor QEA	Date:	October 19, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-1948 - 1965
Revised on:		Date sampled:	July 16, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor	-		Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			
	_				

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: October 1, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-1948	LDW21-GT39-GB-0-1.5 ft	182.2	359.3	304.7	54.6	122.5	44.6%
B21-1949	LDW21-GT39-GB-0-8.8 ft	229.5	1120.6	890.6	230.0	661.1	34.8%
B21-1950	LDW21-GT39-GB-8.8-10.5 ft	234.3	1839.1	1517.6	321.5	1283.3	25.1%
B21-1951	LDW21-GT39-GB-10.5-12 ft	222.9	1270.1	1072.1	198.0	849.2	23.3%
B21-1952	LDW21-GT39-GB-10.5-20.5 ft	228.8	652.9	584.6	68.3	355.8	19.2%
B21-1953	LDW21-GT39-GB-20.5-21 ft	225.2	577.3	508.6	68.7	283.4	24.2%
B21-1954	LDW21-GT39-GB-20.5-30.5 ft	234.4	1327.0	1148.4	178.6	914.0	19.5%
B21-1955	LDW21-GT39-GB-30.5-32 ft	233.2	876.4	747.6	128.8	514.4	25.0%
B21-1956	LDW21-GT23-GB-0-1.5 ft	223.0	462.7	361.7	101.0	138.7	72.8%
B21-1957	LDW21-GT23-GB-0-8.2 ft	221.9	900.9	625.0	275.9	403.1	68.4%
B21-1958	LDW21-GT23-GB-8.5-10 ft	215.4	919.5	775.8	143.7	560.4	25.6%
B21-1959	LDW21-GT23-GB-8.5-17.6 ft	234.7	1060.0	934.4	125.6	699.7	18.0%
B21-1960	LDW21-GT23-GB-17.6-18.5 ft	217.3	972.1	771.5	200.6	554.2	36.2%
B21-1961	LDW21-GT23-GB-18.5-20 ft	270.1	687.9	581.4	106.5	311.3	34.2%
B21-1962	LDW21-GT23-GB-21.1-22.8 ft	222.3	1022.4	815.3	207.1	593.0	34.9%
B21-1963	LDW21-GT23-GB-22.8-26.8 ft	266.3	870.9	724.1	146.8	457.8	32.1%
B21-1964	LDW21-GT23-GB-27.7-28.5 ft	224.7	963.8	779.9	183.9	555.2	33.1%
B21-1965	LDW21-GT23-GB-30.5-32 ft	235.2	627.7	539.1	88.6	303.9	29.2%
_							
				California and and administration			

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 20, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Tare	Mass of Dry Soil	Pycno ID		Pycno	Density of Water @ Tx	soils	Mass of Pycno filled w/ water	Water, 0.1 *C	SpG of Soils	Factor	SpG
B21-1952	LDW21-GT39-GB-10.5-20.5 ft	493.16	568.87	75.7	TSA-014	192.3	499.5	0.99858	738.22	691.08		2.6499101		2.6508905
B21-1957	LDW21-GT23-GB-0-8.2 ft	584.01	660.92	76.9	TSA-013	184.0	499.7	0.99858	729.36	682.95	18.1	2.5216018	1.00037	2.5225348
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all results apply only to actual locations and materials tested.	As a mutual protection to clients, the public and ourselves, a	all reports are submitted as the confidential prop	perty of clients, and authorization for publication of	f statements, conclusions or extracts from or regain	rding our reports is reserved pending our wi	ntten approval.

Reviewed by:

Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project #: 21B: Client: Ancl Source: LDV Sample #: B21-	hor QEA, LLC V21-GT39-GB-0-8.8 ft -1949 #1 et Soils + Pan:	Sa Da Liquid Limit Determina	Received: 29 mpled By: Cli tet Tested: 6-(Tested By: C.	ient Oct-21	#5	Visual Identificat Silt with Sand Sample Color brown	tion
Weight Weigh	y Soils + Fail: Veight of Pan: t of Dry Soils: t of Moisture: % Moisture: bber of Blows:	Unable to determine					Liquid Limit @ 25 Blows: N/A Plastic Limit: N/A Plasticity Index, I _P : N/A
Weight	#1 ct Soils + Pan: y Soils + Pan: Veight of Pan: t of Dry Soils: t of Moisture: % Moisture:	Plastic Limit Determinat #2 Unable to establish	#3	#4	#5	#6	ACCREDITED Certificate #: 1366.01, 1366.02 & 1366.04
70 % 60 % 50 % 40 % 20 % 0 % 0 % 0 % 0 %		Plasticity Chart Of Older 1	CH of MH	or OH	90% 1	110%	Liquid Limit 100% 90% 80% 80% 40% 40% 30% 20% 10 Number of Blows, "N"

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments: Liquid limit cannot be determined as the material displays rapid dilation. At lower moistures the sample does not spread into the cup without tearing the soil cake. Unable to establish plastic limit as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:

Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT39-GB-8.8-10.5 ft

Sample#: B21-1950

#140

#170

#200

0.106

0.090

0.075

2.0%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 4-Oct-21 Tested By: K. Mendez Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

Sample Color:

grayish-brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{AS IM D43} \\ \textbf{D}_{(5)} = 0.157 \\ \textbf{D}_{(10)} = 0.187 \\ \textbf{D}_{(15)} = 0.218 \\ \textbf{D}_{(30)} = 0.311 \\ \textbf{D}_{(50)} = 0.471 \\ \textbf{D}_{(60)} = 0.777 \\ \textbf{D}_{(90)} = 1.696 \end{array}$ mm % Gravel = 0.0% % Sand = 98.0% mm % Silt & Clay = 2.0% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm

Sand Equivalent = n/a racture %, 1 Face = n/a ces = n/a

Coeff. of Curvature, $C_C = 0.66$ Coeff. of Uniformity, $C_U = 4.15$ Fineness Modulus = 2.40

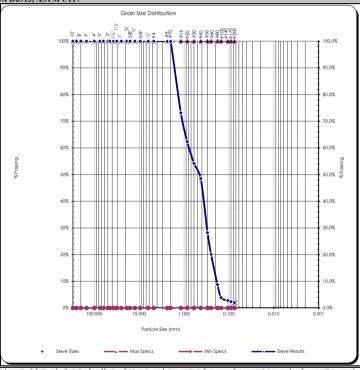
Plastic Limit = n/a Moisture %, as sampled = 25.0% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 1.696$	mm	Fra	acture %,	, 1 Fac
					D	ust Ratio = 1/24		Fract	ture %, 2-	+ Fac
				AS	STM C136, AS	TM D6913, ASTN	A C117			
		Actual	Interpolated					G	Frain Size Dis	istributic
			Cumulative	_	1 -	-				
	Size	Percent	Percent	Specs	Specs		9: 8: 9	1 2 4 4 4 t	% % %	4 ±±
US	Metric	Passing	Passing	Max	Min	4	100%			1
12.00"	300.00		100%	100.0%	0.0%		H			
10.00"	250.00		100%	100.0%	0.0%		90%			
8.00"	200.00		100%	100.0%	0.0%		70%			
6.00"	150.00		100%	100.0%	0.0%					
4.00"	100.00		100%	100.0%	0.0%		80%			Ш.
3.00"	75.00		100%	100.0%	0.0%					
2.50"	63.00		100%	100.0%	0.0%		<u> </u>			
2.00"	50.00	100%	100%	100.0%	0.0%		70%			+++
1.75"	45.00		100%	100.0%	0.0%					
1.50"	37.50		100%	100.0%	0.0%					
1.25"	31.50		100%	100.0%	0.0%		60%			Ш
1.00"	25.00	100%	100%	100.0%	0.0%	guig				
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%			Ш
5/8"	16.00		100%	100.0%	0.0%	8<	1			
1/2"	12.50	100%	100%	100.0%	0.0%		H			
3/8"	9.50	100%	100%	100.0%	0.0%		40%			HHH
1/4"	6.30		100%	100.0%	0.0%					
#4	4.75	100%	100%	100.0%	0.0%					
#8	2.36		100%	100.0%	0.0%		30%			H
#10	2.00	100%	100%	100.0%	0.0%					
#16	1.18		73%	100.0%	0.0%		20%			Ш
#20	0.850		62%	100.0%	0.0%		1			
#30	0.600		54%	100.0%	0.0%		H			
#40	0.425	49%	49%	100.0%	0.0%		10%			++-+
#50	0.300		28%	100.0%	0.0%					
#60	0.250		20%	100.0%	0.0%		1.1.			
#80	0.180		9%	100.0%	0.0%		0% 606-0	100.000	10.000	D00
#100	0.150	4%	4%	100.0%	0.0%					
		1			1	II .			D	-1- 0: 1-

3%

2%

2.0%



0.0%

0.0%

0.0%

Comments: Reviewed by:

100.0%

100.0%

100.0%



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT39-GB-10.5-20.5 ft

Sample#: B21-1952

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 4-Oct-21 Tested By: K. Mendez Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color: grayish-brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs

0.180

0.150

0.106

0.090

0.075

7.0%

Meghan Blodgett-Carrillo

#80 #100

#140

#170

#200

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.053 \\ D_{(10)} = 0.121 \\ D_{(15)} = 0.178 \\ D_{(30)} = 0.313 \end{array}$ mm % Gravel = 1.1% % Sand = 91.9% mm % Silt & Clay = 7.0% mm mm Liquid Limit = n/a $D_{(50)} = 0.638$ Plasticity Index = n/a $D_{(60)}^{(50)} = 0.919$ mm Sand Equivalent = n/a $D_{(90)} = 1.762$ ust Ratio = 1/6 mm

Fracture %, 1 Face = n/aFracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 0.88$ Coeff. of Uniformity, $C_U = 7.60$

Fineness Modulus = 2.45 Plastic Limit = n/a Moisture %, as sampled = 19.2% Req'd Sand Equivalent = Reald Fracture % 1 Face =

	equiridetare 70, 1 1 dee
Req	'd Fracture %, 2+ Faces =

				AS	TM C136,	
			Interpolated e Cumulative			
Sieve Size		Percent	Percent	Specs	Specs	
US	Metric	Passing	Passing	Max	Min	
12.00"	300.00		100%	100.0%	0.0%	
10.00"	250.00		100%	100.0%	0.0%	
8.00"	200.00		100%	100.0%	0.0%	
6.00"	150.00		100%	100.0%	0.0%	
4.00"	100.00		100%	100.0%	0.0%	
3.00"	75.00		100%	100.0%	0.0%	
2.50"	63.00		100%	100.0%	0.0%	
2.00"	50.00	100%	100%	100.0%	0.0%	
1.75"	45.00		100%	100.0%	0.0%	
1.50"	37.50		100%	100.0%	0.0%	
1.25"	31.50		100%	100.0%	0.0%	
1.00"	25.00	100%	100%	100.0%	0.0%	
3/4"	19.00	100%	100%	100.0%	0.0%	
5/8"	16.00		100%	100.0%	0.0%	
1/2"	12.50	100%	100%	100.0%	0.0%	
3/8"	9.50	100%	100%	100.0%	0.0%	
1/4"	6.30		99%	100.0%	0.0%	
#4	4.75	99%	99%	100.0%	0.0%	
#8	2.36		99%	100.0%	0.0%	
#10	2.00	98%	98%	100.0%	0.0%	
#16	1.18		69%	100.0%	0.0%	
#20	0.850		58%	100.0%	0.0%	
#30	0.600		49%	100.0%	0.0%	
#40	0.425	42%	42%	100.0%	0.0%	
#50	0.300		29%	100.0%	0.0%	
#60	0.250		23%	100.0%	0.0%	

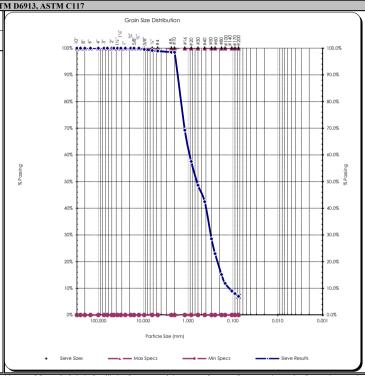
15%

12%

9%

8%

7.0%



0.0%

0.0%

0.0%

0.0%

0.0%

Comments: Reviewed by:

100.0%

100.0%

100.0%

100.0%

100.0%

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1952
Sample Date:	7/16/2021
Test Date:	10/4/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT39-GB-10.5-20.5 ft

 Visual Soil Description:
 grayish-brown sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

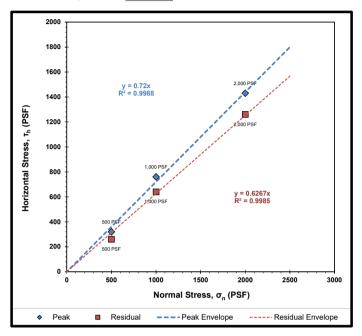
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	26.0	
	Initial	Post-Consolidation
Dry Density (PCF):	109.4	111.1
Void Ratio:	0.540	0.516
Porosity (%):	35.1	34.0
Degree of Saturation (%):	saturated	saturated

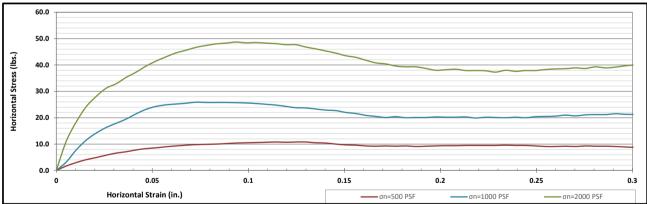
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	26.7	
	Initial	Post-Consolidation
Dry Density (PCF):	107.4	109.6
Void Ratio:	0.569	0.537
Porosity (%):	36.3	34.9
Degree of Saturation (%):	saturated	saturated

Summary of Sample	e Data:	σ _n =2000 PSF		
Initial Moisture Content (%):	25.2			
	Initial	Post-Consolidation		
Dry Density (PCF):	109.0	113.2		
Void Ratio:	0.546	0.488		
Porosity (%):	35.3	32.8		
Degree of Saturation (%):	saturated	saturated		

ESTIMATED STRENGTH PARAMETERS						
	PEAK	RESIDUAL				
Angle of Internal Friction, φ (°):	36	32				
Cohesion (PSF):	0	0				



Failure Envelope Test Values:								
Normal Stress, σ _n (PSF):	500	1000	2000					
Peak Horizontal Stress, τ _h (PSF):	320	760	1430					
Residual Horizontal Stress, τ _h (PSF):	260	640	1260					





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233

#170

#200

0.090

0.075

2.8%

Meghan Blodgett-Carrillo

Source: LDW21-GT39-GB-20.5-30.5 ft Sample#: B21-1954

Client: Anchor QEA

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 4-Oct-21

Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand Sample Color:

gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{AS IM D43} \\ \textbf{D}_{(5)} = 0.153 \\ \textbf{D}_{(10)} = 0.197 \\ \textbf{D}_{(15)} = 0.241 \\ \textbf{D}_{(30)} = 0.371 \\ \textbf{D}_{(50)} = 0.789 \\ \textbf{D}_{(60)} = 1.051 \\ \textbf{D}_{(90)} = 1.839 \end{array}$ mm % Gravel = 2.1% % Sand = 95.1% mm % Silt & Clay = 2.8% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm Sand Equivalent = n/a

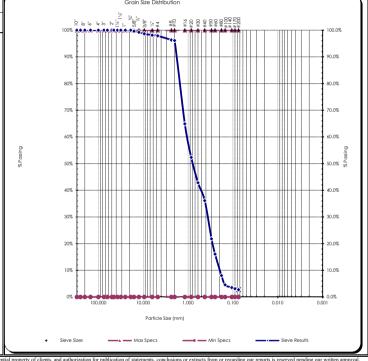
mm Fracture %. 1 Face = n/a

Coeff. of Curvature, $C_C = 0.67$ Coeff. of Uniformity, $C_U = 5.34$

Fineness Modulus = 2.73 Plastic Limit = n/a Moisture %, as sampled = 19.5% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

							$D_{(90)} - 1.839$	1111		racture 70, 1				
							ust Ratio = 1/13			eture %, 2+ I	Faces =	n/a		R
					AS	TM C136, AST	FM D6913, ASTM	I C117	7					
			Actual Cumulative	Interpolated Cumulative						Grain Size Distrib	oution			
	Sieve	Size	Percent	Percent	Specs	Specs			4.	3/8"	~O % C		888	8988
	US	Metric	Passing	Passing	Max	Min		100% ♣.	p 6 4 6 6 ½ <u>:</u>	8,8,74	## ##	1 2 3	\$ 4 8 ±	***
	12.00"	300.00		100%	100.0%	0.0%		T)		+.T - I		T	
	10.00"	250.00		100%	100.0%	0.0%		ł			1			
	8.00"	200.00		100%	100.0%	0.0%		90%	+	+-+++++++++++++++++++++++++++++++++++	$+\Lambda-$	HHH	++	$- \parallel \parallel$
	6.00"	150.00		100%	100.0%	0.0%		-						
	4.00"	100.00		100%	100.0%	0.0%								
	3.00"	75.00		100%	100.0%	0.0%		80%				M		-111
	2.50"	63.00		100%	100.0%	0.0%								
	2.00"	50.00	100%	100%	100.0%	0.0%		70%			++++	Ш	44	
	1.75"	45.00		100%	100.0%	0.0%								
	1.50"	37.50		100%	100.0%	0.0%					i			
	1.25"	31.50		100%	100.0%	0.0%		60%	+			HH	++	-##
	1.00"	25.00	100%	100%	100.0%	0.0%	0	ŀ			\ \			
	3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%						
	5/8"	16.00		100%	100.0%	0.0%	86	30%				1		
	1/2"	12.50	99%	99%	100.0%	0.0%		F				N.		
	3/8"	9.50	99%	99%	100.0%	0.0%		40%			+	H		
	1/4"	6.30		98%	100.0%	0.0%						ı Ņ		
	#4	4.75	98%	98%	100.0%	0.0%								
	#8	2.36		96%	100.0%	0.0%		30%	 					
	#10	2.00	96%	96%	100.0%	0.0%							1	
	#16	1.18		65%	100.0%	0.0%		20%				ШЦ		
	#20	0.850		52%	100.0%	0.0%		20,0					V	
	#30	0.600		43%	100.0%	0.0%		ŀ					I)	
	#40	0.425	36%	36%	100.0%	0.0%		10%			-	₩₩	+	
Ш	#50	0.300		22%	100.0%	0.0%							1	
Ш	#60	0.250		16%	100.0%	0.0%								~**
Ш	#80	0.180		8%	100.0%	0.0%		0%	100.000	10.000	1.000) O	-00-00	0.100
	#100	0.150	5%	5%	100.0%	0.0%								
Ш	#140	0.106		4%	100.0%	0.0%				Particle Si	ize (mm)			



0.0%

0.0%

100.0%

100.0%

Comments: Reviewed by:

3%

2.8%

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Client: Anchor QEA, I Source: LDW21-GT23 Sample #: B21-1957	Sampled By: Client Date Tested: 6-Oct-21				Visual Identification Silt with Sand Sample Color brown		
	Liqui	d Limit Determi	nation				
	#1	#2	#3	#4	#5	#6	
Weight of Wet Soils + Pa	nn: 33.87	31.07	35.40				
Weight of Dry Soils + Pa	nn: 29.74	27.66	30.53				
Weight of Pa		19.72	19.51				
Weight of Dry Soi		7.94	11.02				Liquid Limit @ 25 Blows: 42 %
Weight of Moistur		3.41 43.0 %	4.87				Plastic Limit: N/A
% Moistu Number of Blov		43.0 %	44.2 % 13				Plasticity Index, I _P : N/A
Plastic Limit Determination #1 #2 #3 Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:				#4	#5	#6	ACCREDITED Certificate #: 1366.01, 1366.02 & 1366.04
70 % 60 %		Plasticity Char		, tine	عمنان		Liquid Limit 50% 45% 40%
50 % 40 % 10 % 10 % 10 % 10 % 10 % 10 % 1	Cl or Ol			H or OH			35% 10%
0 % CL-M	ML or O	•	60% 70%	6 80%	90%	100% 110%	5% 10 100 Number of Blows, "N"

Comments: Unable to establish plastic limit as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:

Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT23-GB-8.5-17.6 ft

Sample#: B21-1959

Comments:

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 4-Oct-21 Tested By: K. Mendez Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color: grayish-brown

mm



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} \textbf{, AS IM D431} \\ D_{(5)} = 0.056 \\ D_{(10)} = 0.102 \\ D_{(15)} = 0.142 \\ D_{(30)} = 0.292 \\ D_{(50)} = 0.667 \\ D_{(60)} = 1.020 \\ D_{(90)} = 2.624 \\ Patio = -7/45 \end{array}$ mm % Gravel = 2.5% % Sand = 90.8% mm % Silt & Clay = 6.7% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 0.82$ Coeff. of Uniformity, $C_U = 10.03$ Fineness Modulus = 2.55 Plastic Limit = n/a

Moisture %, as sampled = 18.0% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	Oust Ratio =	7/45	Fractur	e %, 2+ Face	es = n/a	Req'd I	Fracture %, 2	+ Faces =
				AS	TM C136, AS	TM D6913,	ASTM C117						
		Actual	Interpolated					Grai	n Size Distributio	on			
		Cumulative	Cumulative										
Sieve		Percent	Percent	Specs	Specs		b :. :.	, 48 94 9 , 7 8 94 9	3/8" 2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	88488		
US	Metric	Passing	Passing	Max	Min		100%	7-6'66'66'6'6'	⊛ ≥ ≟ == • 1. • 1. • • • • • • • • • • • • • • • • • • •		#### ####		100.0%
12.00"	300.00		100%	100.0%	0.0%								1 1
10.00"	250.00		100%	100.0%	0.0%		11						
8.00"	200.00		100%	100.0%	0.0%		90%				+		90.0%
6.00"	150.00		100%	100.0%	0.0%		- 1						1 1
4.00"	100.00		100%	100.0%	0.0%					\			1 1
3.00"	75.00		100%	100.0%	0.0%		80%			1			80.0%
2.50"	63.00		100%	100.0%	0.0%		- 11			\			
2.00"	50.00	100%	100%	100.0%	0.0%		70%						70.0%
1.75"	45.00		100%	100.0%	0.0%		11			\			1 1
1.50"	37.50		100%	100.0%	0.0%		ł l			1			1 1
1.25"	31.50		100%	100.0%	0.0%		60%				+		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	2	F 1			N. III			P 2
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	[]			Niii			50.0% kg
5/8"	16.00		100%	100.0%	0.0%	96	50%			1			50.0% _{be}
1/2"	12.50	100%	100%	100.0%	0.0%		11			IIII N			1 1
3/8"	9.50	99%	99%	100.0%	0.0%		40%						40.0%
1/4"	6.30		98%	100.0%	0.0%		11			\ \ \			1 1
#4	4.75	97%	97%	100.0%	0.0%		l l			 			1 1
#8	2.36		89%	100.0%	0.0%		30%						30.0%
#10	2.00	88%	88%	100.0%	0.0%		<u> </u>			\			1 1
#16	1.18		65%	100.0%	0.0%		[]			\	V		1 1
#20	0.850		55%	100.0%	0.0%		20%				1		20.0%
#30	0.600		48%	100.0%	0.0%		- 1				1		1 1
#40	0.425	43%	43%	100.0%	0.0%		10%						10.0%
#50	0.300		31%	100.0%	0.0%		11				 		1 1
#60	0.250		26%	100.0%	0.0%		<u> </u>						
#80	0.180		19%	100.0%	0.0%		0%	100.000	10.000	1.000	0.100	0.010	0.0%
#100	0.150	16%	16%	100.0%	0.0%			100.000	10.000	1.000	0.100	0.010	0.001
#140	0.106		11%	100.0%	0.0%				Particle Size (n	mm)			
#170	0.090		9%	100.0%	0.0%								
#200	0.075	6.7%	6.7%	100.0%	0.0%		Sieve Sizes	<u></u> ^	tax Specs	Min	Specs -	Sieve Res	ults
	Spears Engineering & Tec	1	ļ										
17 0	1 0			and ourselves, all reports are	submitted as the confid	dential property of cl	ients, and authorization	for publication of sta	tements, conclusio	ons or extracts from	or regarding our re	ports is reserved pe	nding our written appro

Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-1959
Sample Date:	7/16/2021
Test Date:	10/5/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT23-GB-8.5-17.6 ft

 Visual Soil Description:
 grayish-brown sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

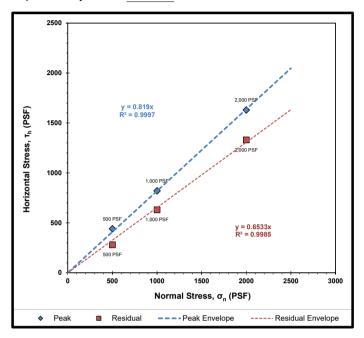
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Samp	le Data:	σ _n =500 PSF
Initial Moisture Content (%):	22.6	
	Initial	Post-Consolidation
Dry Density (PCF):	109.4	111.1
Void Ratio:	0.539	0.517
Porosity (%):	35.0	34.1
Degree of Saturation (%):	saturated	saturated

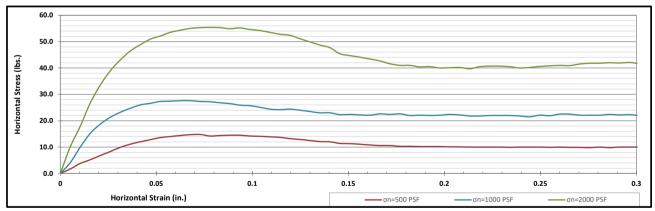
Summary of Samp	le Data: σ _n =1000 PSF			
Initial Moisture Content (%):	22.2			
	Initial	Post-Consolidation		
Dry Density (PCF):	110.1	111.8		
Void Ratio:	0.531	0.507		
Porosity (%):	34.7	33.7		
Degree of Saturation (%):	saturated	saturated		

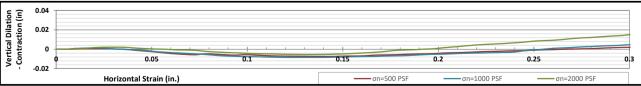
Summary of Samp	ole Data: σ _n =2000 PS			
Initial Moisture Content (%):	23.3			
	Initial	Post-Consolidation		
Dry Density (PCF):	109.0	114.1		
Void Ratio:	0.545	0.476		
Porosity (%):	35.3	32.3		
Degree of Saturation (%):	saturated	saturated		

ESTIMATED STRENGTH PARAMETERS						
	PEAK	RESIDUAL				
Angle of Internal Friction, φ (°):	39	33				
Cohesion (PSF):	0	0				



Failure Envelope Test Values:							
Normal Stress, σ _n (PSF):	500	1000	2000				
Peak Horizontal Stress, τ _h (PSF):	440	820	1630				
Residual Horizontal Stress, τ _h (PSF):	280	630	1330				





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT23-GB-17.6-18.5 ft

Sample#: B21-1960

#60

#80

#100

#140

#170

#200

0.250

0.180

0.150

0.106

0.090

0.075

17.9%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 4-Oct-21

Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color: grayish-brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications	
No Specs	

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.028 \\ D_{(10)} = 0.059 \\ D_{(15)} = 0.069 \\ D_{(30)} = 0.100 \end{array}$ mm % Gravel = 0.1% % Sand = 82.0% mm % Silt & Clay = 17.9% mm mm Liquid Limit = n/a $D_{(50)} = 0.142$ $D_{(60)} = 0.189$ mm Plasticity Index = n/a

mm Sand Equivalent = n/a $D_{(90)} = 0.374$ mm Fracture %, 1 Face = n/a aces = n/a

Coeff. of Curvature, $C_C = 0.90$ Coeff. of Uniformity, $C_U = 3.20$ Fineness Modulus = 0.72

Plastic Limit = n/a Moisture %, as sampled = 36.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

					D	ust Ratio = 2	/11	Fracti	ure %, 2+ Fac
				AS	TM C136, AS	ΓM D6913, AS	TM C117		
		Actual Cumulative	Interpolated Cumulative						rain Size Distribution
Sieve	Size	Percent	Percent	Specs	Specs		b		2 S S S S S S S S S S S S S S S S S S S
US	Metric	Passing	Passing	Max	Min		2 % ≪ 100%		\$ 8 × 1 = 1
12.00"	300.00		100%	100.0%	0.0%				
10.00"	250.00		100%	100.0%	0.0%		ł l		
8.00"	200.00		100%	100.0%	0.0%		90%		
6.00"	150.00		100%	100.0%	0.0%		-		
4.00"	100.00		100%	100.0%	0.0%				
3.00"	75.00		100%	100.0%	0.0%		80%		
2.50"	63.00		100%	100.0%	0.0%				
2.00"	50.00	100%	100%	100.0%	0.0%		70%		
1.75"	45.00		100%	100.0%	0.0%		l l		
1.50"	37.50		100%	100.0%	0.0%		ł I		
1.25"	31.50		100%	100.0%	0.0%		60%		
1.00"	25.00	100%	100%	100.0%	0.0%	2	H		
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%		
5/8"	16.00		100%	100.0%	0.0%	₩.	50%		
1/2"	12.50	100%	100%	100.0%	0.0%				
3/8"	9.50	100%	100%	100.0%	0.0%		40%		
1/4"	6.30		100%	100.0%	0.0%				
#4	4.75	100%	100%	100.0%	0.0%		t		
#8	2.36		100%	100.0%	0.0%		30%		
#10	2.00	100%	100%	100.0%	0.0%		ł I		
#16	1.18		99%	100.0%	0.0%		20%		
#20	0.850		99%	100.0%	0.0%		20/6		
#30	0.600		98%	100.0%	0.0%				
#40	0.425	98%	98%	100.0%	0.0%		10%		
#50	0.300		78%	100.0%	0.0%				

100.0%

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70%

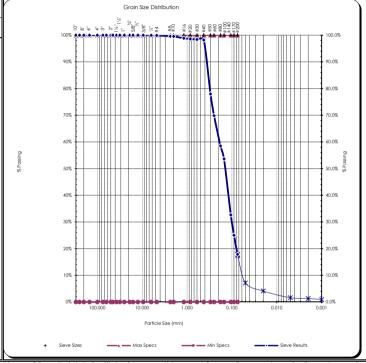
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54%

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17.9%



Comments: Reviewed by:

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Hydrometer Report

-	-	Duwamish Wa	terway Date Recei			assification Sys	stem, ASTM-2487
Project #: 1	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 4-Oct-21	Sample Color		
Source:	LDW21-GT2	3-GB-17.6-18.5	ft Tested	By: K. Mendez	grayish-brown		
Sample#:	B21-1960						
AS	STM D7928	, HYDROMI	ETER ANALYSI	S		ASTM	D6913
Assumed Sp Gr :	2.65					Sieve A	Analysis
Sample Weight:	75.28	grams				Grain Size	Distribution
Hydroscopic Moist.:	1.16%			25	Sieve	Percent	Soils Particle
Adj. Sample Wgt :	74.42	grams		ACCREDITED	Size	Passing	Diameter
		8		Certificate #: 1366.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	5.5	7.4%	0.0537 mm		1.0"	100%	25.000 mm
2	4.5	6.0%	0.0381 mm		3/4"	100%	19.000 mm
5	3.5	4.7%	0.0243 mm		5/8"	100%	16.000 mm
15	2.5	3.3%	0.0141 mm		1/2"	100%	12.500 mm
30	2	2.7%	0.0100 mm		3/8"	100%	9.500 mm
60	1.5	2.0%	0.0071 mm		1/4"	100%	6.300 mm
240	1	1.3%	0.0035 mm		#4	100%	4.750 mm
1440	1	1.3%	0.0014 mm		#10	100%	2.000 mm
1110		1.570	0.0011 111111		#20	99%	0.850 mm
% Gravel:	0.1%	т	iquid Limit: n/a		#40	98%	0.425 mm
% Sand:	82.0%		Plastic Limit: n/a		#100	54%	0.150 mm
% Silt:	16.3%		sticity Index: n/a		#200	17.9%	0.075 mm
		rias	sucity index: 11/a				
% Clay:	1.6%				Silts	17.4%	0.074 mm
						7.2%	0.050 mm
					CI.	4.1%	0.020 mm
					Clays	1.6%	0.005 mm
					G. H. 14.	1.3%	0.002 mm
					Colloids	0.9%	0.001 mm
	USDA S	oil Textural (Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mn	1				
% Clay:		< 0.002 mm					
	USDA S	oil Textural (Classification				
		Sand					
A11		A	- E	-11	61		cation of statements, conclusions or extracts from or
regarding our reports is reserved pend			o clients, the public and ourselves,	aii reports are submitted as the cor	ninential property of clients,	and authorization for public	cation of statements, conclusions or extracts from or
Comments:							
		1					
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	(1 wyw to	agen was					
Reviewed by:	0						
1	Meghan Blodgett		·				

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C Lower Duwa Project #: 21B233 Client: Anchor QEA, LLC Source: LDW21-GT23-GB Sample #: B21-1962	·	Date Received: 29-Ju Sampled By: Clien Date Tested: 6-Oc Tested By: C. Kr	t :-21	Visual Identification Sandy Silt Sample Color brown	
Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: Number of Blows:	#1 #2 Unable to de	#3	#4 #5	#6	Liquid Limit @ 25 Blows: N/A Plastic Limit: N/A Plasticity Index, I _P : N/A
Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	#1 #2 Unable to es	#3	#4 #5	#6	ACCREDITED Certificato p. 1366.01, 1366.02 & 1366.04
70 % 60 % 50 % 40 % 20 % CL-ML 0 % 10 % 20 %	Plasticity CL of OL WIL or OL Liquid L	MH of	ОН	enn siow %	Liquid Limit 100% 80% 80% 70% 60% 40% 30% 10% Number of Blows, "N"

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments: Liquid limit cannot be determined as the material displays rapid dilation. At lower moistures the sample does not spread into the cup without tearing the soil cake. Unable to establish plastic limit as the material does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:

Meghan Blodgett-Carrillo

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980 **Regional Offices:** Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

Visit our website: www.mtc-inc.net



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT23-GB-22.8-26.8 ft

Sample#: B21-1963

1/4"

#4

#8

#10

#16

#20

#30

#40

#50

#60

#80

#100

#140

#170

#200

6.30 4.75

2.36

2.00

1.18

0.850

0.600

 $0.425 \\ 0.300$

0.250

0.180

0.150

0.106

0.090

0.075

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 4-Oct-21

Date Tested: 4-Oct-21
Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487

SM, Silty Sand
Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281 D₍₅₎ = 0.011 mm

Specifications No Specs

Sample Meets Specs ? N/A

 $\begin{array}{c} D_{(5)} = 0.011 & mm \\ D_{(10)} = 0.053 & mm \\ D_{(15)} = 0.063 & mm \\ D_{(30)} = 0.090 & mm \\ D_{(50)} = 0.126 & mm \\ D_{(60)} = 0.143 & mm \\ D_{(90)} = 0.353 & mm \\ D_{ust} Ratio = 7/32 & mm \\ \end{array}$

% Silt & Clay = 21.7%
Liquid Limit = n/a
Plasticity Index = n/a
Sand Equivalent = n/a
Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a

% Gravel = 0.0%

% Sand = 78.3%

Coeff. of Curvature, $C_C = 1.05$ Coeff. of Uniformity, $C_U = 2.69$ Fineness Modulus = 0.54 Plastic Limit = n/a

Moisture %, as sampled = 32.1% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

3, ASTM C117	5. ASTM D6	STM C136, A	AS				
2,1101.11 (11)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	J1 0100, 11	710	Interpolated Cumulative	Actual Cumulative		
	es	Specs	Specs	Percent	Percent	Size	Sieve
ે હ ર 100% 	n	Min	Max	Passing	Passing	Metric	US
TT	V ₀	0.0%	100.0%	100%		300.00	12.00"
ł l	V ₀	0.0%	100.0%	100%		250.00	10.00"
90%	%	0.0%	100.0%	100%		200.00	8.00"
	%	0.0%	100.0%	100%		150.00	6.00"
	%	0.0%	100.0%	100%		100.00	4.00"
80%	%	0.0%	100.0%	100%		75.00	3.00"
!	%	0.0%	100.0%	100%		63.00	2.50"
70%	V ₀	0.0%	100.0%	100%	100%	50.00	2.00"
	%	0.0%	100.0%	100%		45.00	1.75"
	%	0.0%	100.0%	100%		37.50	1.50"
60%	%	0.0%	100.0%	100%		31.50	1.25"
ł I	% <u>₽</u>	0.0%	100.0%	100%	100%	25.00	1.00"
50%	% Possing	0.0%	100.0%	100%	100%	19.00	3/4"
50%	%	0.0%	100.0%	100%		16.00	5/8"
11	%	0.0%	100.0%	100%	100%	12.50	1/2"
	V ₀	0.09/	100.09/-	100%	100%	0.50	3/8"

100%

99%

100%

100%

100%

100%

100%

99%

99%

99%

83%

77%

68%

64%

39%

30%

21.7%

100.0%

100.0%

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Grain Size Distribution)
	100.0%
90%	90.0%
80%	80.0%
70%	70.0%
60%	60.0%
0 0 0 0 0 0 0 0 0	% %0.002
40%	40.0%
305	30.0%
20%	20.0%
10%	10.0%
0% data	0.0%
Particle Size (mm) + Sieve Sizes — Max Specs — Min Specs — Sieve	a Regults

Il results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval

Reviewed by:

Meghan Blodgett-Carrillo



Hydrometer Report

Project:	Q.C Lower	Duwamish Wat	erway Date Recei	ved: 29-Jul-21	Unified Soil Cl	assification Sys	stem, ASTM-2487
Project #: 2	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 4-Oct-21	Sample Color		
Source: 1	LDW21-GT23	3-GB-22.8-26.8	ft Tested	By: K. Mendez	brown		
Sample#: 1	B21-1963			·			
AS	STM D7928	, HYDROME	TER ANALYSI	S		ASTM	D6913
Assumed Sp Gr :	2.65					Sieve A	nalysis
Sample Weight:	76.06	grams				Grain Size l	Distribution
Hydroscopic Moist.:	1.08%	_			Sieve	Percent	Soils Particle
Adj. Sample Wgt :	75.25	grams		ACCREDITED	Size	Passing	Diameter
, ,		Ü		Certificate #: 1366.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	7.5	10.0%	0.0532 mm		1.0"	100%	25.000 mm
2	6.5	8.6%	0.0378 mm		3/4"	100%	19.000 mm
5	5.5	7.3%	0.0240 mm		5/8"	100%	16.000 mm
15	4.5	6.0%	0.0139 mm		1/2"	100%	12.500 mm
30	3.5	4.6%	0.0099 mm		3/8"	100%	9.500 mm
60	2	2.7%	0.0070 mm		1/4"	100%	6.300 mm
240	1.5	2.0%	0.0035 mm		#4	100%	4.750 mm
1440	1	1.3%	0.0014 mm		#10	100%	2.000 mm
					#20	99%	0.850 mm
% Gravel:	0.0%	L	iquid Limit: n/a		#40	99%	0.425 mm
% Sand:	78.3%	P	lastic Limit: n/a		#100	64%	0.150 mm
% Silt:	19.5%	Plas	ticity Index: n/a		#200	21.7%	0.075 mm
% Clay:	2.3%				Silts	21.2%	0.074 mm
						9.8%	0.050 mm
						6.8%	0.020 mm
					Clays	2.3%	0.005 mm
						1.5%	0.002 mm
					Colloids	0.9%	0.001 mm
	USDA S	oil Textural C	Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mm	ı				
% Clay:		< 0.002 mm					

	USDA S	oil Textural C	lassification				
		Sand					
			P . d . 1P . 1 . 1		61 61 65	1 4 1 2 6 18	
All results apply only to actual location regarding our reports is reserved pend			clients, the public and ourselves,	all reports are submitted as the con	fidential property of clients,	and authorization for public	ation of statements, conclusions or extracts from or
Comments:							
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	(I Wight Be	ingin inni a					
Reviewed by:	0						
1	Meghan Blodgett	-Carrillo					



Client:	Anchor QEA	Date:	October 19, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-2050-2069
Revised on:		Date sampled:	8-4-21 & 8-5-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor	-		Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			
	_				

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	-
Date Received: July 29, 2021	Sampled by: Client
Date Tested: October 8, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2050	LDW21-GT44-GB-0-5 ft	341.8	1294.0	1086.4	207.6	744.6	27.9%
B21-2051	LDW21-GT44-GB-5-6.1 ft	354.2	977.3	871.3	106.0	517.1	20.5%
B21-2052	LDW21-GT44-GB-6.1-6.5 ft	359.6	665.7	593.5	72.2	233.9	30.9%
B21-2053	LDW21-GT44-GB-5-10 ft	357.1	1289.6	1063.4	226.2	706.3	32.0%
B21-2054	LDW21-GT44-GB-10-11.5 ft	360.2	1379.9	1209.6	170.3	849.4	20.0%
B21-2055	LDW21-GT44-GB-10-15 ft	346.4	1230.1	1027.5	202.6	681.1	29.7%
B21-2056	LDW21-GT44-GB-15.5-16.5 ft	225.1	974.7	803.8	170.9	578.7	29.5%
B21-2057	LDW21-GT44-GB-15-20 ft	266.4	1004.4	805.9	198.5	539.5	36.8%
B21-2058	LDW21-GT44-GB-20-21.5 ft	301.2	1328.5	1051.3	277.2	750.1	37.0%
B21-2059	LDW21-GT44-GB-20-25 ft	224.4	1222.2	950.5	271.7	726.1	37.4%
B21-2060	LDW21-GT44-GB-25-28.7 ft	270.1	1116.1	1011.0	105.1	740.9	14.2%
B21-2061	LDW21-GT44-GB-28.7-30 ft	182.4	916.9	718.4	198.5	536.0	37.0%
B21-2062	LDW21-GT44-GB-30-31.5 ft	220.5	1200.8	943.4	257.4	722.9	35.6%
B21-2063	LDW21-GT48-GB-0-5 ft	234.7	1032.0	887.3	144.7	652.6	22.2%
B21-2064	LDW21-GT48-GB-5-6.5 ft	221.5	1216.7	1036.8	179.9	815.3	22.1%
B21-2065	LDW21-GT48-GB-5-10 ft	233.9	698.1	566.7	131.4	332.8	39.5%
B21-2066	LDW21-GT48-GB-10-15 ft	233.2	798.5	665.7	132.8	432.5	30.7%
B21-2067	LDW21-GT48-GB-15-18.2 ft	224.4	960.1	827.8	132.3	603.4	21.9%
B21-2068	LDW21-GT48-GB-18.2-19.5 ft	221.9	948.5	777.2	171.3	555.3	30.8%
B21-2069	LDW21-GT48-GB-20-21.6 ft	306.7	947.8	795.3	152.5	488.6	31.2%
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Reviewed by:

Meghan Blodgett-Carrillo



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: September 20, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Tare	Mass of Dry Soil	Pycno ID		Pycno	Density of Water @ Tx	soils	Mass of Pycno filled w/ water	Water, 0.1 *C	SpG of Soils	Factor	SpG
B21-2055	LDW21-GT44-GB-10-15 ft	497.91	595.93	98.0	TSA-017	187.9	499.4	0.99858	747.34	686.58	18.1	2.630647		2.6316204
B21-2066	LDW21-GT48-GB-10-15 ft	510.08	607.93	97.9	TSA-011	190.3	499.5	0.99856	749.61	689.15	18.2	2.6169635	1.00035	2.6178795
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all results apply only to actual locations and materials tested.	As a mutual protection to clients, the public and ourselves, a	all reports are submitted as the confidential prop	perty of clients, and authorization for publication of	f statements, conclusions or extracts from or regain	rding our reports is reserved pending our wi	ntten approval.

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Sample Meets Specs? N/A

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT44-GB-0-5 ft Sample#: B21-2050

Specifications

No Specs

#30

#40

#50

#60

#80

#100

#140

#170

#200

Comments:

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

37%

20%

9.6%

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21

Tested By: A. Eifrig

SW-SC, Well-graded Sand with Silty Clay Sample Color:

mm

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

 $D_{(5)} = 0.039$ $D_{(10)} = 0.083$ $D_{(15)} = 0.170$ mm % Gravel = 4.2% % Sand = 86.2% mm % Silt & Clay = 9.6% mm $D_{(30)} = 0.352$ mm Liquid Limit = n/a $D_{(50)} = 0.593$ mm Plasticity Index = n/a $D_{(60)} = 0.724$ mm

Unified Soil Classification System, ASTM-2487

Sand Equivalent = n/a Fracture %, 1 Face = n/aFracture %, 2+ Faces = n/a

Fineness Modulus = 2.51 Plastic Limit = n/a Moisture %, as sampled = 27.9% Req'd Sand Equivalent =

Coeff. of Curvature, $C_C = 2.07$

Coeff. of Uniformity, $C_U = 8.74$

Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(60)} =$	0.724
						$D_{(90)} =$	1.967
					D	ust Ratio =	9/35
				AS	TM C136, AS	ΓM D6913,	ASTM
		Actual	Interpolated				
		Cumulative	Cumulative				
Sieve	Size	Percent	Percent	Specs	Specs		
US	Metric	Passing	Passing	Max	Min		1
12.00"	300.00		100%	100.0%	0.0%		
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		99%	100.0%	0.0%		
1.00"	25.00	99%	99%	100.0%	0.0%	0	
3/4"	19.00	99%	99%	100.0%	0.0%	% Passing	
5/8"	16.00		99%	100.0%	0.0%	98	
1/2"	12.50	98%	98%	100.0%	0.0%		
3/8"	9.50	98%	98%	100.0%	0.0%		
1/4"	6.30		96%	100.0%	0.0%		
#4	4.75	96%	96%	100.0%	0.0%		
#8	2.36		91%	100.0%	0.0%		
#10	2.00	91%	91%	100.0%	0.0%		
#16	1.18		76%	100.0%	0.0%		
#20	0.850	70%	70%	100.0%	0.0%		
						II	

51%

37%

25%

20%

16%

11%

10%

9.6%

100.0%

100.0%

100.0%

100.0%

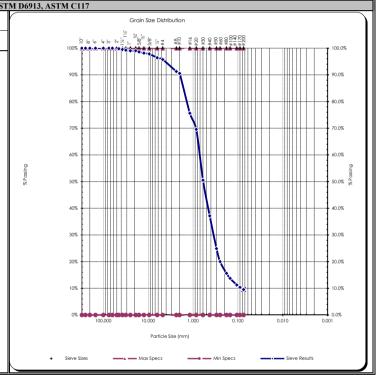
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Reviewed by: Meghan Blodgett-Carrillo

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-2050
Sample Date:	8/4/2021
Test Date:	10/13/2021
Technician:	M. Carrillo

Sample Source: LDW21-GT44-GB-0-5 ft

Visual Soil Description: brown silty sand with gravel

Type of Specimen: Remolded Cylindrical Shear Box

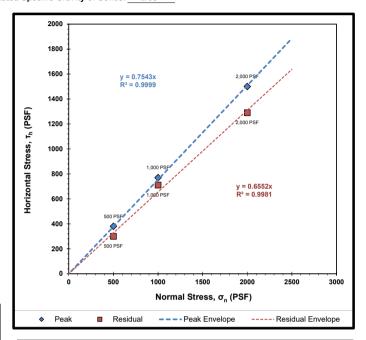
Specimen Diameter (in): 2.5

Summary of Sample	σ _n =500 PSF	
Initial Moisture Content (%):	24.6	
	Initial	Post-Consolidation
Dry Density (PCF):	109.7	110.8
Void Ratio:	0.536	0.520
Porosity (%):	34.9	34.2
Degree of Saturation (%):	saturated	saturated

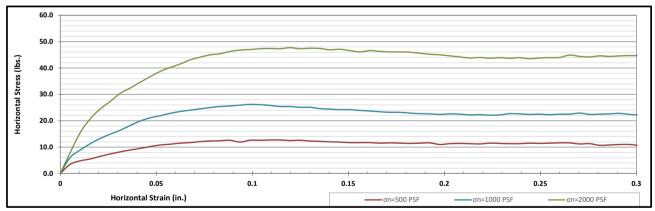
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	23.8	
	Initial	Post-Consolidation
Dry Density (PCF):	110.7	113.4
Void Ratio:	0.523	0.486
Porosity (%):	34.3	32.7
Degree of Saturation (%):	saturated	saturated

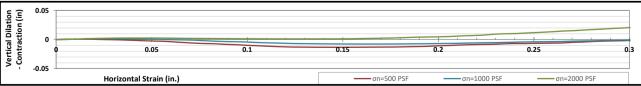
Summary of Samp	le Data:	σ _n =2000 PSF
Initial Moisture Content (%):	23.8	
	Initial	Post-Consolidation
Dry Density (PCF):	110.9	114.3
Void Ratio:	0.520	0.473
Porosity (%):	34.2	32.1
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS						
	PEAK	RESIDUAL				
Angle of Internal Friction, φ (°):	37	33				
Cohesion (PSF):	0	0				



Failure Envelope Test Values:						
Normal Stress, σ _n (PSF):	500	1000	2000			
Peak Horizontal Stress, τ _h (PSF):	380	770	1500			
Residual Horizontal Stress, τ _h (PSF):	300	710	1290			





Corporate • 777 Chrysler Drive • Burlington, WA 98233 • Phone 360.755.1990 • Fax 360.755.1980 SW Region • 2118 Black Lake Blvd. S.W.• Olympia, WA 98512 • Phone 360.534.9777 • Fax 360.534.9779 NW Region • 805 Dupont, Suite #5 • Bellingham, WA 98225 • Phone 360.647.6061 • Fax 360.647.8111 Kitsap Region • 5451 N.W. Newberry Hill Road, Suite 101 • Silverdale, WA 98383 • Phone/Fax 360.698.6787



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT44-GB-5-10 ft Sample#: B21-2053

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21

Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color: dark brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.031 \\ \textbf{D}_{(10)} = 0.062 \\ \textbf{D}_{(15)} = 0.081 \\ \textbf{D}_{(30)} = 0.112 \\ \textbf{D}_{(50)} = 0.154 \\ \textbf{D}_{(60)} = 0.178 \\ \textbf{D}_{(90)} = 0.247 \\ \textbf{Partice} = 9774 \\ \textbf{D}_{(74)} = 9774 \\ \textbf{D$ mm % Gravel = 0.0%% Sand = 88.0% mm % Silt & Clay = 12.0% mm mm Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a mm

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.14$ Coeff. of Uniformity, $C_U = 2.85$ Fineness Modulus = 0.59

Plastic Limit = n/a Moisture %, as sampled = 32.0% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	ust Ratio =	9/74		Fracti	re %, 2+	Faces =	n/a		Req'd	Fractur	e %, 2-	+ Faces	=
				AS	TM C136, AS	ГМ D6913, A	STM C11	7										
			Interpolated						Gr	ain Size Distri	hution							
		Cumulative				1												
	e Size	Percent	Percent	Specs	Specs		ь		: ² :	3/8"	80 91 ### ##	8 8 9 8	88888	8				
US	Metric	Passing	Passing	Max	Min	_	100%	****	*****	ம் த≥் ****** **	## # # *	# # # ****	* * * * * *	<u>.</u>				00.0%
12.00"	300.00		100%	100.0%	0.0%							\ \					1 1	
10.00"	250.00		100%	100.0%	0.0%													
8.00"	200.00		100%	100.0%	0.0%		90%						i I			-	9	0.0%
6.00"	150.00		100%	100.0%	0.0%		ŀ										1 1	
4.00"	100.00		100%	100.0%	0.0%		80%										11.	0.0%
3.00"	75.00		100%	100.0%	0.0%		00%										Τľ	0.076
2.50"	63.00		100%	100.0%	0.0%												1 1	
2.00"	50.00	100%	100%	100.0%	0.0%		70%	-			-	\cdots		$\mathbb{H}\mathbb{H}$		++++		0.0%
1.75"	45.00		100%	100.0%	0.0%												1 1	
1.50"	37.50		100%	100.0%	0.0%													
1.25"	31.50		100%	100.0%	0.0%		60%						i			****	1 1	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%	in a	1						1				1 1	.ing
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%											. Bij. 80.0
5/8"	16.00		100%	100.0%	0.0%	P6	30% E										T I	0.0,0 86
1/2"	12.50	100%	100%	100.0%	0.0%		-										1 1	
3/8"	9.50	100%	100%	100.0%	0.0%		40%						+	\blacksquare		++++		0.0%
1/4"	6.30		100%	100.0%	0.0%													
#4	4.75	100%	100%	100.0%	0.0%													
#8	2.36		100%	100.0%	0.0%		30%						1			****	³	0.0%
#10	2.00	100%	100%	100.0%	0.0%		1						i					
#16	1.18		100%	100.0%	0.0%		20%											0.0%
#20	0.850	100%	100%	100.0%	0.0%		20,0						ı				1 1	0.070
#30	0.600		99%	100.0%	0.0%		ł							Ĭ			1 1	
#40	0.425	99%	99%	100.0%	0.0%		10%	-			+	+++++	+-+	îШ		+++++		0.0%
#50	0.300		93%	100.0%	0.0%		ļ										1 1	
#60	0.250	91%	91%	100.0%	0.0%													
#80	0.180		61%	100.0%	0.0%		0%	100.00	00	10.000	1.00)()	0.10	0	0.01	0	0.001	.0%
#100	0.150	48%	48%	100.0%	0.0%													
#140	0.106		27%	100.0%	0.0%					Particle	Size (mm)							
#170	0.090		19%	100.0%	0.0%													
#200	0.075	12.0%	12.0%	100.0%	0.0%		+ Sieve Size	S		Max Specs	_	— мі	n Specs	-		Sieve Resu	lts	
Copyrigl	nt Spears Engineering & Tec	hnical Services PS, 1996-9	8															

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#4

#8 #10

#16

#20

#30

#40

#50

#60

#80

#100 #140

#170

#200

4.75

2.36

2.00

1.18

0.850

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

Source: LDW21-GT44-GB-10-15 ft Sample#: B21-2055

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

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0.0%

Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487 SP-SM, Poorly graded Sand with Silt

Sample Color: dark brown

mm



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.032$ $D_{(10)} = 0.064$ $D_{(15)} = 0.082$ mm % Gravel = 0.0%% Sand = 88.2% mm % Silt & Clay = 11.8% mm $D_{(30)} = 0.116$ mm Liquid Limit = n/a $D_{(50)} = 0.164$ Plasticity Index = n/a $D_{(60)} = 0.192$ mm Sand Equivalent = n/a

Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Fineness Modulus = 0.77 Plastic Limit = n/a Moisture %, as sampled = 29.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

Req'd Fracture %, 2+ Faces =

Coeff. of Curvature, $C_C = 1.11$

Coeff. of Uniformity, C_U = 3.02

Dust Ratio = 11/85 ASTM C136, ASTM D6913, ASTM C117

 $D_{(90)} = 0.404$

Interpolated Actual Cumulative Cumulative Sieve Size Percent Percent Specs Specs Min Metric Passing Passing Max 12.00 100.0% 0.0% 10.00" 250.00 100% 100.0% 0.0% 100% 100.0% 8.00" 200.00 0.0% 100.0% 6.00' 100% 0.0% 150.00 4.00" 100.00 100% 100.0% 0.0% 3.00" 75.00 100% 100.0% 0.0% 2.50" 63.00 100% 100.0% 0.0% 2.00" 50.00 100% 100% 100.0% 0.0% 1.75" 45.00 100% 100.0% 0.0% 100% 100.0% 0.0% 1.50" 37.50 1.25" 100% 100.0% 0.0% 31.50 100.0% 1.00" 25.00 100% 100% 0.0% 3/4" 19.00 100% 100% 100.0% 0.0% 5/8" 16.00 100% 100.0% 0.0% 1/2" 12.50 100% 100% 100.0% 0.0% 3/8" 9.50 100% 100% 100.0% 0.0% 1/4" 100% 100.0% 6.30 0.0%

100%

100%

100%

100%

100%

95%

91%

84%

81%

56%

45%

25%

18%

11.8%

100%

100%

100%

91%

81%

11.8%

M D0713, A31	Grain Size Distribution	
	는 100% 등록 100	į.
	90%	
	80%	
	70.5%	
% Passing	60.0%	% Passing
% ⊕	50%	% d
	40.5	
	2005	
	10%	
	0% 10000 1000 1,000 0,100 0,010 0,001	
	Particle Size (mm)	
	Sieve Szes — Max Specs — Min Specs — Sieve Results	

Comments: Reviewed by: Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT44-GB-15-20 ft

Sample#: B21-2057

#16

#20

#30

#40

#50

#60

#80

#100

#140

#170

#200

Comments:

1.18

0.850

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

98%

98%

94%

62.6%

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21

Tested By: A. Eifrig

Visual Identification

mm

Sandy Silt Sample Color: dark brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

 $D_{(90)} = 0.216$

Specifications

No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.006$ $D_{(10)} = 0.012$ $D_{(15)} = 0.018$ mm % Gravel = 0.6%% Sand = 36.7% mm % Silt & Clay = 62.6% mm $D_{(30)} = 0.036$ mm Liquid Limit = n/a $D_{(50)} = 0.060$ Plasticity Index = n/a $D_{(60)} = 0.072$ mm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.50$ Coeff. of Uniformity, $C_U = 6.00$ Fineness Modulus = 0.29

Plastic Limit = n/a Moisture %, as sampled = 36.8% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						(20)	0.210
				4.0		ust Ratio =	
		Actual	Interpolated	AS	TM C136, AS	IM D6913,	ASIM
			Cumulative			ľ	
Sieve	Size	Percent	Percent	Specs	Specs	-	
US	Metric	Passing	Passing	Max	Min		
12.00"	300.00		100%	100.0%	0.0%	1	
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		
1.00"	25.00	100%	100%	100.0%	0.0%	2	
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	
5/8"	16.00		100%	100.0%	0.0%	96	
1/2"	12.50	100%	100%	100.0%	0.0%		
3/8"	9.50	99%	99%	100.0%	0.0%		
1/4"	6.30		99%	100.0%	0.0%		
#4	4.75	99%	99%	100.0%	0.0%		
#8	2.36		99%	100.0%	0.0%		
#10	2.00	99%	99%	100.0%	0.0%		

99%

98%

98%

98%

95% 94%

85%

70%

66%

62.6%

100.0%

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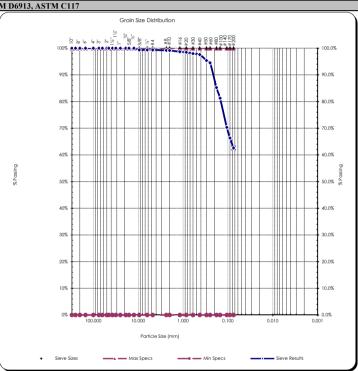
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Reviewed by: Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#16

#20

#30

#40

#50

#60

#80

#100

#140

#170

#200

1.18

0.850

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

92%

78.5%

Source: LDW21-GT44-GB-20-25 ft Sample#: B21-2059

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21 Tested By: A. Eifrig

Visual Identification Sandy Silt with Clay Sample Color: brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

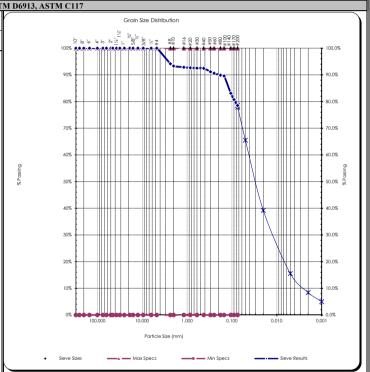
 $D_{(5)} = 0.001$ $D_{(10)} = 0.003$ $D_{(15)} = 0.005$ mm % Gravel = 0.0%% Sand = 21.5% mm % Silt & Clay = 78.5% mm $D_{(30)} = 0.014$ mm Liquid Limit = n/a $D_{(50)} = 0.032$ mm Plasticity Index = n/a $D_{(60)} = 0.048$ mm Sand Equivalent = n/a $D_{(90)} = 0.190$ mm

Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.61$ Coeff. of Uniformity, $C_U = 17.87$ Fineness Modulus = 0.40

Plastic Limit = n/a Moisture %, as sampled = 37.4% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

ll							D(90) -	0.170
						D	ust Ratio =	17/20
					AS	TM C136, AS	ΓM D6913,	ASTM
			Actual	Interpolated				
			Cumulativ	e Cumulative			_	
	Sieve	Size	Percent	Percent	Specs	Specs		
	US	Metric	Passing	Passing	Max	Min		1
	12.00"	300.00		100%	100.0%	0.0%		
	10.00"	250.00		100%	100.0%	0.0%		
	8.00"	200.00		100%	100.0%	0.0%		
	6.00"	150.00		100%	100.0%	0.0%		
	4.00"	100.00		100%	100.0%	0.0%		
	3.00"	75.00		100%	100.0%	0.0%		
	2.50"	63.00		100%	100.0%	0.0%		
	2.00"	50.00	100%	100%	100.0%	0.0%		
	1.75"	45.00		100%	100.0%	0.0%		
	1.50"	37.50		100%	100.0%	0.0%		
	1.25"	31.50		100%	100.0%	0.0%		
	1.00"	25.00	100%	100%	100.0%	0.0%	2	
	3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	
	5/8"	16.00		100%	100.0%	0.0%	96	
	1/2"	12.50	100%	100%	100.0%	0.0%		
	3/8"	9.50	100%	100%	100.0%	0.0%		
	1/4"	6.30		100%	100.0%	0.0%		
	#4	4.75	100%	100%	100.0%	0.0%		
	#8	2.36		94%	100.0%	0.0%		
	#10	2.00	93%	93%	100.0%	0.0%		



0.0%

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0.0%

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0.0%

0.0%

0.0%

0.0%

0.0%

Comments: Reviewed by: Meghan Blodgett-Carrillo

93%

93%

93%

92%

91%

91%

90%

90%

83%

81%

78.5%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

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100.0%

100.0%



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification **Project #:** 21B233 Sandy Silt with Clay Sampled By: Client Client: Anchor QEA Date Tested: 8-Oct-21 Sample Color **Source:** LDW21-GT44-GB-20-25 ft Tested By: A. Eifrig brown Sample#: B21-2059 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: Sieve Analysis 2.65 Sample Weight: 75.15 **Grain Size Distribution** Hydroscopic Moist .: 3.83% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 72.38 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 55.4% 0.0414 mm 1.0" 100% 2 38 49.0% $0.0307 \ mm$ 3/4" 100% 19.000 mm 31 40.0% 0.0204 mm 5/8" 100% 16.000 mm 27.1% 0.0127 mm 1/2" 100% 12.500 mm 30 23.2% 0.0091 mm 3/8" 100% 9.500 mm 18 60 15 19.3% 0.0065 mm 1/4" 100% 6.300 mm 240 0.0034 mm 100% 4.750 mm 11.6% #4 0.0014 mm #10 2.000 mm 1440 5.5 7.1% 93% #20 93% 0.850 mm Liquid Limit: n/a % Gravel: 0.0% #40 92% 0.425 mm % Sand: 21.5% Plastic Limit: n/a #100 90% 0.150 mm % Silt: 63.0% Plasticity Index: n/a #200 78.5% 0.075 mm 0.074 mm % Clay: 15.5% Silts 77.8% 65.5% 0.050 mm 0.020 mm 39.3% 15.5% 0.005 mm Clays 8.4% $0.002 \ mm$ Colloids 5.0% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:**

Environmental • Geotechnical Engineering • Special Inspection • Non-Destructive Testing • Materials Testing Burlington | Olympia | Bellingham | Silverdale | Tukwila 360.755.1990 www.mtc-inc.net

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT44-GB-25-28.7 ft

Sample#: B21-2060

#140

#170

#200

0.106

0.090

0.075

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 8-Oct-21 Tested By: A. Eifrig Unified Soils Classification System, ASTM D-2487

SP, Poorly graded Sand

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.370 \\ \textbf{D}_{(10)} = 0.495 \\ \textbf{D}_{(15)} = 0.577 \\ \textbf{D}_{(30)} = 0.822 \\ \textbf{D}_{(50)} = 1.264 \\ \textbf{D}_{(60)} = 1.490 \\ \textbf{D}_{(90)} = 14.510 \end{array}$ mm % Gravel = 11.1% % Sand = 87.4% mm % Silt & Clay = 1.5% mm mm Liquid Limit = n/a mm Plasticity Index = n/a mm Sand Equivalent = n/a

Face = n/a aces = n/a

Coeff. of Curvature, $C_C = 0.92$ Coeff. of Uniformity, $C_U = 3.01$ Fineness Modulus = 3.78

Plastic Limit = n/a Moisture %, as sampled = 14.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

							$D_{(90)} = 14.510$	mm	Frac	cture %,	, 1 Fa
						Dι	ust Ratio = 6/23		Fractu	re %, 2	+ Fac
					AS	TM C136, AST	TM D6913, ASTM C1	.17			
			Actual	Interpolated					Gr	ain Size Di	istributi
			_	Cumulative						3111 0120 151	
	Sieve		Percent	Percent	Specs	Specs		. 4.4. 6.9.5 . 9.4. 6.9.5	. 2 %	of ² of	- ω'
	US	Metric	Passing	Passing	Max	Min	100%		•	4 4 4 4 4 4 €	* *
	12.00"	300.00		100%	100.0%	0.0%			N.		
	10.00"	250.00		100%	100.0%	0.0%		<u> </u>	1		
	8.00"	200.00		100%	100.0%	0.0%	90%	t	+++***	*****	
	6.00"	150.00		100%	100.0%	0.0%		<u> </u>			
	4.00"	100.00		100%	100.0%	0.0%	80%	<u> </u>			
	3.00"	75.00		100%	100.0%	0.0%	00/6	-			
	2.50"	63.00		100%	100.0%	0.0%		[
	2.00"	50.00	100%	100%	100.0%	0.0%	70%	1	+		
	1.75"	45.00		98%	100.0%	0.0%					
	1.50"	37.50		95%	100.0%	0.0%					
	1.25"	31.50		93%	100.0%	0.0%	60%		++++		++-
	1.00"	25.00	91%	91%	100.0%	0.0%	D	<u> </u>			
	3/4"	19.00	91%	91%	100.0%	0.0%	00 Liss 80 44 50%	<u> </u>			
	5/8"	16.00		90%	100.0%	0.0%	P6 20/e	-			
	1/2"	12.50	90%	90%	100.0%	0.0%		F			
	3/8"	9.50	90%	90%	100.0%	0.0%	40%	1	+++-+		
	1/4"	6.30		89%	100.0%	0.0%		ļ			
	#4	4.75	89%	89%	100.0%	0.0%					
	#8	2.36		83%	100.0%	0.0%	30%	† † † † † † † † † † † † † † † † † † †	***		+
	#10	2.00	83%	83%	100.0%	0.0%					
	#16	1.18		46%	100.0%	0.0%	20%	<u> </u>			
	#20	0.850	32%	32%	100.0%	0.0%	20,0	ł I IIII			
	#30	0.600		16%	100.0%	0.0%		F			
	#40	0.425	6%	6%	100.0%	0.0%	10%	1	++++		
	#50	0.300		4%	100.0%	0.0%		[
	#60	0.250	3%	3%	100.0%	0.0%		ļ			
	#80	0.180		3%	100.0%	0.0%	0%	100.000	40000	10.000	وننو
	#100	0.150	3%	3%	100.0%	0.0%					
- 11					1	1	II .			0.00	1 00

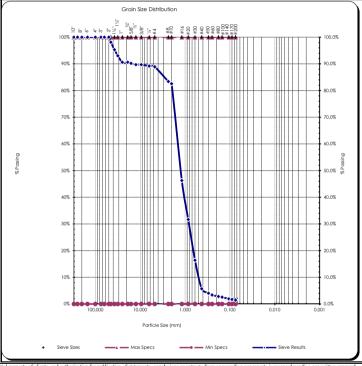
2%

2%

1.5%

1.5%

Meghan Blodgett-Carrillo



0.0%

0.0%

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Comments: Reviewed by:

100.0%

100.0%

100.0%



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT44-GB-28.7-30 ft Sample#: B21-2061

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21 Tested By: A. Eifrig Visual Identification

mm

Sandy Silt Sample Color: brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

0.180

0.150

0.106

0.090

0.075

#80 #100

#140

#170

#200

Sample Meets Specs? N/A

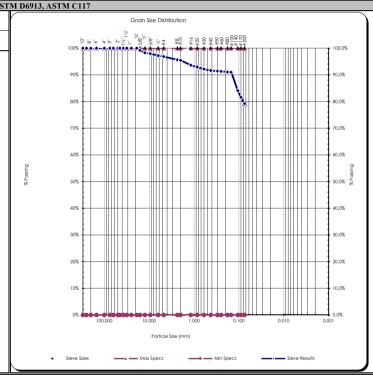
 $D_{(5)} = 0.005$ $D_{(10)} = 0.009$ $D_{(15)} = 0.014$ mm % Gravel = 3.2% % Sand = 17.6% mm % Silt & Clay = 79.2% mm $D_{(30)} = 0.028$ mm Liquid Limit = n/a $D_{(50)} = 0.047$ mm Plasticity Index = n/a $D_{(60)} = 0.057$ mm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.50$ Coeff. of Uniformity, $C_U = 6.00$ Fineness Modulus = 0.41

Plastic Limit = n/a Moisture %, as sampled = 37.0% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(60)} - C$	
						$D_{(90)} = 0$	
						ust Ratio =	
		Actual	Interpolated	AS	TM C136, AST	FM D6913,	ASTM
			Cumulative			ľ	
6.	G.	-		6	6	-	
Sieve US		Percent	Percent	Specs	Specs Min		
12.00"	Metric 300.00	Passing	Passing 100%	Max 100.0%	0.0%	-	10
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		•
1.00"	25.00	100%	100%	100.0%	0.0%	E	
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	
5/8"	16.00		99%	100.0%	0.0%	96	
1/2"	12.50	98%	98%	100.0%	0.0%		
3/8"	9.50	98%	98%	100.0%	0.0%		
1/4"	6.30		97%	100.0%	0.0%		
#4	4.75	97%	97%	100.0%	0.0%		
#8	2.36		96%	100.0%	0.0%		;
#10	2.00	95%	95%	100.0%	0.0%		
#16	1.18		94%	100.0%	0.0%		
#20	0.850	93%	93%	100.0%	0.0%		
#30	0.600		92%	100.0%	0.0%		
#40	0.425	92%	92%	100.0%	0.0%		
#50	0.300		91%	100.0%	0.0%		
#60	0.250	91%	91%	100.0%	0.0%		



0.0%

0.0%

0.0%

0.0%

0.0%

Comments: Reviewed by: Meghan Blodgett-Carrillo

79.2%

91%

91%

84%

82%

79.2%

100.0%

100.0%

100.0%

100.0%

100.0%

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-2065
Sample Date:	8/5/2021
Test Date:	10/15/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT48-GB-5-10 ft

 Visual Soil Description:
 brown silty sand with gravel

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

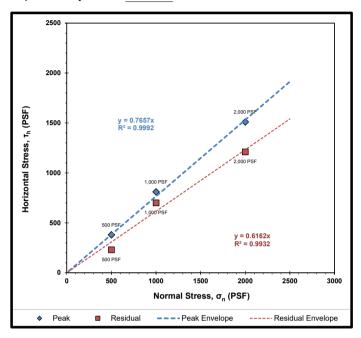
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	37.5	
	Initial	Post-Consolidation
Dry Density (PCF):	-4530.4	-4603.6
Void Ratio:	-1.037	-1.037
Porosity (%):	2789.0	2832.4
Degree of Saturation (%):	-97.6	saturated

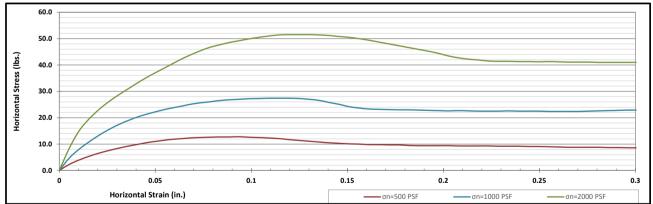
Summary of Sampl	e Data:	σ _n =1000 PSF
Initial Moisture Content (%):	34.3	
	Initial	Post-Consolidation
Dry Density (PCF):	100.8	104.7
Void Ratio:	0.672	0.610
Porosity (%):	40.2	37.9
Degree of Saturation (%):	saturated	saturated

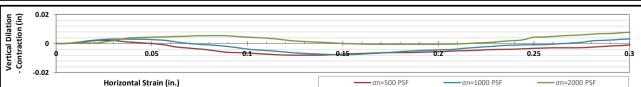
Summary of Sampl	e Data:	σ _n =2000 PSF
Initial Moisture Content (%):	35.3	
	Initial	Post-Consolidation
Dry Density (PCF):	100.6	106.4
Void Ratio:	0.675	0.584
Porosity (%):	40.3	36.9
Degree of Saturation (%):	saturated	saturated

ESTIMATED STR	ENGTH PARA	METERS
	PEAK	RESIDUAL
Angle of Internal Friction, φ (°):	37	32
Cohesion (PSF):	0	0



Failure Envelope Test	Values:		
Normal Stress, σ _n (PSF):	500	1000	2000
Peak Horizontal Stress, τ _h (PSF):	380	810	1510
Residual Horizontal Stress, τ _h (PSF):	230	700	1210





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Project: Q.C. - Lower Duwamish Waterway

Sample Meets Specs? N/A

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT48-GB-0-5 ft Sample#: B21-2063

Specifications

No Specs

#80

#100

#140

#170

#200

0.180

0.150

0.106

0.090

0.075

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 8-Oct-21

Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SP, Poorly graded Sand

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.123 \\ \textbf{D}_{(10)} = 0.234 \\ \textbf{D}_{(15)} = 0.337 \\ \textbf{D}_{(30)} = 0.655 \\ \textbf{D}_{(50)} = 1.086 \\ \textbf{D}_{(60)} = 1.301 \\ \textbf{D}_{(90)} = 1.947 \end{array}$ mm % Gravel = 0.0% % Sand = 96.5% mm % Silt & Clay = 3.5% mm mm Liquid Limit = n/a mm Plasticity Index = n/a mm Sand Equivalent = n/a

Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.41$ Coeff. of Uniformity, $C_U = 5.55$ Fineness Modulus = 3.06 Plastic Limit = n/a

Moisture %, as sampled = 22.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 1$.947 m	nm
						ust Ratio =	7/39	
				AS	TM C136, AS	ΓM D6913, A	ASTM C11	7
		Actual	Interpolated					
			Cumulative		1	1		
Sieve		Percent	Percent	Specs	Specs		ь	\$0 \$0
US	Metric	Passing	Passing	Max	Min	4	100%	
12.00"	300.00		100%	100.0%	0.0%		- 1	
10.00"	250.00		100%	100.0%	0.0%			.
8.00"	200.00		100%	100.0%	0.0%		90%	-
6.00"	150.00		100%	100.0%	0.0%		ŀ	
4.00"	100.00		100%	100.0%	0.0%		80%	
3.00"	75.00		100%	100.0%	0.0%		ou‰ [
2.50"	63.00		100%	100.0%	0.0%		1	
2.00"	50.00	100%	100%	100.0%	0.0%		70%	_
1.75"	45.00		100%	100.0%	0.0%		į.	
1.50"	37.50		100%	100.0%	0.0%		ŀ	
1.25"	31.50		100%	100.0%	0.0%		60%	
1.00"	25.00	100%	100%	100.0%	0.0%	2		
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing		
5/8"	16.00		100%	100.0%	0.0%	96	50%	
1/2"	12.50	100%	100%	100.0%	0.0%		1	
3/8"	9.50	100%	100%	100.0%	0.0%		40%	
1/4"	6.30		100%	100.0%	0.0%		ŀ	
#4	4.75	100%	100%	100.0%	0.0%		ł	
#8	2.36		93%	100.0%	0.0%		30%	-
#10	2.00	92%	92%	100.0%	0.0%			
#16	1.18		54%	100.0%	0.0%		20%	
#20	0.850		39%	100.0%	0.0%		20%	
#30	0.600		27%	100.0%	0.0%			
#40	0.425	19%	19%	100.0%	0.0%		10%	_
#50	0.300		13%	100.0%	0.0%		ţ	
#60	0.250		11%	100.0%	0.0%		ŀ	
		1			1	II	1	

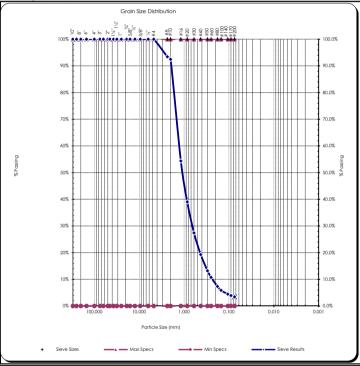
7%

6%

4%

4%

3.5%



Comments: Reviewed by:

0.0%

0.0%

0.0%

0.0%

0.0%

100.0%

100.0%

100.0%

100.0%

100.0%



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT48-GB-5-10 ft Sample#: B21-2065

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21

Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.026 \\ \textbf{D}_{(10)} = 0.051 \\ \textbf{D}_{(15)} = 0.076 \\ \textbf{D}_{(30)} = 0.102 \\ \textbf{D}_{(50)} = 0.137 \\ \textbf{D}_{(60)} = 0.171 \\ \textbf{D}_{(90)} = 0.386 \end{array}$ mm % Gravel = 0.7% % Sand = 84.7% mm % Silt & Clay = 14.6% mm mm Liquid Limit = n/a mm Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %. 1 Face = n/a Coeff. of Curvature, $C_C = 1.19$ Coeff. of Uniformity, $C_U = 3.32$ Fineness Modulus = 0.75

Plastic Limit = n/a Moisture %, as sampled = 39.5% Req'd Sand Equivalent = Rea'd Fracture %, 1 Face =

				AS	STM C136, AS	TM D6913, AS	TM C11'	1												
		Actual	Interpolated							Grain Si	ze Distrib	oution								
		1	Cumulative		T				E+											
Sieve		Percent	Percent	Specs	Specs		<u>b</u>	10 to to i	2.2.5	. 58. 5	5 : 4	e02 ¥ ## ##	88	÷ 25 25 25	8258					
US	Metric	Passing	Passing	Max	Min	_	100%	* *-*	. (0.00		# 0 1 0 m			++++		ттт	тт	пттт		T 100.0%
2.00"	300.00		100%	100.0%	0.0%							-	****							1
0.00"	250.00		100%	100.0%	0.0%		1							111						1
8.00"	200.00		100%	100.0%	0.0%		90%					Ħ		1	- 111	mm	1 1	MITT		90.0%
5.00"	150.00		100%	100.0%	0.0%		t							1						1
4.00"	100.00		100%	100.0%	0.0%		80%											ШШ		80.0%
3.00"	75.00		100%	100.0%	0.0%															00.070
2.50"	63.00		100%	100.0%	0.0%									11						1
2.00"	50.00	100%	100%	100.0%	0.0%		70%							+++		+++	4	####		70.0%
1.75"	45.00		100%	100.0%	0.0%		- 1							111						1
1.50"	37.50		100%	100.0%	0.0%		- 1													1
1.25"	31.50		100%	100.0%	0.0%		60%					$\vdash \vdash \vdash$		HŤ	\	+++		ШН		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	0	ŀ								i					
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%								1					50.0%
5/8"	16.00		100%	100.0%	0.0%	PG	30% F							TIT				ШП		30.0%
1/2"	12.50	100%	100%	100.0%	0.0%		- 1								1					1
3/8"	9.50	99%	99%	100.0%	0.0%		40%	4				<u> </u>		$+\!+\!+$		+++		ШН		40.0%
1/4"	6.30		99%	100.0%	0.0%		1													1
#4	4.75	99%	99%	100.0%	0.0%		1								, i					
#8	2.36		99%	100.0%	0.0%		30%	-				\vdash		+++	₩	+++	+	ШН		30.0%
#10	2.00	99%	99%	100.0%	0.0%		ŀ													ł
#16	1.18		97%	100.0%	0.0%		20%								i					20.0%
#20	0.850		96%	100.0%	0.0%		20%								I			Ш		20.0%
#30	0.600		96%	100.0%	0.0%										*					1
#40	0.425	95%	95%	100.0%	0.0%		10%	44		_				+++		###	444	HHH		10.0%
#50	0.300		78%	100.0%	0.0%		1													1
#60	0.250		71%	100.0%	0.0%		ŀ													i
#80	0.180		61%	100.0%	0.0%		0%	100.00		10.0		- 40 -	.000	0-00-0	0.100	1111	0.010	اللللل م	-	0.0%
#100	0.150	57%	57%	100.0%	0.0%			100.00		10.0	00	1.	.000		0.100		0.010	,	0.0	201
#140	0.106		32%	100.0%	0.0%						Particle S	ize (mm)								
#170	0.090		23%	100.0%	0.0%															
#200	0.075	14.6%	14.6%	100.0%	0.0%		Sieve Size:			- Max	Specs	_		- Min Sp	ecs	_		Sieve Resi	ults	
	Spears Engineering & Tec	ļ	ll .	100.070	0.073	IL .														

Comments: Reviewed by: Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT48-GB-10-15 ft Sample#: B21-2066

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 8-Oct-21 Tested By: A. Eifrig Unified Soils Classification System, ASTM D-2487

SM, Silty Sand Sample Color: dark brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.009 \\ D_{(10)} = 0.056 \\ D_{(15)} = 0.071 \\ D_{(30)} = 0.102 \end{array}$ mm % Gravel = 0.1% % Sand = 83.7% mm % Silt & Clay = 16.2% mm mm Liquid Limit = n/a $D_{(50)} = 0.141$ Plasticity Index = n/a mm Sand Equivalent = n/a

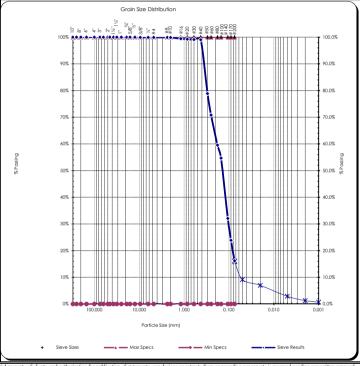
 $D_{(60)} = 0.183$ $D_{(90)} = 0.369$ Dust Ratio = 8/49 Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a mm

Coeff. of Curvature, $C_C = 1.02$ Coeff. of Uniformity, $C_U = 3.29$ Fineness Modulus = 0.68

Plastic Limit = n/a Moisture %, as sampled = 30.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

AS	TM C136, AST	M D6913, ASTM C117
		Grain Size Distribution
	Specs Min	- 100.0% - 100.0% - 100.0% - 100.0% - 100.0%
	0.0% 0.0%	
	0.00/	90%

				AS	TWI C130, A
		Actual	Interpolated		
		Cumulative	Cumulative		
Siev	e Size	Percent	Percent	Specs	Specs
US	Metric	Passing	Passing	Max	Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	99%	99%	100.0%	0.0%
#50	0.300		79%	100.0%	0.0%
#60	0.250		71%	100.0%	0.0%
#80	0.180		60%	100.0%	0.0%
#100	0.150	55%	55%	100.0%	0.0%
#140	0.106		32%	100.0%	0.0%
#170	0.090		24%	100.0%	0.0%
#200	0.075	16.2%	16.2%	100.0%	0.0%
Converied	ht Spears Engineering & Tec	buical Carriose DC 1006 0	10		



Comments:			
	1 22 1 1.11		

Meghan Blodgett-Carrillo

Reviewed by:



Hydrometer Report

Project:	Q.C Lower	Duwamish Wa	terway Date Recei	ved: 29-Jul-21	Unified Soils C	lassification S	ystem, ASTM D-2487
Project #: 1	21B233		Sampled	By: Client	SM, Silty Sand		
•	Anchor QEA			sted: 8-Oct-21	Sample Color		
		8-GB-10-15 ft		By: A. Eifrig	dark brown		
Sample#:		0 02 10 10 11	105000	D, The Line	durit orown		
		, HYDROMI	ETER ANALYSI	S		ASTM	1 D6913
Sp Gr :	2.62					Sieve	Analysis
Sample Weight:	100.83	grams				Grain Size	Distribution
Hydroscopic Moist.:	3.02%				Sieve	Percent	Soils Particle
Adj. Sample Wgt :	97.87	grams		ACCREDITED	Size	Passing	Diameter
		_		Certificate #: 1366.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	9	9.3%	0.0533 mm		1.0"	100%	25.000 mm
2	8	8.2%	0.0380 mm		3/4"	100%	19.000 mm
5	7	7.2%	0.0242 mm		5/8"	100%	16.000 mm
15	6.5	6.7%	0.0140 mm		1/2"	100%	12.500 mm
30	5.5	5.7%	0.0100 mm		3/8"	100%	9.500 mm
60	4	4.1%	0.0071 mm		1/4"	100%	6.300 mm
240	2	2.1%	0.0036 mm		#4	100%	4.750 mm
1440	1	1.0%	0.0015 mm		#10	100%	2.000 mm
0/ C1.	0.10/				#20	99%	0.850 mm
% Gravel: % Sand:	0.1%		Liquid Limit: n/a		#40	99%	0.425 mm
% Sanu: % Silt:	83.7% 13.3%		Plastic Limit: n/a sticity Index: n/a		#100 #200	55% 16.2%	0.150 mm 0.075 mm
% Clay:	2.9%	r ia:	sucity muex: 11/a		Silts	15.9%	0.074 mm
76 Clay.	2.970				Sitts	9.1%	0.050 mm
						7.0%	0.020 mm
					Clays	2.9%	0.005 mm
					Clays	1.3%	0.003 mm
					Colloids	0.7%	0.001 mm
					Conoras	0.770	0.001
	USDA S	oil Textural (Classification				
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mm	n				
% Clay:		< 0.002 mm					

	USDA S	oil Textural (Classification				
		Sand					
All results apply only to actual locatio	ons and materials tested	As a mutual protection t	o clients, the public and ourselves.	all reports are submitted as the con-	fidential property of clients.	and authorization for publ	ication of statements, conclusions or extracts from or
regarding our reports is reserved pend			, 1	i	11,		,
Comments:							
							_
	1 . 1	reget and b	,				
	Wagh the	reget and o					
Reviewed by:		0					
· -	Meghan Blodgett	t-Carrillo					



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT48-GB-15-18.2 ft

Sample#: B21-2067

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 8-Oct-21 Tested By: A. Eifrig Unified Soils Classification System, ASTM D-2487

SP-SM, Poorly graded Sand with Silt

Sample Color: dark brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
M. C.

No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.070 \\ \textbf{D}_{(10)} = 0.104 \\ \textbf{D}_{(15)} = 0.134 \\ \textbf{D}_{(30)} = 0.194 \\ \textbf{D}_{(50)} = 0.288 \\ \textbf{D}_{(60)} = 0.377 \\ \textbf{D}_{(90)} = 1.510 \\ \textbf{D}_{(50)} = 0.288 \\ \textbf{D}_{(60)} = 0.377 \\ \textbf{D}_{(90)} = 1.510 \\ \textbf{D}_{(15)} = 0.000 \\ \textbf$ mm % Gravel = 0.2% % Sand = 94.4% mm % Silt & Clay = 5.3% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 0.97$ Coeff. of Uniformity, $C_U = 3.64$ Fineness Modulus = 1.77

Plastic Limit = n/a Moisture %, as sampled = 21.9% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	ust Ratio = $4/49$		Fracture 9	6 2+ Fa					cture %		
						TM D6913, AST		Tracture /	o, 2 · 1 a	ccs – II		ice	9 4 1 14	ctare /0	, 2 : 1 a	-
		Actual	Interpolated	AS	11M C130, AS	1 N D0913, AS11	vi CII/									
			Cumulative			ľ		Grain Si	ze Distribu	tion						
Sieve	Size	Percent	Percent	Specs	Specs	1		5 5 8 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				00.00				
US	Metric	Passing	Passing	Max	Min		ø ₫	2 4 9 9 2 E 8 8 8	3 4 8	9 1 2	8 4 8 8	82458				100.00
12.00"	300.00	1 assing	100%	100.0%	0.0%	1	100%	···			1111	** ***	TTT			100.0%
10.00"	250.00		100%	100.0%	0.0%					\						1
8.00"	200.00		100%	100.0%	0.0%		90%			11 111						90.0%
6.00"	150.00		100%	100.0%	0.0%					1 \						1
4.00"	100.00		100%	100.0%	0.0%					1						1
3.00"	75.00		100%	100.0%	0.0%		80%							-++++		80.0%
2.50"	63.00		100%	100.0%	0.0%		- 1			N						}
2.00"	50.00	100%	100%	100.0%	0.0%		70%									70.0%
1.75"	45.00	10070	100%	100.0%	0.0%		/0%				X III					70.0%
1.50"	37.50		100%	100.0%	0.0%						1					1
1.25"	31.50		100%	100.0%	0.0%		60%				$\sqcup A \sqcup$					60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	O)										
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing					III 🚶 I					50.0% lg
5/8"	16.00	10070	100%	100.0%	0.0%	P6	50%			1	l i					50.0%
1/2"	12.50	100%	100%	100.0%	0.0%		1				1					1
3/8"	9.50	100%	100%	100.0%	0.0%		40%				1					40.0%
1/4"	6.30	10070	100%	100.0%	0.0%		40/0				l l					40.0%
#4	4.75	100%	100%	100.0%	0.0%		- []									1
#8	2.36	10070	98%	100.0%	0.0%		30%						++-	$-\!\!+\!\!+\!\!+\!\!+$		30.0%
#10	2.00	98%	98%	100.0%	0.0%											1
#16	1.18	,0,0	85%	100.0%	0.0%							\				1
#20	0.850	80%	80%	100.0%	0.0%		20%			1		ţ				20.0%
#30	0.600	0070	71%	100.0%	0.0%							1				1
#40	0.425	65%	65%	100.0%	0.0%		10%					\				10.0%
#50	0.300	0370	51%	100.0%	0.0%		1					1				1
#60	0.250	46%	46%	100.0%	0.0%		ł I					ı î				1
#80	0.180	.570	26%	100.0%	0.0%		0%	100.000			0 00		шш			0.0%
#100	0.150	18%	18%	100.0%	0.0%			100.000 10.0	00	1.000		0.100		0.010		0.001
#140	0.106	1370	10%	100.0%	0.0%				Particle Size	(mm)						
#170	0.090		8%	100.0%	0.0%											
#200	0.075	5.3%	5.3%	100.0%	0.0%	1	Sieve Sizes	— Max	Specs	_	— Min S	pecs		Sieve	Results	
	Spears Engineering & Tec		II .	100.070	0.070											
Сорунда	opens anguitering & rec		ection to clients, the public	1	1											

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT48-GB-18.2-19.5 ft Sample#: B21-2068

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 8-Oct-21 Tested By: A. Eifrig

Visual Identification Sandy Silt Sample Color:

brown

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

#40

#50

#60

#80

#100

#140

#170

#200

94%

91%

67.9%

Meghan Blodgett-Carrillo

94%

91%

91%

85%

82%

74%

71%

67.9%

Sample Meets Specs? N/A

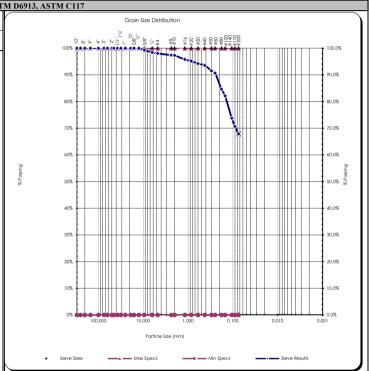
 $D_{(5)} = 0.006$ $D_{(10)} = 0.011$ $D_{(15)} = 0.017$ mm % Gravel = 2.0% % Sand = 30.2% mm % Silt & Clay = 67.9% mm $D_{(30)} = 0.033$ mm Liquid Limit = n/a $D_{(50)} = 0.055$ Plasticity Index = n/a $D_{(60)} = 0.066$ mm Sand Equivalent = n/a $D_{(90)} = 0.242$ mm

Fracture %, 1 Face = n/aFracture %, 2+ Faces = n/a

Coeff. of Curvature, $C_C = 1.50$ Coeff. of Uniformity, $C_U = 6.00$ Fineness Modulus = 0.42 Plastic Limit = n/a

Moisture %, as sampled = 30.8% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} - 0$	
						ust Ratio = 3	
		Actual	Interpolated	AS	TM C136, AS	TM D6913, A	ASTM
			Cumulative			ľ	
Sieve	Size	Percent	Percent	Specs	Specs	=	
US	Metric	Passing	Passing	Max	Min		
12.00"	300.00	rassing	100%	100.0%	0.0%	1	
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		
1.00"	25.00	100%	100%	100.0%	0.0%	9	
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	
5/8"	16.00		100%	100.0%	0.0%	96	
1/2"	12.50	100%	100%	100.0%	0.0%		
3/8"	9.50	99%	99%	100.0%	0.0%		
1/4"	6.30		98%	100.0%	0.0%		
#4	4.75	98%	98%	100.0%	0.0%		
#8	2.36		97%	100.0%	0.0%		
#10	2.00	97%	97%	100.0%	0.0%		
#16	1.18		96%	100.0%	0.0%		
#20	0.850	95%	95%	100.0%	0.0%		
#30	0.600		94%	100.0%	0.0%		



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Comments: Reviewed by:

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

1/4"

#4

#8 #10

#16

#20

#30

#40

#50

#60

#80

#100

#140

#170

#200

Comments:

6.30

4.75

2.36

2.00

1.18

0.850

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

Source: LDW21-GT48-GB-20-21.6 ft Sample#: B21-2069

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 8-Oct-21

Tested By: A. Eifrig

Unified Soils Classification System, ASTM D-2487

SP-SM, Poorly graded Sand with Silt Sample Color:

mm

dark brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281 mm

Specifications No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.057$ $D_{(10)} = 0.087$ $D_{(15)} = 0.104$ mm mm $D_{(30)} = 0.153$ mm $D_{(50)} = 0.190$ mm $D_{(60)} = 0.208$ mm $D_{(90)} = 0.329$ Dust Ratio = 6/91

Liquid Limit = n/a Plasticity Index = n/a Sand Equivalent = n/a Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a

% Gravel = 0.0%

% Silt & Clay = 6.5%

% Sand = 93.5%

Coeff. of Curvature, $C_C = 1.29$ Coeff. of Uniformity, $C_U = 2.40$ Fineness Modulus = 0.85

Plastic Limit = n/a Moisture %, as sampled = 31.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

13, ASTM C117	M D69	TM C136, AST	AS				
				Interpolated	Actual		
				Cumulative	Cumulative		
10.		Specs	Specs	Percent	Percent	Size	Sieve
≌ ‰ 100% •,•,•,•		Min	Max	Passing	Passing	Metric	US
T.	1	0.0%	100.0%	100%		300.00	12.00"
ł I		0.0%	100.0%	100%		250.00	10.00"
90%		0.0%	100.0%	100%		200.00	8.00"
[]		0.0%	100.0%	100%		150.00	6.00"
		0.0%	100.0%	100%		100.00	4.00"
80%		0.0%	100.0%	100%		75.00	3.00"
<u> </u>		0.0%	100.0%	100%		63.00	2.50"
70%		0.0%	100.0%	100%	100%	50.00	2.00"
11		0.0%	100.0%	100%		45.00	1.75"
<u> </u>		0.0%	100.0%	100%		37.50	1.50"
60%		0.0%	100.0%	100%		31.50	1.25"
	ē	0.0%	100.0%	100%	100%	25.00	1.00"
[]	% Passing	0.0%	100.0%	100%	100%	19.00	3/4"
50%	96	0.0%	100.0%	100%		16.00	5/8"
[]		0.0%	100.0%	100%	100%	12.50	1/2"
40%		0.0%	100.0%	100%	100%	9.50	3/8"

100%

100%

100%

99%

83%

100%

100%

100%

100%

100%

100%

99%

99%

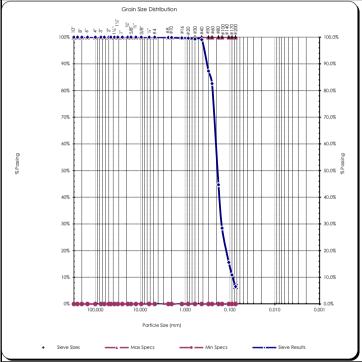
87% 83%

45%

16%

11%

6.5%



0.0%

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Reviewed by: Meghan Blodgett-Carrillo



October 19, 2021 HWA Project No. 2012-002-23 Task 51

Materials Testing & Consulting, Inc.

777 Chrysler Drive Burlington, WA 98233

Attention: Ms. Meghan Blodgett-Carrillo

Subject: LABORATORY TESTING REPORT

QC - Lower Duwamish Waterway MTC Project Number: 21B233

Dear Ms. Blodgett-Carrillo;

In accordance with your request, HWA GeoSciences Inc. (HWA) performed laboratory testing for the above referenced project. Herein we present the results of our laboratory analyses, which are summarized on the attached Figures. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE DESCRIPTION: The subject samples were delivered to our laboratory on August 26, 2021 by MTC personnel. The samples were delivered in four Shelby tubes and were designated with exploration ID and depth of sampling. The soil samples were classified using visual-manual methods. The descriptions may be found on the attached Summary of Material Properties, Figure 1.

MOISTURE CONTENT OF SOIL: The moisture contents of the soil samples (percent by dry mass) were determined in general accordance with ASTM D2216. The results are shown on Figure 1.

SPECIFIC GRAVITY OF SOILS: The specific gravity of the selected samples was determined using method ASTM D854. The test results are shown on the attached Summary of Material Properties, Figure 1.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The plasticity index of each specified sample was tested using method ASTM D4318, multi-point method. The results are reported on the attached Liquid Limit, Plastic Limit, and Plasticity Index of Soils Report, Figure 2.

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION OF SOILS: Selected samples were tested in general accordance with method ASTM D4767 to determine the shear strength characteristics of the soil. The samples were extruded from Shelby tubes, and the test specimens were trimmed to obtain a cylindrical test sample with a length to diameter ratio between 2:1 and 2.5:1. The specimens were carefully weighed and measured prior to testing.

Three trials were run at varying confining stresses specified by the client. Each sample was run using a single specimen to perform a multi-stage shear test.

The multi-stage method was performed by first consolidating the sample at the lowest specified confining pressure. The sample was then sheared until the change in pore pressure was at or near its estimated peak. After reaching the peak change in pore pressure, the shear phase was terminated, and the specimen was reconsolidated at the middle consolidation pressure. Under the second consolidation pressure the sample was again sheared until the change in pore pressure was at or near its estimated peak, at which point the shear was terminated. The sample was reconsolidated a third and final time under the highest confining pressure and shearing was performed to sample failure, concluding the test.

For sample LDW21-GT33-GB at 6.0-8.0', the test was terminated at 20.5% strain due to a spike in pore pressure caused by a perforation in the membrane encasing the sample. As a result, the final moisture content of the sample was affected due to the ingress of water from the surrounding water filled pressure cell. The final moisture content for this sample was determined to be 70.7%.

The Consolidated Undrained test results are summarized and plotted graphically in Figures 3-6.

ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOIL: The consolidation properties of selected soil samples were measured in general accordance with ASTM D 2435. Saturation was maintained by inundation of the sample throughout the test. The samples were subjected to increasing increments of total stress, the duration of which was selected to exceed the time required for completion of primary consolidation as defined in the Standard, Method B. Unloading of the sample was carried out incrementally. The primary compression test results are presented on the attached Consolidation Test Reports, Figures 7-10.



CLOSURE: Experience has shown that test values on soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested samples may represent. HWA also makes no warranty as to how representative either the samples tested or the test results obtained are to actual field conditions. It is a well-established fact that sampling methods present varying degrees of disturbance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

Greg Barker

Materials Laboratory Supervisor

Steven E. Greene, L.G., L.E.G. Principal Engineering Geologist

Vice President

Attachments:

Figure 1

Summary of Material Properties

Figure 2

Liquid Limit, Plastic Limit and Plasticity Index of Soils

Figures 3-6

Consolidated Undrained Triaxial Compression Test for Cohesive Soils

Figures 7-10

Consolidation Test Report

		Ŧ			VITY		ATTERBERG LIMITS (%)					NO	
EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPT (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAY	LL	PL	PI	% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
LDW21-GT23-GB,	28.5	30.5	33.3		2.617	26	25	1				SM	Dark grayish-brown, silty SAND
LDW21-GT33-GB,	6.0	8.0	58.6		2.612	38	36	2				ML	Very dark grayish-brown, SILT with sand
LDW21-GT33-GB,	21.0	23.0	35.3		2.643	31	29	2				SM	Very dark grayish-brown, silty SAND
LDW21-GT53-SPT,	30.0	32.0	43.6		2.627	38	27	11				ML	Very dark grayish-brown, SILT with sand

Notes:

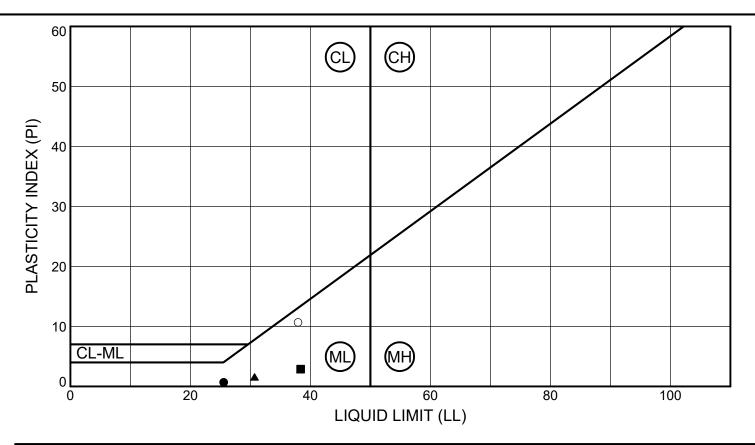
- 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
- 2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.



MLT for MTC, Inc. QC - Lower Duwamish Waterway Client Project No.: 21B233 SUMMARY OF MATERIAL PROPERTIES

PAGE: 1 of 1

PROJECT NO.: 2012-002 T51 FIGURE: 1



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
•	LDW21-GT23-GB	28.5 - 30.5	(SM) Dark grayish-brown, silty SAND	33	26	25	1	
-	LDW21-GT33-GB	6.0 - 8.0	(ML) Very dark grayish-brown, SILT with sand	59	38	36	2	
A	LDW21-GT33-GB	21.0 - 23.0	(SM) Very dark grayish-brown, silty SAND	35	31	29	2	
0	LDW21-GT53-SPT	30.0 - 32.0	(ML) Very dark grayish-brown, SILT with sand	44	38	27	11	

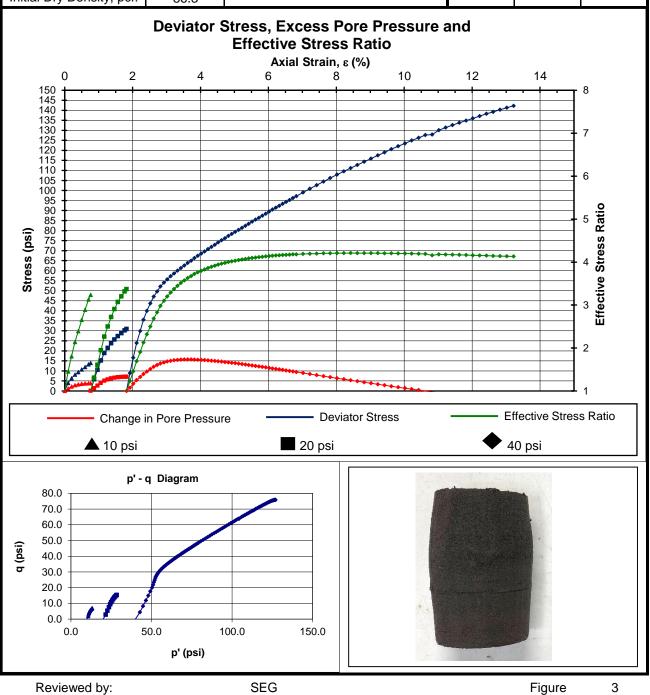


MLT for MTC, Inc. QC - Lower Duwamish Waterway Client Project No.: 21B233 LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS METHOD ASTM D4318

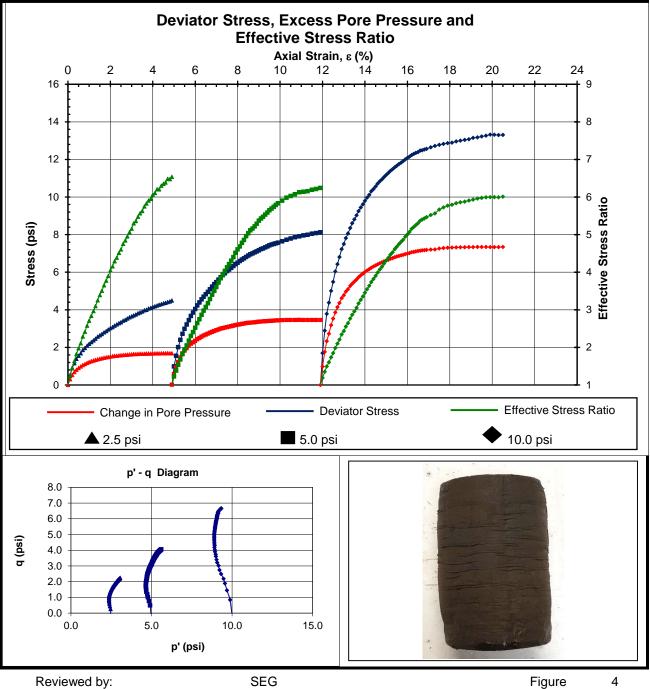
PROJECT NO.: 2012-002 T51 FIGU

FIGURE: 2

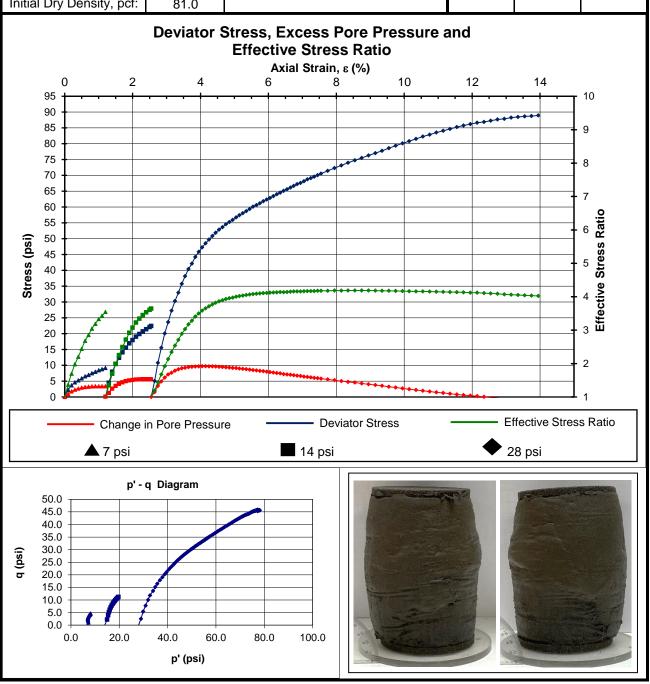
	HWA GeoSciences Inc - Materials Testing Laboratory													
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)														
Project Name:	Lower Duwamish Waterway Date: 8/27/2021													
Project No.:	2012-00	2-23 T51	E	ploration ID	:	LDW21-	GT23-GB							
Technician:	D	W		/a										
Sample Description:	Dark (grayish-browr	rayish-brown, silty SAND (SM)			Depth, ft:	28.5-30.5'							
Confining Pressures:	10 psi	20 psi	40 psi		Consolidat	tion T50 Value	s (minutes)							
Initial Moisture:	33.4%	Final M	Noisture:	10 psi	20 psi	40 psi								
Initial Wet Density, pcf:	115.2				0.6	0.6	1.0							
Initial Dry Density, pcf:	86.3				0.6	0.6	1.0							



	HWA GeoSciences Inc - Materials Testing Laboratory													
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)														
Project Name: Lower Duwamish Waterway Date: 8/28/2021														
Project No.:	2012-00	2-23 T51	E>	cploration ID	:	LDW21-0	GT33-GB							
Technician:	G	В			n,	/a								
Sample Description:	Very dark	grayish-brow	n, SILT with s	Sample	Depth, ft:	6.0 - 8.0								
Confining Pressures:	2.5 psi	5.0 psi	10.0 psi		Consolidat	tion T50 Values	s (minutes)							
Initial Moisture:	64.8%	Final M	loisture:	see report	2.5 psi	5.0 psi	10.0 psi							
Initial Wet Density, pcf:	93.4				04.42	02.24	160.0							
Initial Dry Density, pcf:	56.7				91.13	83.21	162.0							

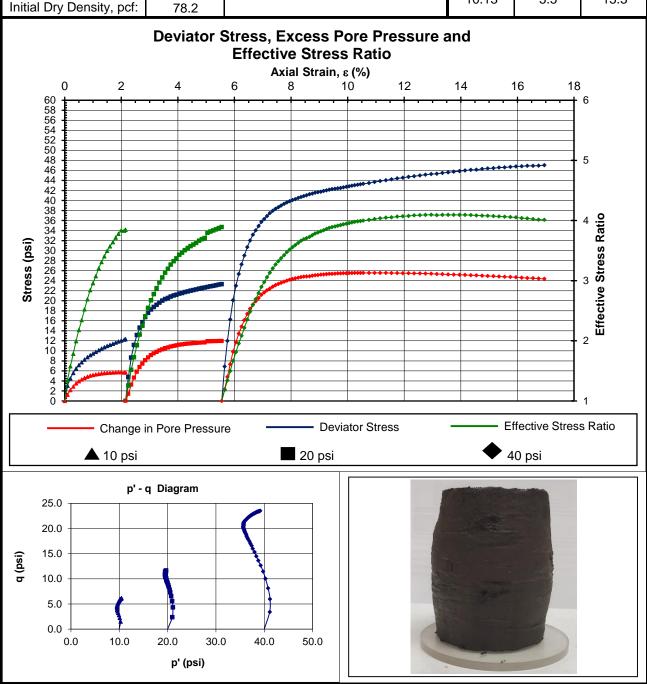


HWA GeoSciences Inc - Materials Testing Laboratory								
Consolidated-	Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)							
Project Name:	L	ower Duwam	ish Waterway		Date:	9/7/2	2021	
Project No.:	2012-00	2-23 T51	Ex	ploration ID	:	LDW21-0	GT33-GB	
Technician:	G	В	B Sample No:				/a	
Sample Description:	Very daı	k grayish-bro	wn, silty SANI	O (SM)	Sample	Depth, ft:	21.0-23.0	
Confining Pressures:	7 psi	14 psi	28 psi		Consolidat	tion T50 Value	s (minutes)	
Initial Moisture:	35.3%	Final M	loisture:	34.7%	7 psi	14 psi	28 psi	
Initial Wet Density, pcf:	109.6			·	111 E	22.0	0.2	
Initial Dry Density, pcf:	81.0				144.5	23.8	0.3	



Reviewed by: SEG Figure 5

HWA GeoSciences Inc - Materials Testing Laboratory								
Consolidated-	Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)							
Project Name:	L	ower Duwami	sh Waterway		Date:	9/16/	2021	
Project No.:	2012-00	2-23 T51	E>	ploration ID	:	LDW21-0	ST53-SPT	
Technician:	G	GB Sample					n/a	
Sample Description:	Very dark	grayish-browr	n, SILT with s	and (ML)	Sample	Depth, ft:	30.0-32.0	
Confining Pressures:	10 psi	20 psi	40 psi		Consolidat	tion T50 Value	s (minutes)	
Initial Moisture:	43.6%	Final M	loisture:	36.3%	10 psi	20 psi	40 psi	
Initial Wet Density, pcf:	112.3			·	10.12	5.5	45.0	
Initial Dry Density, pcf:	78.2				10.13	5.5	15.3	

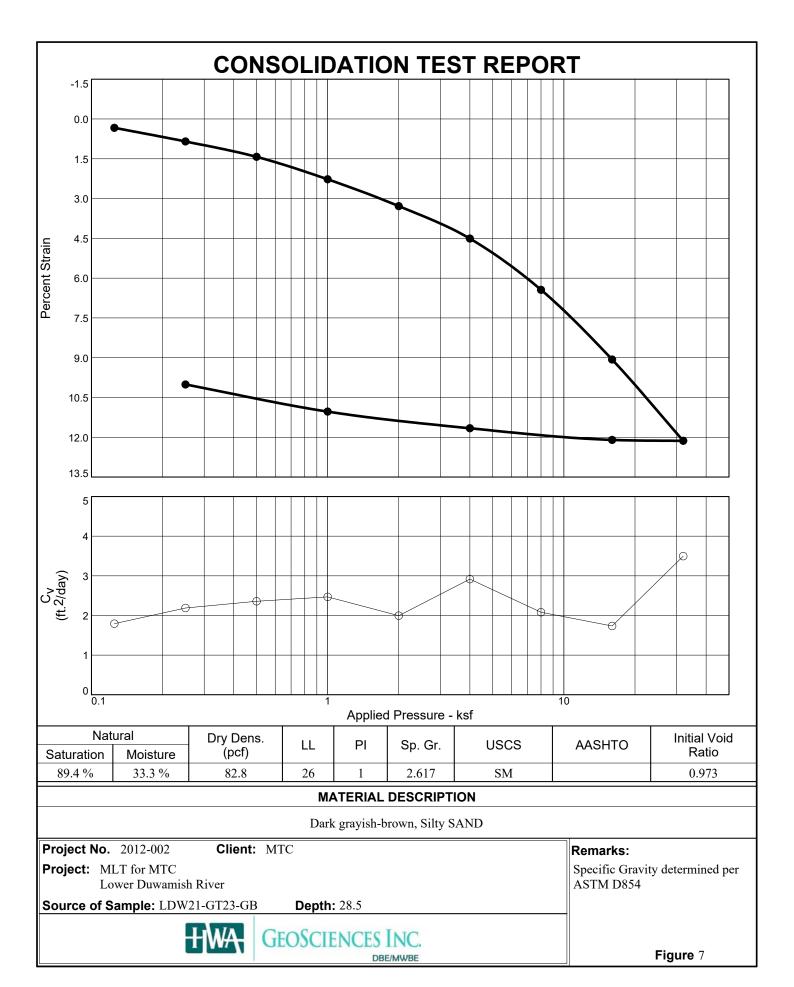


SEG

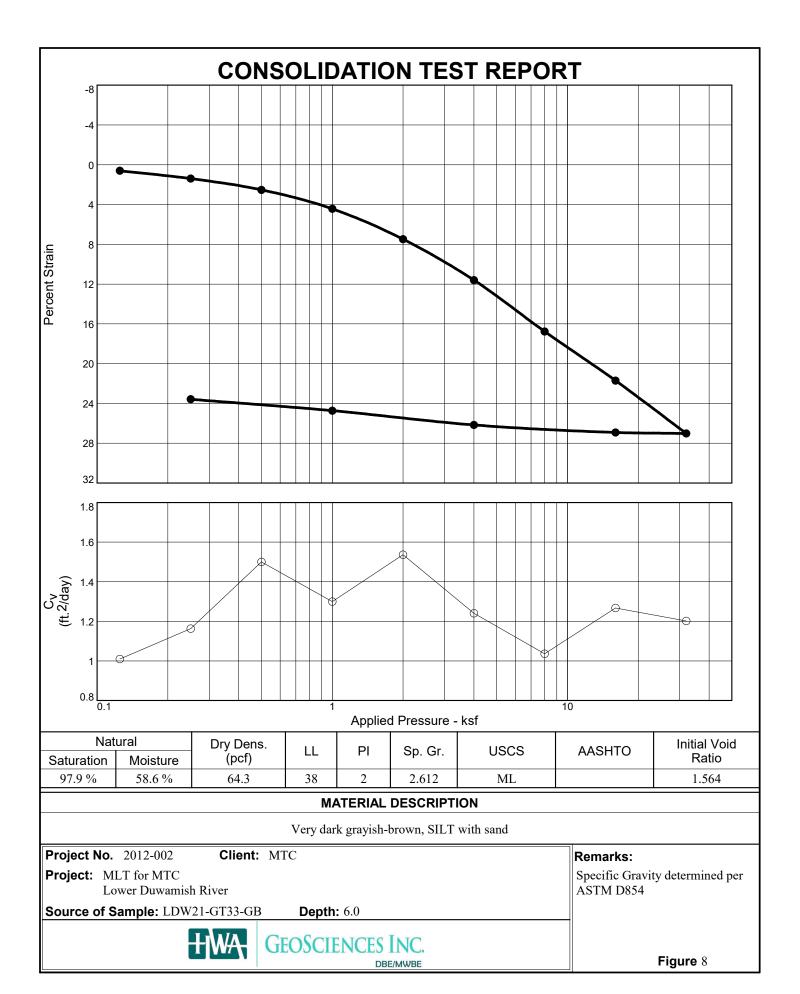
Figure

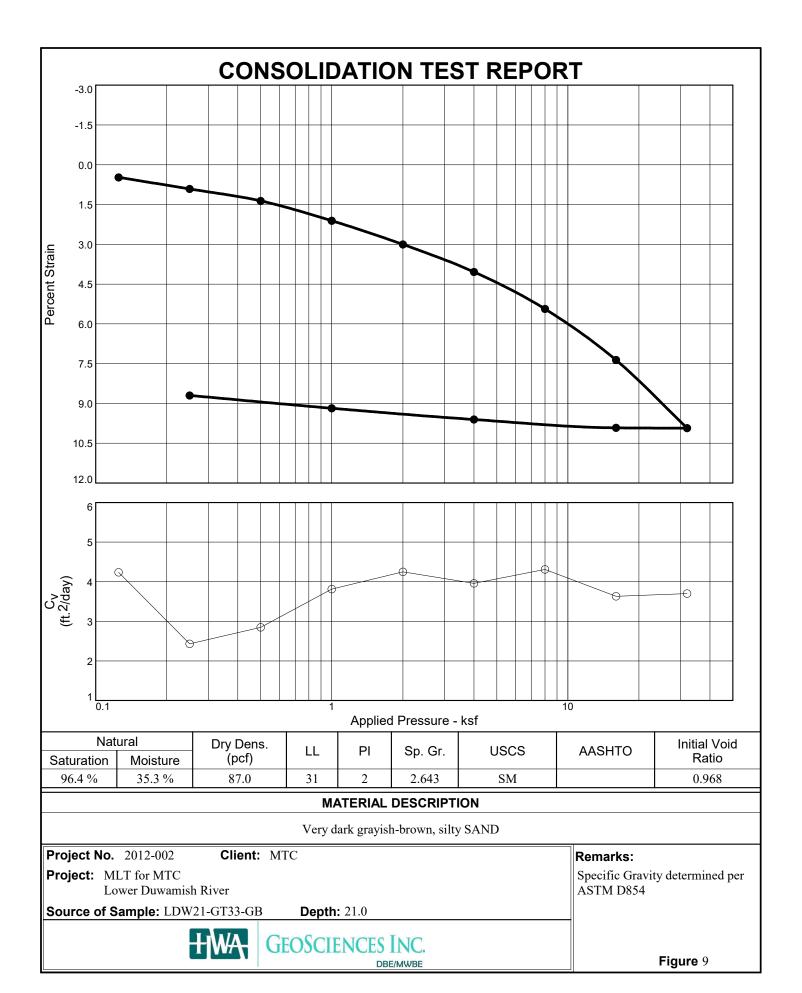
6

Reviewed by:

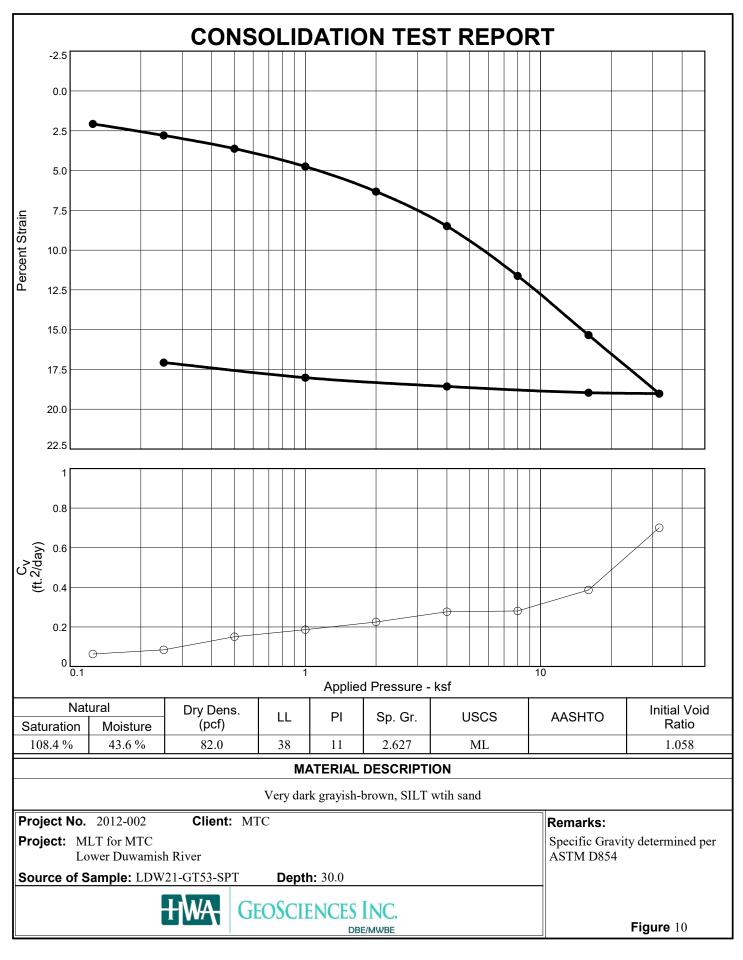


Tested By: AH/GB Checked By: SEG





Tested By: GB Checked By: SEG



Tested By: GB Checked By: SEG



Client:	Anchor QEA	Date:	October 22, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-2006 - 2020
Revised on:		Date sampled:	7-19-21 & 7-20-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor	-		Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			
	_				

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: October 5, 2021	Tested by: M. Carrillo

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2006	LDW21-GT5-0-1.5 ft	233.4	758.3	626.0	132.3	392.6	33.7%
B21-2007	LDW21-GT5-0-7.5 ft	266.3	675.6	572.3	103.3	306.0	33.8%
B21-2008	LDW21-GT5-7.5-9 ft	270.2	918.2	773.3	144.9	503.1	28.8%
B21-2009	LDW21-GT5-7.5-17.2ft	215.7	960.7	862.1	98.6	646.4	15.3%
B21-2010	LDW21-GT5-17.2-17.5 ft	300.9	721.1	625.3	95.8	324.4	29.5%
B21-2011	LDW21-GT5-17.5-19 ft	346.3	836.3	746.0	90.3	399.7	22.6%
B21-2012	LDW21-GT5-17.5-27.5 ft	341.8	961.5	816.3	145.2	474.5	30.6%
B21-2013	LDW21-GT5-27.5-29 ft	356.9	833.5	719.1	114.4	362.2	31.6%
B21-2014	LDW21-GT35-0-1.5 ft	360.3	821.8	607.9	213.9	247.6	86.4%
B21-2015	LDW21-GT35-5-6.5 ft	354.1	572.7	469.6	103.1	115.5	89.3%
B21-2016	LDW21-GT35-10-11.5 ft	359.4	882.4	671.2	211.2	311.8	67.7%
B21-2017	LDW21-GT35-15-16.5 ft	236.6	466.5	417.1	49.4	180.5	27.4%
B21-2018	LDW21-GT35-20-21.5 ft	237.4	947.7	793.9	153.8	556.5	27.6%
B21-2019	LDW21-GT35-25-26.5 ft	224.2	733.1	614.5	118.6	390.3	30.4%
B21-2020	LDW21-GT35-30-31.5 ft	225.1	669.4	560.4	109.0	335.3	32.5%

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is

Reviewed by:

Meghan Blodgett-Carrillo



Moisture Content - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: October 5, 2021	Tested by: A. Eifrig

Ī	I	Ī	I	Ī]		Ī	Ī	Mass of	I	1	I	I	1 1
									Pycno filled	Mass of	Temp. of		Temp.	
			Dry Soil +	Mass of Dry		Mass of	Volume of	Density of	w/ water &	Pycno filled	Water, 0.1	SpG of		Corrected
Sample #	Location	Tare	Tare	Soil	Pycno ID	Pycno	Pycno	Water @ Tx	soils	w/ water	*C	Soils	Factor	SpG
B21-2009	LDW21-GT5-7.5-17.2ft	601.79	703.81	102.0	TSA-022	198.0	499.5	0.99865	760.54	696.77	17.7	2.6674865	1.00045	2.6686868
B21-2012	LDW21-GT5-17.5-27.5 ft	497.70	600.26	102.6	TSA-021	183.4	499.4	0.99869	744.61	682.18	17.6	2.5559632	1.00048	
B21-2017	LDW21-GT35-15-16.5 ft	509.68	611.88	102.2	TSA-023	163.9	498.7	0.99865	724.72	661.99		2.5895248		2.5906901
		<u> </u>												
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

P	Project: Q.C Lower Duw Project #: 21B233 Client: Anchor QEA Source: LDW21-GT5-GB- sample #: B21-2007	•	5	te Received: Sampled By: Date Tested: Tested By:	Client 14-Oct-21		Visual Identific Sand with Silt Sample Color brown	ation
		Liquid L	imit Determinat	ion				
		#1	#2	#3	#4	#5	#6	
	Weight of Wet Soils + Pan:							
	Weight of Dry Soils + Pan:	Liquid	limit cannot be est	ablished				
	Weight of Pan: Weight of Dry Soils:							Liquid Limit @ 25 Blows: N/A
	Weight of Moisture:							Plastic Limit: N/A
	% Moisture:							Plasticity Index, I _P : N/A
	Number of Blows:							
		Diagria I	imit Determinat	ion.				
		#1	#2	#3	#4	#5	#6	
	Weight of Wet Soils + Pan:							
	Weight of Dry Soils + Pan: Weight of Pan:	Plastic	limit cannot be det	ermined				
	Weight of Dry Soils:							ACCREDITED
	Weight of Moisture: % Moisture:							Certificate #: 1366.01, 1366.02 & 1366.04
	/o Monstares							
ĺ	70 % T	Pla	sticity Chart					Liquid Limit
	60 %				ME			90%
				m'	I LINE	WHIRE-		80%
×	50 %		\angle		0,0H			70%
Plasticity Index	40 %			CH	orOH			and 60%
ξ	30 %							50% 50%
astic		N.						40%
ď	20 %	Cl. or OL		М	H or OH			30%
	10 %							20%
	0 % CL-ML	ML or OL					—	10%
	0% 10%	20% 30% 40%		0% 70%	80%	90% 10	00% 110%	0% 10 100
			Liquid Limit					Number of Blows, "N"
	Copyright Spears Engineering & Techn	nical Services PS, 1996-98						

Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumblind. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT5-GB-7.5-17.2 ft

Sample#: B21-2009

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 6-Oct-21

Tested By: K. Mendez

Unified Soil Classification System, ASTM-2487 SW-SM, Well-graded Sand with Silt and Gravel

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.034 \\ D_{(10)} = 0.068 \\ D_{(15)} = 0.162 \\ D_{(30)} = 0.370 \end{array}$ mm % Gravel = 24.4% % Sand = 64.6% mm % Silt & Clay = 11.0% mm mm Liquid Limit = n/a $D_{(50)} = 0.801$ $D_{(60)} = 1.580$ $D_{(90)} = 12.641$ Plasticity Index = n/a mm Sand Equivalent = n/a

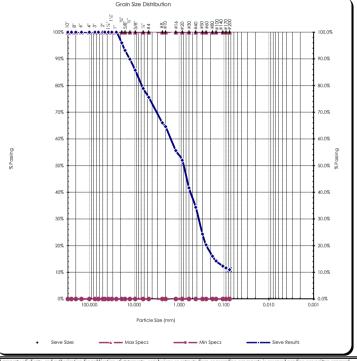
Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a mm Dust Ratio = 23/72

Coeff. of Curvature, $C_C = 1.27$ Coeff. of Uniformity, $C_U = 23.13$ Fineness Modulus = 3.41

Plastic Limit = n/a Moisture %, as sampled = 15.3% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

	Du	st Ratio = 23/72	Fracture %, 2+ Faces =	· n/a	Req'd Fracture %	, 2+ Faces =
S	TM C136, AST	M D6913, ASTM C11	7			
			Grain Size Distribution			
	Specs Min		86. 1.7. 1	#20 #40 #50 #80 #100 #170	88 8	
	0.0%					
	0.0%	90%		 	 	90.09

				AS	1M C136, AS
		Actual	Interpolated		
		Cumulative	Cumulative		
Sieve	Size	Percent	Percent	Specs	Specs
US	Metric	Passing	Passing	Max	Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	96%	96%	100.0%	0.0%
5/8"	16.00		93%	100.0%	0.0%
1/2"	12.50	90%	90%	100.0%	0.0%
3/8"	9.50	86%	86%	100.0%	0.0%
1/4"	6.30		79%	100.0%	0.0%
#4	4.75	76%	76%	100.0%	0.0%
#8	2.36		66%	100.0%	0.0%
#10	2.00	65%	65%	100.0%	0.0%
#16	1.18		56%	100.0%	0.0%
#20	0.850	52%	52%	100.0%	0.0%
#30	0.600		42%	100.0%	0.0%
#40	0.425	34%	34%	100.0%	0.0%
#50	0.300		24%	100.0%	0.0%
#60	0.250	20%	20%	100.0%	0.0%
#80	0.180		16%	100.0%	0.0%
#100	0.150	14%	14%	100.0%	0.0%
#140	0.106		12%	100.0%	0.0%
#170	0.090		12%	100.0%	0.0%
#200	0.075	11.0%	11.0%	100.0%	0.0%
Copyrigh	at Spears Engineering & Tec	hnical Services PS, 1996-9	98		



Comments:

Meghan Blodgett-Carrillo

Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-2009
Sample Date:	7/19/2021
Test Date:	10/12/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT5-GB-7.5-17.2 ft

 Visual Soil Description:
 brown sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

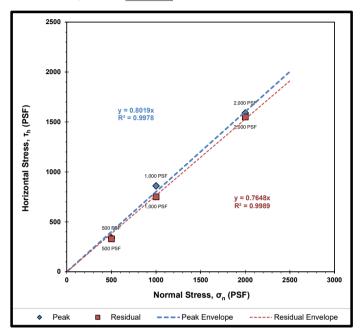
Specimen Height (in): 1
Rate of Strain (in/min): 0.0208
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	25.3	
	Initial	Post-Consolidation
Dry Density (PCF):	106.6	108.7
Void Ratio:	0.580	0.549
Porosity (%):	36.7	35.5
Degree of Saturation (%):	saturated	saturated

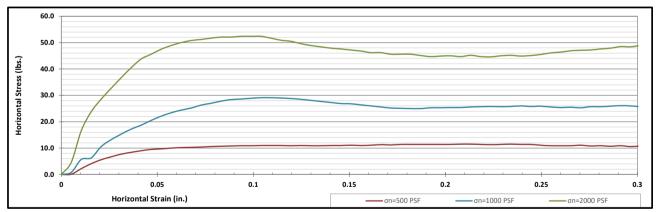
Summary of Samp	le Data:	σ _n =1000 PSF
Initial Moisture Content (%):	25.2	
	Initial	Post-Consolidation
Dry Density (PCF):	107.2	109.2
Void Ratio:	0.571	0.543
Porosity (%):	36.3	35.2
Degree of Saturation (%):	saturated	saturated

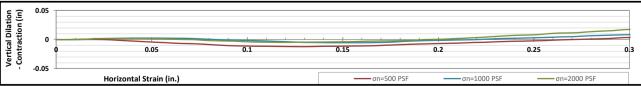
Summary of Sample	Data:	σ _n =2000 PSF
Initial Moisture Content (%):	25.8	
	Initial	Post-Consolidation
Dry Density (PCF):	106.6	109.4
Void Ratio:	0.581	0.540
Porosity (%):	36.7	35.1
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS								
	PEAK	RESIDUAL						
Angle of Internal Friction, φ (°):	39	37						
Cohesion (PSF):	0	0						



Failure Envelope Test Values:									
Normal Stress, σ _n (PSF):	500	1000	2000						
Peak Horizontal Stress, τ _h (PSF):	340	860	1590						
Residual Horizontal Stress, τ _h (PSF):	330	750	1550						





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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

P	Project: Q.C Lower Duw roject #: 21B233 Client: Anchor QEA Source: LDW21-GT5-GB ample #: B21-2010	•		te Received: Sampled By: Date Tested: Tested By:	Client 14-Oct-21		Visual Identific Sand with Silt Sample Color brown	cation
		Liquid L	imit Determina				_	
		#1	#2	#3	#4	#5	#6	
	Weight of Wet Soils + Pan:	** **	10 00 001	. 1 . 1 . 1				
	Weight of Dry Soils + Pan: Weight of Pan:	Liquid	limit cannot be es	tablished				
	Weight of Dry Soils:							Liquid Limit @ 25 Blows: N/A
	Weight of Moisture: % Moisture:							Plastic Limit: N/A Plasticity Index, I _P : N/A
	Number of Blows:							rasticity flucx, sp. 10/A
			imit Determina					
	Weight of Wet Soils + Pan:	#1	#2	#3	#4	#5	#6	
	Weight of Dry Soils + Pan:	Plastic	limit cannot be de	termined				
	Weight of Pan: Weight of Dry Soils:							
	Weight of Moisture:							Certificate #: 1366.01, 1366.02 & 1366.04
	% Moisture:							
\bigcap	70 % T	Pla	sticity Chart					Liquid Limit
								100%
	60 %				I' LINE	سعميا ،		90%
×	50 %				orOH	JAN TO THE REAL PROPERTY OF THE PERTY OF THE		80%
nde	40 %			Ch	01			2 70%
Plasticity Index	30 %							w 60%
ıstic	50 70							8 40%
풉	20 %	ClorOL		M	IH or OH			30%
	10 %				· · · · · · · · · · · · · · · · · · ·			20%
	0 %	ML or OL						10%
	0% 10%	20% 30% 40%		60% 70%	80%	90% 1	00% 110%	0% 10 100
			Liquid Limit					Number of Blows, "N"
	Copyright Spears Engineering & Tech	inicai Services PS, 1996-98						

All results apply only to actual locations and mate reports is reserved pending our written approval.

Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumblind. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT5-GB-17.5-27.5 ft

Sample#: B21-2012

#30

#40

#50

#60

#80

#100

#140

#170

#200

Comments:

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

82%

11.0%

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 6-Oct-21 Tested By: K. Mendez

SP-SM, Poorly graded Sand with Silt

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $D_{(5)} = 0.022$ $D_{(10)} = 0.068$ $D_{(15)} = 0.088$ mm % Gravel = 0.6%% Sand = 88.5% mm % Silt & Clay = 11.0% mm $D_{(30)} = 0.136$ mm Liquid Limit = n/a $D_{(50)} = 0.239$ Plasticity Index = n/a $D_{(60)} = 0.297$ mm Sand Equivalent = n/a $D_{(90)} = 1.161$ ust Ratio = 2/15 mm Fracture %, 1 Face = n/aFracture %, 2+ Faces = n/a

Unified Soil Classification System, ASTM-2487

Coeff. of Uniformity, $C_U = 4.38$ Fineness Modulus = 1.33 Plastic Limit = n/aMoisture %, as sampled = 30.6%

Coeff. of Curvature, $C_C = 0.91$

Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

		Actual Cumulative	Interpolated Cumulative	AS	TM C136,
Sieve	Size	Percent	Percent	Specs	Specs
US	Metric	Passing	Passing	Max	Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		970/-	100.0%	0.09/-

84%

82%

61%

52%

40%

35%

21%

16%

11.0%

100.0%

100.0%

100.0%

100.0%

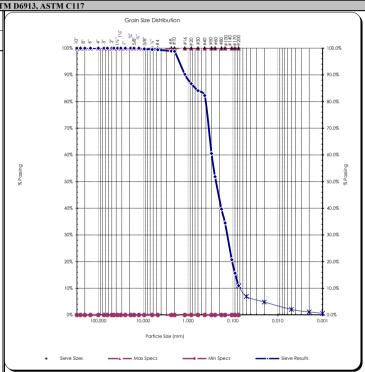
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Reviewed by:

Meghan Blodgett-Carrillo



Hydrometer Report

Date Received: 29-Jul-21 Project: Q.C. - Lower Duwamish Waterway Unified Soil Classification System, ASTM-2487 Project #: 21B233 Sampled By: Client SP-SM, Poorly graded Sand with Silt Client: Anchor QEA Date Tested: 6-Oct-21 Sample Color Source: LDW21-GT5-GB-17.5-27.5 ft Tested By: K. Mendez brown Sample#: B21-2012 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp Gr. 2.56 Sieve Analysis Sample Weight: 100.01 grams Grain Size Distribution Hydroscopic Moist.: 1.52% Sieve Percent Soils Particle Adj. Sample Wgt: 98.51 Size Passing Diameter grams 3.0" 100% 75.000 mm Hydrometer 100% 50.000 mm 2.0" Soils Particle 1.5" 100% 37.500 mm Reading Corrected Percent 31.500 mm 1 25" 100% Minutes Reading **Passing** Diameter 0.0545 mm 25.000 mm 8.2% 1.0" 100% 0.0389 mm 3/4" 100% 19.000 mm 6.1% 5 5.1% 0.0248 mm 5/8" 100% 16.000 mm 15 4.5 4.6% $0.0144\ mm$ 1/2" 100% 12.500 mm 30 4 4.1% 0.0102 mm 3/8" 100% 9.500 mm 60 3.1% $0.0072 \ mm$ 1/4" 100% 6.300 mm 240 1.5 1.5% 0.0036 mm #4 99% 4.750 mm 1440 1.0% 0.0015 mm #10 99% 2.000 mm #20 87% 0.850 mm % Gravel: Liquid Limit: n/a #40 82% 0.425 mm % Sand: 88.5% Plastic Limit: n/a #100 35% 0.150 mm Plasticity Index: n/a 0.075 mm % Silt: #200 11.0% % Clay: 10.8% 0.074 mm 0.050 mm 6.9% 4.9% 0.020 mm 0.005 mm Clavs 2.1% 0.002 mm 1.1% Colloids 0.7% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments:			
	1 1000 D.M.		
Reviewed by:	Mayb Bakget wills		
	Meghan Blodgett-Carrillo		

Materials Testing & Consulting, Inc. Geotechnical Engineering • Special Inspections • Materials Testing • Environmental Consulting



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Dry Soils + Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: 70 % 60 %	#1 30.42 27.89 19.88 8.01 2.53 31.6 % 25 Plastic I #1 37.34 36.82 31.03 5.79	27.71 24.44 15.05 9.39 3.27 34.8 % 20 2imit Determina #2 36.36 35.86 30.33 5.53	#3 26.95 23.66 14.81 8.85 3.29 37.2 %	#4	#5	#6	Liquid Limit @ 25 Plastic Plasticity In	c Limit: 9 %
Weight of Dry Soils + Pan: Weight of Pan: Weight of Pry Soils: Weight of Moisture: % Moisture: Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Dry Soils: Weight of Dry Soils: Weight of Moisture: % Moisture:	#1 30.42 27.89 19.88 8.01 2.53 31.6 % 25 Plastic I #1 37.34 36.82 31.03 5.79	#2 27.71 24.44 15.05 9.39 3.27 34.8 % 20 Limit Determina #2 36.36 35.86 30.33	#3 26.95 23.66 14.81 8.85 3.29 37.2 % 15				Plastic	c Limit: 9 %
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Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Dry Soils: Weight of Dry Soils: Weight of Moisture: % Moisture:	19.88 8.01 2.53 31.6 % 25 Plastic I #1 37.34 36.82 31.03 5.79	15.05 9.39 3.27 34.8 % 20 	14.81 8.85 3.29 37.2 % 15	#4	#5	#6	Plastic	c Limit: 9 %
Weight of Dry Soils: Weight of Moisture: % Moisture: Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	8.01 2.53 31.6 % 25 Plastic I #1 37.34 36.82 31.03 5.79	9.39 3.27 34.8 % 20 Limit Determina #2 36.36 35.86 30.33	8.85 3.29 37.2 % 15	#4	#5	#6	Plastic	c Limit: 9 %
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Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	25 Plastic I #1 37.34 36.82 31.03 5.79	20 Limit Determina #2 36.36 35.86 30.33	15	#4	#5	#6	Plasticity In	dex, I _P : 23 %
Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	#1 37.34 36.82 31.03 5.79	#2 36.36 35.86 30.33	tion	#4	#5	#6		
Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	#1 37.34 36.82 31.03 5.79	#2 36.36 35.86 30.33		#4	#5	#6		
Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	37.34 36.82 31.03 5.79	36.36 35.86 30.33	#3	#4	#5	#6		
Weight of Dry Soils + Pan: Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	36.82 31.03 5.79	35.86 30.33						
Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture:	31.03 5.79	30.33						
Weight of Dry Soils: Weight of Moisture: % Moisture:	5.79							
Weight of Moisture: % Moisture: 70 %							ACCRED	TED)
70 %	0.52	0.50					Certificate #: 1366.01,	1366.02 & 1366.04
	9.0 %	9.0 %						
60 %	Pla	asticity Chart					Liquid L	
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40 %							25% Woistne 20% Woistne	
	CLorOL						15%	
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0% 10% 20%	30% 40%		0% 70%	80%	90%	00% 110%	0% +	100
		Liquid Limit						f Blows, "N"
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ults apply only to actual locations and materials tested. s is reserved pending our written approval.	As a mutual protection to clien	nts, the public and ourselv	es, all reports are sub-	nitted as the confident	tial property of clic	nts, and authorization	for publication of statements, conclusions or	r extracts from or regarding
nments:								

Reviewed by: Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT35-GB-15-16.5 ft

Specifications

No Specs

Sample#: B21-2017

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 6-Oct-21

Tested By: K. Mendez

mm mm mm mm

mm

Fracture %, 1 Face = n/a

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

gray



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

 $\begin{array}{c} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.004 \\ \textbf{D}_{(10)} = 0.009 \\ \textbf{D}_{(15)} = 0.017 \\ \textbf{D}_{(30)} = 0.057 \\ \textbf{D}_{(50)} = 0.119 \\ \textbf{D}_{(60)} = 0.148 \\ \textbf{D}_{(90)} = 0.320 \\ \textbf{Partice} = 11/31 \\ \textbf{D}_{(40)} = 0.131 \\ \textbf{D}_{(40)} = 0.132 \\ \textbf{$ Coeff. of Curvature, $C_C = 2.36$ Coeff. of Uniformity, $C_U = 16.11$ Fineness Modulus = 0.52 % Gravel = 0.0% % Sand = 64.9% % Silt & Clay = 35.1% Liquid Limit = n/a Plasticity Index = n/a mm Sand Equivalent = n/a

Plastic Limit = n/a Moisture %, as sampled = 27.4% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

		Actual	Interpolated	710	STM C136, AST	V														=
		Cumulative	Cumulative							Grain Siz										
Sieve	Size	Percent	Percent	Specs	Specs		ь.		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	\$ is		8 19 19	0 9 0	888	3888					
US	Metric	Passing	Passing	Max	Min		100%	0 ₹0 ₹18 0 40 = 0 0	ი (1 <u>≥</u> <u>:</u>	- 15 S	× =	## # -44-4	± ± ±	###	** **				, . 1	00.00
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4.00"	100.00		100%	100.0%	0.0%									Ĭ					1.	
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2.50"	63.00		100%	100.0%	0.0%														1	
2.00"	50.00	100%	100%	100.0%	0.0%		70%				Ш								7	0.0%
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1.00"	25.00	100%	100%	100.0%	0.0%	g.	-								\				1	
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5/8"	16.00		100%	100.0%	0.0%	95	50%				ШТ				V				1 5	D.0%
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3/8"	9.50	100%	100%	100.0%	0.0%		40%				Ш.				- 1				4	10.0%
1/4"	6.30		100%	100.0%	0.0%		t								١.					
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#10	2.00	100%	100%	100.0%	0.0%		F												1	
#16	1.18		100%	100.0%	0.0%											\ \			1.	
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#30	0.600		99%	100.0%	0.0%		ļ.									*	\ III			
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#60	0.250	84%	84%	100.0%	0.0%		ŀ												K	
#80	0.180		68%	100.0%	0.0%		0%	100.00		10.0	₩ \$	-	000 000	-00-00	0.100	шш	0.010		0.001	0.0%
#100	0.150	61%	61%	100.0%	0.0%			100.00	,,,	10.0	50	1.0	500		0.100		0.010		0.001	
#140	0.106	****	46%	100.0%	0.0%						Particle S	ze (mm)								
#170	0.090		40%	100.0%	0.0%															
#200	0.075	35.1%	35.1%	100.0%	0.0%		Sieve Sizes			— Max S	pecs	_	_	Min Spe	cs	_	· Sie	ve Results		
Copyright		hnical Services PS, 1996-9	ļ.	100.070	0.070	, ·														

Reviewed by: _



Hydrometer Report

Date Received: 29-Jul-21 Project: Q.C. - Lower Duwamish Waterway Unified Soil Classification System, ASTM-2487 Project #: 21B233 Sampled By: Client SM, Silty Sand Client: Anchor QEA Date Tested: 6-Oct-21 Sample Color Source: LDW21-GT35-GB-15-16.5 ft Tested By: K. Mendez gray Sample#: B21-2017 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp Gr. 2.59 Sieve Analysis Sample Weight: 102.29 grams Grain Size Distribution Hydroscopic Moist .: 1.10% Sieve Percent Soils Particle ACCREDITED Adj. Sample Wgt: 101.18 Size Passing Diameter grams 3.0" 100% 75.000 mm 100% 50.000 mm Hydrometer 2.0" Soils Particle 1.5" 100% 37.500 mm Reading Corrected Percent 1 25" 100% 31.500 mm Minutes Reading **Passing** Diameter 0.0486 mm 25.000 mm 27.5 27.7% 1.0" 100% 23 2% 0.0352 mm 3/4" 100% 19.000 mm 23 18 18.1% 0.0230 mm 5/8" 100% 16.000 mm 15 13 13 1% $0.0137\ mm$ 1/2" 100% 12.500 mm 30 10.5 10.6% 0.0099 mm 3/8" 100% 9.500 mm 60 8.1% 0.0070 mm 1/4" 100% 6.300 mm 240 5 5.0% 0.0036 mm #4 100% 4.750 mm 1440 3.0% 0.0015 mm #10 100% 2.000 mm #20 100% 0.850 mm % Gravel: 0.0% Liquid Limit: n/a #40 99% 0.425 mm % Sand: 64.9% Plastic Limit: n/a #100 61% 0.150 mm Plasticity Index: n/a 0.075 mm % Silt: 28.8% #200 35.1% % Clay: 0.074 mm 34.8% 0.050 mm 30.4% 0.020 mm 16.5% 0.005 mm Clavs 6.3% 3.5% 0.002 mm Colloids 2.0% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:**

Reviewed by:

Environmental • Geotechnical Engineering • Special Inspection • Non-Destructive Testing • Materials Testing

Burlington | Olympia | Bellingham | Silverdale | Tukwila

360.755.1990

www.mtc-inc.net

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-2017
Sample Date:	7/20/2021
Test Date:	10/6/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT35-GB-15-16.5 ft

 Visual Soil Description:
 gray sand

 Type of Specimen:
 Remolded Cylindrical Shear Box

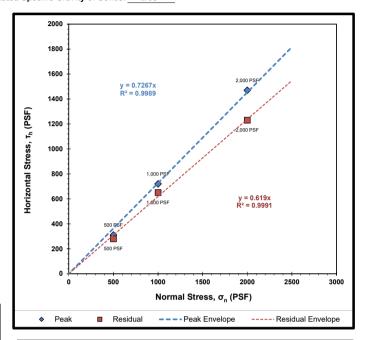
Estimated Specific Gravity of Solids: 2.65

Summary of Sample	le Data:	σ _n =500 PSF
Initial Moisture Content (%):	29.5	
	Initial	Post-Consolidation
Dry Density (PCF):	109.5	110.5
Void Ratio:	0.539	0.525
Porosity (%):	35.0	34.4
Degree of Saturation (%):	saturated	saturated

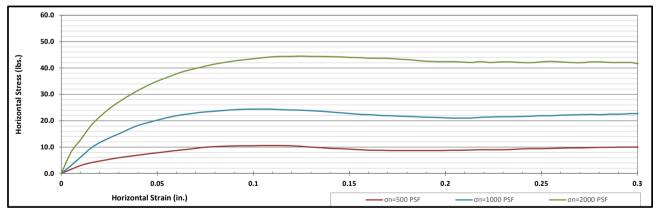
Summary of Samp	le Data:	σ _n =1000 PSF				
Initial Moisture Content (%):	30.1					
	Initial Post-Consol					
Dry Density (PCF):	108.1	110.4				
Void Ratio:	0.559	0.527				
Porosity (%):	35.8	34.5				
Degree of Saturation (%):	saturated	saturated				

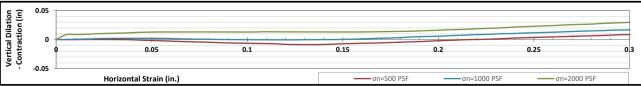
Summary of Sampl	e Data:	σ _n =2000 PSF
Initial Moisture Content (%):	32.2	
	Initial	Post-Consolidation
Dry Density (PCF):	107.5	110.7
Void Ratio:	0.567	0.522
Porosity (%):	36.2	34.3
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS										
	PEAK	RESIDUAL								
Angle of Internal Friction, φ (°):	36	32								
Cohesion (PSF):	0	0								



Failure Envelope Test Values:										
Normal Stress, σ _n (PSF):	500	1000	2000							
Peak Horizontal Stress, τ _h (PSF):	310	720	1470							
Residual Horizontal Stress, τ _h (PSF):	280	650	1230							





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233

Comments:

Source: LDW21-GT35-GB-20-21.5 ft Sample#: B21-2018

Client: Anchor QEA

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 6-Oct-21 Tested By: K. Mendez Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

mm

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} \textbf{, AS IM D431} \\ D_{(5)} = 0.019 \\ D_{(10)} = 0.038 \\ D_{(15)} = 0.058 \\ D_{(30)} = 0.108 \\ D_{(50)} = 0.166 \\ D_{(60)} = 0.189 \\ D_{(90)} = 0.304 \\ \end{array}$ mm % Gravel = 0.0% % Sand = 80.5% mm % Silt & Clay = 19.5% mm mm Liquid Limit = n/a Plasticity Index = n/amm

Sand Equivalent = n/a Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.60$ Coeff. of Uniformity, $C_U = 4.92$ Fineness Modulus = 0.68 Plastic Limit = n/a

Moisture %, as sampled = 27.6% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Di	ust Ratio = $13/66$	111111		ture %,				1				Faces =	
				AS		FM D6913, ASTM	C117	Trac	ture 70,	Z Pa	Jes - 11	/ a		xeq u i	Tacture	2 70, 2	races -	
		Actual	Interpolated	AS	1 W C 130, AS	INI DO913, ASTM	CII/											
			Cumulative			Y		(Grain Size	Distribut	ion							
Sieve	Size	Percent	Percent	Specs	Specs				Št. in				00.00	5				
US	Metric	Passing	Passing	Max	Min	1	ં જંલે •••••• 200	- 8 6 8 ±	38, 58	4 4	# # 10	8 4 4 4 4	8845	3			10	00.0%
12.00"	300.00	1 assing	100%	100.0%	0.0%	┪ ''	JU%		"""	**************************************		î		1		MIT	T 7 "	.0.0%
10.00"	250.00		100%	100.0%	0.0%							 					1 1	
8.00"	200.00		100%	100.0%	0.0%		90%	Ш.		-		₩.	1	Ш.	$\perp \perp \parallel$	ЩЩ.	90	0.0%
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4.00"	100.00		100%	100.0%	0.0%							l l						
3.00"	75.00		100%	100.0%	0.0%		80%	####		###				++++	+	.####	80	0.0%
2.50"	63.00		100%	100.0%	0.0%												1 1	
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1.25"	31.50		100%	100.0%	0.0%		60%	++++		+++-				++++	+-++	+++		0.0%
1.00"	25.00	100%	100%	100.0%	0.0%	p p											1 1	p
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1/2"	12.50	100%	100%	100.0%	0.0%													
3/8"	9.50	100%	100%	100.0%	0.0%		40%			444	Ш.		1	ЩЩ		ЩЦ	40	0.0%
1/4"	6.30		100%	100.0%	0.0%								1 1 11				1 1	
#4	4.75	100%	100%	100.0%	0.0%		ł l						1 111				1 1	
#8	2.36		100%	100.0%	0.0%	:	30%			-					+-++		30	0.0%
#10	2.00	100%	100%	100.0%	0.0%		[]						V				1 }	
#16	1.18		100%	100.0%	0.0%								l 1				1 1	
#20	0.850	100%	100%	100.0%	0.0%	1	20%							fill			7	0.0%
#30	0.600		99%	100.0%	0.0%												1 1	
#40	0.425	99%	99%	100.0%	0.0%		10%							₩₩		###		0.0%
#50	0.300		90%	100.0%	0.0%													
#60	0.250	86%	86%	100.0%	0.0%													
#80	0.180		56%	100.0%	0.0%		0%	000	10.000	00'-1 0	1.000	0 0-00	0.100	, 	0.010)	0.001	3%
#100	0.150	43%	43%	100.0%	0.0%													
#140	0.106		29%	100.0%	0.0%				Po	rticle Size	(mm)							
#170	0.090		24%	100.0%	0.0%													
#200	0.075	19.5%	19.5%	100.0%	0.0%	+ Sie	eve Sizes		— Max Spe	ecs	_	— Min	Specs	_	 s	Sieve Resu	lts	
	t Spears Engineering & Tec																	
All results apply only to	actual locations and materials	s tested. As a mutual prote	ection to clients, the public	and ourselves, all reports are s	submitted as the confide	ntial property of clients, and a	uthorization for	publication	of statemen	ts, conclus	ions or ext	racts from	n or regard	ing our re	ports is res	erved pen	ding our writ	tten approv

Reviewed by: _ Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C Lower Duwamish Waterway Project #: 21B233 Sampled By: Client Silty Sand Client: Anchor QEA Source: LDW21-GT35-GB-30-31.5 ft Sample #: B21-2020 Source: LDW21-GT35-GB-30-31.5 ft Sample #: B21-2020 Source: LDW21-GT35-GB-30-31.5 ft Sample #: B21-2020 Source: LDW21-GT35-GB-30-31.5 ft Sample #: B21-2020 Visual Identification Silty Sand Sample Glor brown Sample #: B21-2020								eation
		Liquid Li	nit Determinat	ion				
		#1	#2	#3	#4	#5	#6	
	Weight of Wet Soils + Pan:							
	Weight of Dry Soils + Pan:	Liquid 1	imit cannot be esta	ablished				
	Weight of Pan:							Liquid Limit @ 25 Blows: N/A
	Weight of Dry Soils: Weight of Moisture:							Liquid Limit @ 25 Blows: N/A Plastic Limit: N/A
	% Moisture:							Plasticity Index, I _P : N/A
	Number of Blows:							
		Plastic Li	mit Determinat #2	ion #3	#4	#5	#6	
	Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Weight of Pan:	Plastic li	mit cannot be dete	ermined				
	Weight of Dry Soils: Weight of Moisture: % Moisture:							Certificate 8: 1366.01, 1366.02 & 1366.04
		Plas	ticity Chart					Liquid Limit
	70 %				Time	" Lipe		100% Elquid Ellinit
×e	50 %				or OH	_WA!LLIKILL		80%
Plasticity Index	40 %			ch				ann 60%
stici	30 %							30% 40% 40%
Pla	20 %	CLorOL		М	H or OH			30%
	10 %	ML or OL						20%
	0 %	20% 30% 40%	50% 60	0% 70%	80%	90% 1	00% 110%	10%
	U70 IU70		iquid Limit	570 10%	0070	5070 I	0070 11070	10 100
	Copyright Spears Engineering & Techr		-q					Number of Blows, "N"

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our

Liquid limit cannot be established as the material displays rapid dilation upon spreading into the cup. At lower moistures the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the material does not roll down to 1/8" threads before cracking or crumblind. Non-plastic.

Reviewed by: Meghan Blodgett-Carrillo

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Client:	Anchor QEA	Date:	October 25, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-2143-2162
Revised on:		Date sampled:	August 5, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor	-		Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			
	_				

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	
Date Received: July 29, 2021	Sampled by: Client
Date Tested: October 15, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2143	LDW21-GT48-GB-21.6-25 ft	234.6	512.3	437.5	74.8	202.9	36.9%
B21-2144	LDW21-GT48-GB-25-30 ft	221.6	1232.1	959.0	273.1	737.4	37.0%
B21-2145	LDW21-GT48-GB-30-35 ft	215.3	1034.5	826.3	208.2	611.0	34.1%
B21-2146	LDW21-GT48-GB-35-36.5 ft	235.3	1073.2	832.7	240.5	597.4	40.3%
B21-2147	LDW21-GT53-GB-0-1.5 ft	228.9	845.1	638.7	206.4	409.8	50.4%
B21-2148	LDW21-GT53-GB-0-5 ft	208.5	682.6	526.4	156.2	317.9	49.1%
B21-2149	LDW21-GT53-GB-5-6.5 ft	222.9	1006.1	801.8	204.3	578.9	35.3%
B21-2150	LDW21-GT53-GB-5-10 ft	229.4	762.5	595.5	167.0	366.1	45.6%
B21-2151	LDW21-GT53-GB-10-15 ft	221.1	1092.3	749.6	342.7	528.5	64.8%
B21-2152	LDW21-GT53-GB-15-20 ft	220.4	805.0	678.3	126.7	457.9	27.7%
B21-2153	LDW21-GT53-GB-20-23.5 ft	222.9	998.0	819.4	178.6	596.5	29.9%
B21-2154	LDW21-GT53-GB-23.5-25 ft	217.3	990.1	795.4	194.7	578.1	33.7%
B21-2155	LDW21-GT53-GB-25-28.6 ft	222.6	807.8	656.4	151.4	433.8	34.9%
B21-2156	LDW21-GT53-GB-28.6-30 ft	224.3	929.6	800.4	129.2	576.1	22.4%
B21-2157	LDW21-GT48-SPT-0-0.7 ft	268.9	742.1	658.8	83.3	389.9	21.4%
B21-2158	LDW21-GT48-SPT-0.7-1.5 ft	310.9	685.1	612.8	72.3	301.9	23.9%
B21-2159	LDW21-GT48-SPT-10-11.5 ft	319.8	870.6	717.8	152.8	398.0	38.4%
B21-2160	LDW21-GT48-SPT-15-16.5 ft	301.0	852.0	723.3	128.7	422.3	30.5%
B21-2161	LDW21-GT48-SPT-20-20.6 ft	302.0	675.6	567.7	107.9	265.7	40.6%
B21-2162	LDW21-GT48-SPT-20.6-21.5 ft	303.2	829.7	715.1	114.6	411.9	27.8%
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo



Moisture Content - ASTM D854

Client: Anchor QEA
<u></u>
Sampled by: Client
Tested by: A. Eifrig

Sample #	Location	Tare	Tare	Mass of Dry Soil	Pycno ID	•	Volume of Pycno	Water @ Tx		Pycno filled w/ water	Water, 0.1 *C	SpG of Soils	Factor	Corrected SpG
B21-2143	LDW21-GT48-GB-21.6-25 ft	420.68	495.04	74.4	TSA-010	180.3	499.5	0.99854	725.29	679.12		2.6377506		2.6386475
B21-2148	LDW21-GT53-GB-0-5 ft	413.74	512.57	98.8	TSA-011	190.3	499.5	0.99856	747.85	689.15		2.4627054		2.4635674
B21-2152	LDW21-GT53-GB-15-20 ft	379.63	483.20	103.6	TSA-017	187.9	499.4	0.99841	751.03	686.50	19.1	2.6531994		2.65373
B21-2155	LDW21-GT53-GB-25-28.6 ft	394.13	472.87	78.7	TSA-022	198.0	499.5	0.99856	743.69	696.72	18.3	2.478377	1.00035	2.4792444
														
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Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT48-GB-21.6-25 ft

Sample#: B21-2143

#20

#30

#40

#50

#60

#80

#100

#140

#170

#200

0.850

0.600

0.425

0.300

0.250

0.180

0.150

0.106

0.090

0.075

100%

87.7%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 15-Oct-21 Tested By: A. Eifrig Visual Identification Silt with Sand and Clay Sample Color:

brown

ACCREDITED
Certificate #: 1366.01

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281 D₍₅₎ = 0.001 mm

Specifications
No Space

Sample Meets Specs ? N/A

% Silt & Clay = 87.7%
Liquid Limit = n/a
Plasticity Index = n/a
Sand Equivalent = n/a
Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a

% Gravel = 0.0%

% Sand = 12.3%

Coeff. of Curvature, $C_C = 0.94$ Coeff. of Uniformity, $C_U = 14.64$ Fineness Modulus = 0.02 Plastic Limit = n/a

Moisture %, as sampled = 36.9% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

					D	D(90)	20/22
				AS	TM C136, AS		29/33
		Actual Cumulative	Interpolated Cumulative	AS	11WI C130, AS	1W D0913,	ASTN
Sieve	Size	Percent	Percent	Specs	Specs		
US	Metric	Passing	Passing	Max	Min		1
12.00"	300.00		100%	100.0%	0.0%	1	
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		
1.00"	25.00	100%	100%	100.0%	0.0%	2	
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	
5/8"	16.00		100%	100.0%	0.0%	96	
1/2"	12.50	100%	100%	100.0%	0.0%		
3/8"	9.50	100%	100%	100.0%	0.0%		
1/4"	6.30		100%	100.0%	0.0%		
#4	4.75	100%	100%	100.0%	0.0%		
#8	2.36		100%	100.0%	0.0%		
#10	2.00	100%	100%	100.0%	0.0%		
#16	1.18		100%	100.0%	0.0%		
		1			1	II	

100%

100%

100%

100%

99%

99%

99%

92%

90%

87.7%

100.0%

100.0%

100.0%

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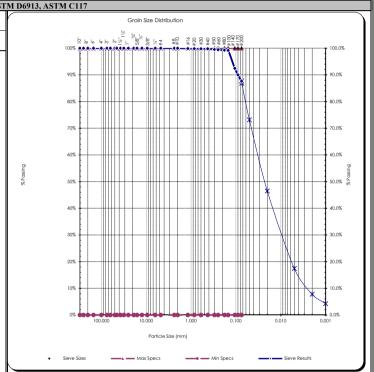
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Comments:

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Reviewed by:



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification **Project #:** 21B233 Silt with Sand and Clay Sampled By: Client Client: Anchor QEA Date Tested: 15-Oct-21 Sample Color Source: LDW21-GT48-GB-21.6-25 ft Tested By: A. Eifrig brown Sample#: B21-2143 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp. Gr Sieve Analysis 2.64 Sample Weight: 50.35 **Grain Size Distribution** Hydroscopic Moist .: 2.46% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 49.14 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 63.7% 0.0464 mm 31 1.0" 100% 2 27.5 56.5% $0.0338\ mm$ 3/4" 100% 19.000 mm 24 49.3% 0.0218 mm 5/8" 100% 16.000 mm 17.5 36.0% 0.0131 mm 1/2" 100% 12.500 mm 30 14 28.8% 0.0095 mm 3/8" 100% 9.500 mm 0.0068 mm 60 11.5 23.6% 1/4" 100% 6.300 mm 240 12.3% 0.0035 mm 100% 4.750 mm #4 6.2% 0.0015 mm #10 100% 2.000 mm 1440 #20 100% 0.850 mm 0.0% Liquid Limit: n/a % Gravel: #40 100% 0.425 mm % Sand: 12.3% Plastic Limit: n/a #100 99% 0.150 mm % Silt: 70.2% Plasticity Index: n/a #200 87.7% 0.075 mm 0.074 mm % Clay: 17.5% Silts 86.8% 0.050 mm 73.1% 0.020 mm 46.5% 17.5% 0.005 mm Clays 7.8% $0.002 \ mm$ Colloids 4.2% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:**

Reviewed by:



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Sampled By: Client Silt with Sand and Clay **Project #:** 21B233 Client: Anchor QEA Date Tested: 15-Oct-21 Sample Color Source: LDW21-GT48-GB-21.6-25 ft Tested By: A. Eifrig Sample #: B21-2143 **Liquid Limit Determination** Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Unable to establish liquid limit Weight of Pan: Liquid Limit @ 25 Blows: Weight of Dry Soils: Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: N/A N/A Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Cannot determined plastic limit Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 100% 60 % 90% 50 % Plasticity Index 40 % 60% 30 % 50% 20 % 10 % 20% 110% 100% 10% Liquid Limit 10 100

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Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures, the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Sampled By: Client Silt with Sand and Clay **Project #:** 21B233 Client: Anchor QEA Date Tested: 15-Oct-21 Sample Color Source: LDW21-GT48-GB-25-30 ft Tested By: A. Eifrig Sample #: B21-2144 **Liquid Limit Determination** Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Unable to establish liquid limit Weight of Pan: Liquid Limit @ 25 Blows: Weight of Dry Soils: Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: N/A N/A Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Cannot determined plastic limit Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 100% 60 % 90% 50 % Plasticity Index 40 % 60% 30 % 50% 20 % 10 % 20% 110% 100% 10% Liquid Limit 10 100

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Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures, the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Silt with Clay Client: Anchor QEA, LLC Date Tested: 18-Oct-21 Sample Color Source: LDW21-GT48-GB-30-35 ft Tested By: C. Kirk-Patterson brown Sample #: B21-2145 **Liquid Limit Determination** Weight of Wet Soils + Pan: 29.11 30.59 34.12 Weight of Dry Soils + Pan: 25.96 26.90 30.59 Weight of Pan: 15.19 14.77 19.81 Liquid Limit @ 25 Blows: Weight of Dry Soils: 10.78 30 % 10.77 12.13 Weight of Moisture: 3.15 3.69 3.53 Plastic Limit: 24 % % Moisture: 29.3 % 32.8 % Plasticity Index, I_P: 30.4 % Number of Blows: **Plastic Limit Determination** Weight of Wet Soils + Pan: 34.58 35.80 Weight of Dry Soils + Pan: 33.37 34.35 Weight of Pan: 28.28 28.60 Weight of Dry Soils: 5.75 5.09 Weight of Moisture: 1.21 1.45 % Moisture: 23.8 % 25.2 % **Plasticity Chart** Liquid Limit 35% 60 % 30% CH or OH 50 % 25% Plasticity Index Moisture 30 % CLorOL 20 % MH or OH 10% 10 % 5% CL-ML ML or OL 30% 20% 100% 100 **Liquid Limit**

All results apply only to actual locations and mat reports is reserved pending our written approval.

Reviewed by:

Comments:

Meghan Blodgett-Carrillo

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C. - Lower Duwamish Waterway Visual Identification Date Received: 29-Jul-21 Sampled By: Client Silt with Clay **Project #:** 21B233 Client: Anchor QEA Date Tested: 15-Oct-21 Sample Color Source: LDW21-GT53-GB-0-5 ft Tested By: A. Eifrig Sample #: B21-2148 **Liquid Limit Determination** Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Unable to establish liquid limit Weight of Pan: Liquid Limit @ 25 Blows: Weight of Dry Soils: Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: N/A N/A Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Cannot determined plastic limit Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Plasticity Chart Liquid Limit** 100% 60 % 90% 50 % Plasticity Index 40 % 60% 30 % 50% 20 % 10 % 20% 110% 100% 10% Liquid Limit 10 100

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Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures, the material does not spread into the liquid limit device without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT53-GB-5-10 ft Sample#: B21-2150

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 15-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{c} \textbf{AS IM D43I} \\ D_{(5)} = 0.005 \\ D_{(10)} = 0.028 \\ D_{(15)} = 0.056 \\ D_{(30)} = 0.081 \\ D_{(50)} = 0.113 \\ D_{(60)} = 0.129 \\ D_{(90)} = 0.335 \\ P_{(90)} = 10/37 \end{array}$ mm % Gravel = 0.0% % Sand = 73.4% mm % Silt & Clay = 26.6% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.81$ Coeff. of Uniformity, $C_U = 4.67$ Fineness Modulus = 0.43

Plastic Limit = n/a Moisture %, as sampled = 45.6% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					Di	ast Ratio = 10	0/37			%, 2+ F						e %, 2+	
				AS	TM C136, AST	TM D6913, A	STM C117										
			Interpolated						Grain	Size Distrib	ution						
		Cumulative	Cumulative			1											
Sieve		Percent	Percent	Specs	Specs		b in	in in in i	7. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	90 :* 4	8º 2º 8	8 8 8	88888	28			
US	Metric	Passing	Passing	Max	Min	1	100%		•••••	And a		* * * *	* * * * *	4			T 100.0%
12.00"	300.00		100%	100.0%	0.0%							Πì					- 1
10.00"	250.00		100%	100.0%	0.0%							1					1
8.00"	200.00		100%	100.0%	0.0%		90%		+++-		1-1					###	90.0%
6.00"	150.00		100%	100.0%	0.0%		ł l					i					1
4.00"	100.00		100%	100.0%	0.0%		80%						1				80.0%
3.00"	75.00		100%	100.0%	0.0%		00%										00.0%
2.50"	63.00		100%	100.0%	0.0%								1				1
2.00"	50.00	100%	100%	100.0%	0.0%		70%						4				70.0%
1.75"	45.00		100%	100.0%	0.0%												1
1.50"	37.50		100%	100.0%	0.0%		t l						- 1				1
1.25"	31.50		100%	100.0%	0.0%		60%		++-+-		+-+		+			++++	60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	0	H						1 1				- P
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%										50.0% be
5/8"	16.00		100%	100.0%	0.0%	86	30%										30.0% %
1/2"	12.50	100%	100%	100.0%	0.0%								i				1
3/8"	9.50	100%	100%	100.0%	0.0%		40%										40.0%
1/4"	6.30		100%	100.0%	0.0%												1
#4	4.75	100%	100%	100.0%	0.0%												1
#8	2.36		100%	100.0%	0.0%		30%		+++-					1		-	30.0%
#10	2.00	100%	100%	100.0%	0.0%		H							*			1
#16	1.18		99%	100.0%	0.0%		20%							IN I I I			20.0%
#20	0.850		99%	100.0%	0.0%		20%							X .			20.0%
#30	0.600		99%	100.0%	0.0%									*			1
#40	0.425	98%	98%	100.0%	0.0%		10%						-	$\square \setminus$	$\downarrow \parallel$		10.0%
#50	0.300		87%	100.0%	0.0%		ļ.								\downarrow	441	1
#60	0.250		82%	100.0%	0.0%		ļ									11 7	\leftarrow
#80	0.180		76%	100.0%	0.0%		0%	100.000	000000	0.000	1.00	 0 0 0	0.10	10 10	0.010	11111	0.0%
#100	0.150	73%	73%	100.0%	0.0%			.00.000				-	0.10	-	5.010		2.001
#140	0.106		46%	100.0%	0.0%					Particle Si	ze (mm)						
#170	0.090		36%	100.0%	0.0%												
#200	0.075	26.6%	26.6%	100.0%	0.0%	.	 Sieve Sizes 	_	Mo	ax Specs	_	• — мі	n Specs	-		sieve Results	
		hnical Services PS, 1996-9	ll .			$\overline{}$											
				and ourselves, all reports are	submitted as the confide	ntial property of clien	nts, and authorizati	on for publi	ation of stat	ements, conc	lusions or e	xtracts fro	m or regar	rding our re	eports is res	erved pendi	ng our written app

Reviewed by: _



Hydrometer Report

-	-	Duwamish Wa	iterway Date Recei			assification Sys	stem, ASTM-2487
Project #: 1	21B233		Sampled	By: Client	SM, Silty Sand		
Client :	Anchor QEA		Date Tes	sted: 15-Oct-21	Sample Color		
Source:	LDW21-GT5	3-GB-5-10 ft	Tested	By: A. Eifrig	brown		
Sample#:	B21-2150						
A	STM D7928	, HYDROM	ETER ANALYSI	S		ASTM	D6913
Assumed Sp. Gr	2.65						analysis
Sample Weight:	100.03	grams				Grain Size	Distribution
Hydroscopic Moist.:	2.23%	C		AR BA	Sieve	Percent	Soils Particle
Adj. Sample Wgt :	97.85	grams		ACCREDITED	Size	Passing	Diameter
raji sampie i ge i	37.05	Branns		Certificate #: 1366.01	3.0"	100%	75.000 mm
Hydrometer					2.0"	100%	50.000 mm
Reading	Corrected	Percent	Soils Particle		1.5"	100%	37.500 mm
Minutes	Reading	Passing	Diameter		1.25"	100%	31.500 mm
1	12	12.3%	0.0516 mm		1.0"	100%	25.000 mm
2	11.5	11.8%	0.0368 mm		3/4"	100%	19.000 mm
5	9	9.2%	0.0235 mm		5/8"	100%	16.000 mm
15	8	8.2%	0.0137 mm		1/2"	100%	12.500 mm
30	7	7.2%	0.0097 mm		3/8"	100%	9.500 mm
60	6.5	6.6%	0.0069 mm		1/4"	100%	6.300 mm
240	3	3.1%	0.0035 mm		#4	100%	4.750 mm
1440	2	2.0%	0.0014 mm		#10	100%	2.000 mm
					#20	99%	0.850 mm
% Gravel:	0.0%	I	Liquid Limit: n/a		#40	98%	0.425 mm
% Sand:	73.4%	1	Plastic Limit: n/a		#100	73%	0.150 mm
% Silt:	22.0%	Pla	sticity Index: n/a		#200	26.6%	0.075 mm
% Clay:	4.6%				Silts	26.0%	0.074 mm
						14.3%	0.050 mm
						8.8%	0.020 mm
					Clays	4.6%	0.005 mm
						2.3%	0.002 mm
					Colloids	1.4%	0.001 mm
	USDA S	oil Textural (Classification		1		
		Particle Size					
% Sand:		2.0 - 0.05 mm					
% Silt:		0.05 - 0.002 mr	n				
% Clay:		< 0.002 mm					
	LICD A C	.9.7.	C1				
	USDA S	Loamy Sand	Classification				
		Loamy Sand					
All results apply only to actual locatio	ns and materials tested.	. As a mutual protection t	to clients, the public and ourselves.	all reports are submitted as the cor	nfidential property of clients.	and authorization for public	ation of statements, conclusions or extracts from or
regarding our reports is reserved pend				1	117	1	
Comments:							
Comments:							
	, ,	abget and b	<i>'</i>				
	Worth His	reget andlo					
Reviewed by:	1	1					

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-2150
Sample Date:	8/5/2021
Test Date:	10/18/2021
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT53-GB-5-10 ft

 Visual Soil Description:
 brown silty sand with gravel

 Type of Specimen:
 Remolded Cylindrical Shear Box

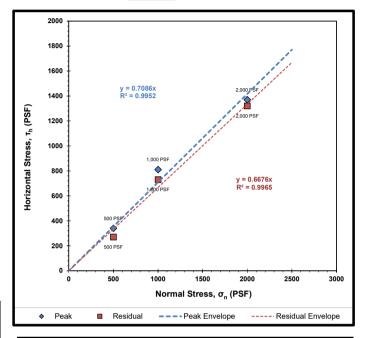
 Specimen Diameter (in):
 2.5

Summary of Samp	le Data:	σ _n =500 PSF
Initial Moisture Content (%):	30.0	
	Initial	Post-Consolidation
Dry Density (PCF):	109.7	110.6
Void Ratio:	0.536	0.523
Porosity (%):	34.9	34.3
Degree of Saturation (%):	saturated	saturated

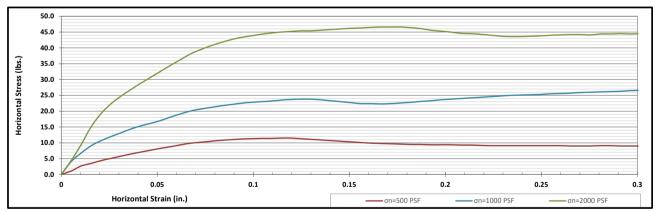
Summary of Sample	le Data:	σ _n =1000 PSF
Initial Moisture Content (%):	29.9	
	Initial	Post-Consolidation
Dry Density (PCF):	110.2	112.7
Void Ratio:	0.529	0.495
Porosity (%):	34.6	33.1
Degree of Saturation (%):	saturated	saturated

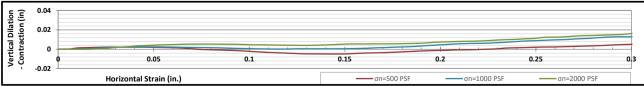
Summary of Sample	e Data:	σ _n =2000 PSF
Initial Moisture Content (%):	29.3	
	Initial	Post-Consolidation
Dry Density (PCF):	110.5	114.2
Void Ratio:	0.524	0.475
Porosity (%):	34.4	32.2
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS									
	PEAK	RESIDUAL							
Angle of Internal Friction, φ (°):	35	34							
Cohesion (PSF):	0	0							



Failure Envelope Test	Values:		
Normal Stress, σ _n (PSF):	500	1000	2000
Peak Horizontal Stress, τ _h (PSF):	340	810	1370
Residual Horizontal Stress, τ _h (PSF):	270	730	1320





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT53-GB-10-15 ft

Sample#: B21-2151

#140

#170

#200

0.106

0.090

0.075

17.1%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 15-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASTM D43} \\ \textbf{D}_{(5)} = 0.022 \\ \textbf{D}_{(10)} = 0.044 \\ \textbf{D}_{(15)} = 0.066 \\ \textbf{D}_{(30)} = 0.118 \\ \textbf{D}_{(50)} = 0.199 \\ \textbf{D}_{(60)} = 0.246 \\ \textbf{D}_{(90)} = 0.735 \end{array}$ mm mm % Silt & Clay = 17.1% mm mm Liquid Limit = n/a mm Plasticity Index = n/a

mm Sand Equivalent = n/a mm Fracture % 1 Face = n/a Coeff. of Curvature, $C_C = 1.30$ Coeff. of Uniformity, $C_U = 5.62$ Fineness Modulus = 1.23

Plastic Limit = n/a Moisture %, as sampled = 64.8% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.735$	m	m		Fractu				
						ust Ratio = 13/61			Fr	acture	%, 2+	- Face	es = r	ı/a
				AS	TM C136, AST	FM D6913, ASTN	M C11	7						
		Actual	Interpolated							Grain S	Size Dis	tribution	n	
		_	Cumulative	_	_	4			Ę	· .				
Sieve		Percent	Percent	Specs	Specs		ġ	90 go g4 g	2 is a	- %%. - %.%.	8 : 4	∞2	8 5	83
US	Metric	Passing	Passing	Max	Min	-	100%			•	åin i	1	*	*
12.00"	300.00		100%	100.0%	0.0%		ł					—•• •		
10.00"	250.00		100%	100.0%	0.0%		90%							
8.00"	200.00		100%	100.0%	0.0%		70%		M		TTTT			1
6.00"	150.00		100%	100.0%	0.0%									١
4.00"	100.00		100%	100.0%	0.0%		80%		Ш.		ШЩ.	$\bot \! \! \bot \! \! \! \bot$		Ш
3.00"	75.00		100%	100.0%	0.0%									
2.50"	63.00		100%	100.0%	0.0%		ŀ							
2.00"	50.00	100%	100%	100.0%	0.0%		70%	-	+++	+	₩₩	+++		₩
1.75"	45.00		100%	100.0%	0.0%		-							
1.50"	37.50		100%	100.0%	0.0%		60%							
1.25"	31.50		100%	100.0%	0.0%		60%		.TTT		m			Ш
1.00"	25.00	100%	100%	100.0%	0.0%	in in in in in in in in in in in in in i	- 1							
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%		Ш.		ШЩ.	$\bot \! \! \bot \! \! \! \bot$		Щ
5/8"	16.00		100%	100.0%	0.0%		1							
1/2"	12.50	100%	100%	100.0%	0.0%		ŀ							
3/8"	9.50	98%	98%	100.0%	0.0%		40%	-		-	₩₩	+++		Н
1/4"	6.30		97%	100.0%	0.0%		-							
#4	4.75	97%	97%	100.0%	0.0%									
#8	2.36		96%	100.0%	0.0%		30%		.###		m	HH	- 11	Ш
#10	2.00	96%	96%	100.0%	0.0%		- 1							
#16	1.18		94%	100.0%	0.0%		20%		Ш.		ЩЩ.	444	Щ	Ш
#20	0.850	94%	94%	100.0%	0.0%									
#30	0.600		86%	100.0%	0.0%		ł							
#40	0.425	80%	80%	100.0%	0.0%		10%	-				+++		₩
#50	0.300		66%	100.0%	0.0%		F							
#60	0.250	61%	61%	100.0%	0.0%].		JJLL	J. L	UIUL		_ []	Ш
#80	0.180		46%	100.0%	0.0%		0%	100.00	00	10	.000		1.000	•
#100	0.150	40%	40%	100.0%	0.0%									

100.0%

100.0%

100.0%

26%

22%

17.1%



% Gravel = 3.1% % Sand = 79.8%

0.0%

0.0%

0.0%

Comments: Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT53-GB-15-20 ft

Sample#: B21-2152

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 15-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.055 \\ \textbf{D}_{(10)} = 0.087 \\ \textbf{D}_{(15)} = 0.106 \\ \textbf{D}_{(30)} = 0.158 \\ \textbf{D}_{(50)} = 0.203 \\ \textbf{D}_{(60)} = 0.226 \\ \textbf{D}_{(90)} = 0.376 \\ \textbf{Betia} = 2.442 \end{array}$ mm % Gravel = 0.1% % Sand = 93.2% mm % Silt & Clay = 6.8% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.27$ Coeff. of Uniformity, $C_U = 2.59$ Fineness Modulus = 0.98

Plastic Limit = n/a Moisture %, as sampled = 27.7% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face =

		Actual	Interpolated							Grain Siz	to Distrib	ution								
		Cumulative	Cumulative									Ulion								
Sieve		Percent	Percent	Specs	Specs		b:		<u>.</u>	5/8/7	: 4	80 9 19 19	288	2 8 8 8 2	8988					
US	Metric	Passing	Passing	Max	Min	_	100%	\$18-\$ 0		- 0 5	s ≥ ≟ Horio	** *	* Andrews	1 1 1 1 1 1 1 1 1 1						T 100
2.00"	300.00		100%	100.0%	0.0%								1						:	1
0.00"	250.00		100%	100.0%	0.0%		1												:	1
8.00"	200.00		100%	100.0%	0.0%		90%	+-+		-	-	-		1		+++	+-+	++++		90.0
6.00"	150.00		100%	100.0%	0.0%		ł							1					1	
4.00"	100.00		100%	100.0%	0.0%		0007							1						80.0
3.00"	75.00		100%	100.0%	0.0%		80%													80.0
2.50"	63.00	1	100%	100.0%	0.0%									11					1	1
2.00"	50.00	100%	100%	100.0%	0.0%		70%	1				<u> </u>	4444	1		Ш.	44			70.0
1.75"	45.00		100%	100.0%	0.0%														:	1
1.50"	37.50		100%	100.0%	0.0%															1
1.25"	31.50		100%	100.0%	0.0%		60%	-		-			₩₩			╫╫	+-+	++++	-	60.0
1.00"	25.00	100%	100%	100.0%	0.0%	<u>p</u>	-													1
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing														50.0
5/8"	16.00		100%	100.0%	0.0%	96	50%						mm							50.0
1/2"	12.50	100%	100%	100.0%	0.0%		- 1													1
3/8"	9.50	100%	100%	100.0%	0.0%		40%	1		_			₩₩			Ш.	44	4444		40.0
1/4"	6.30		100%	100.0%	0.0%		1												:	1
#4	4.75	100%	100%	100.0%	0.0%															1
#8	2.36		100%	100.0%	0.0%		30%	+	+++++	+-+		\vdash	₩₩	+++	₩	+++	+-+	++++	+-	30.0
#10	2.00	100%	100%	100.0%	0.0%		-								1					1
#16	1.18		100%	100.0%	0.0%										1 111					<u>.</u>
#20	0.850	99%	99%	100.0%	0.0%		20%						\mathbb{I}		1	m				20.0
#30	0.600		98%	100.0%	0.0%										1					1
#40	0.425	97%	97%	100.0%	0.0%		10%	1		_				444		!!!!!	44	4444		10.0
#50	0.300		78%	100.0%	0.0%		1													1
#60	0.250	71%	71%	100.0%	0.0%		1													1
#80	0.180		40%	100.0%	0.0%		0%	100.00		10.0	ЩЬ.	-	.000	- 60-6	0.100	1111	0.010	11111	0.0	0.09
#100	0.150	26%	26%	100.0%	0.0%			100.00	JU	10.0	00	1.3	.000		0.100		0.010	,	0.0	JUI
#140	0.106		15%	100.0%	0.0%						Particle Si	ze (mm)								
#170	0.090		11%	100.0%	0.0%															
#200	0.075	6.8%	6.8%	100.0%	0.0%		Sieve Sizes			— Max	Specs	_	_	- Min Sp	ecs	_		iieve Resu	ults	

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT53-GB-20-23.5 ft

Sample#: B21-2153

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 15-Oct-21

Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color:

brown



30.0%

ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Cases

No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.060 \\ D_{(10)} = 0.091 \\ D_{(15)} = 0.112 \\ D_{(30)} = 0.166 \\ D_{(50)} = 0.217 \\ \end{array}$ mm % Gravel = 0.6%% Sand = 93.2% mm % Silt & Clay = 6.2% mm mm Liquid Limit = n/a Plasticity Index = n/a $D_{(60)} = 0.243$ mm

Sand Equivalent = n/a

Coeff. of Curvature, $C_C = 1.24$ Coeff. of Uniformity, $C_U = 2.67$ Fineness Modulus = 1.20

Plastic Limit = n/a Moisture %, as sampled = 29.9% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.522$	mr	n I	racture %, !	1 Face = n/a]
					D	Oust Ratio = 7/99		Fra	cture %, 2+	Faces = n/a	Re
				AS	STM C136, AS	TM D6913, ASTM	C117	1			
		Actual	Interpolated						Grain Size Distr	ribution	
Sieve	G.	-	Cumulative	C	C			54			
		Percent	Percent	Specs	Specs Min		j g		3/8/2	## # # 9 149 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	888888
US 12.00"	Metric 300.00	Passing	Passing 100%	Max 100.0%	0.0%	- '	00%	*·*-*·		-**	** ***
10.00"	250.00		100%	100.0%	0.0%					N	
8.00"	200.00		100%	100.0%	0.0%		90%				
6.00"	150.00		100%	100.0%	0.0%						
4.00"	100.00		100%	100.0%	0.0%		ŀ			.	
3.00"	75.00		100%	100.0%	0.0%		80%				
2.50"	63.00		100%	100.0%	0.0%		F			.	
2.00"	50.00	100%	100%	100.0%	0.0%		70%				
1.75"	45.00	10070	100%	100.0%	0.0%		/U% F				
1.50"	37.50		100%	100.0%	0.0%		- 1				M IIII
1.25"	31.50		100%	100.0%	0.0%		60%				
1.00"	25.00	100%	100%	100.0%	0.0%	o o					\
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	ŀ				
5/8"	16.00	10070	100%	100.0%	0.0%	₽6 —	50%				
1/2"	12.50	100%	100%	100.0%	0.0%		ŀ			.	
3/8"	9.50	100%	100%	100.0%	0.0%		40%				
1/4"	6.30	10070	100%	100.0%	0.0%		40% F				
#4	4.75	99%	99%	100.0%	0.0%		F				i
#8	2.36	,,,,	99%	100.0%	0.0%		30%				++++++
#10	2.00	99%	99%	100.0%	0.0%		- 1				
#16	1.18		97%	100.0%	0.0%		-				1 1 111
#20	0.850	96%	96%	100.0%	0.0%		20%				
#30	0.600		92%	100.0%	0.0%		-				l l
#40	0.425	88%	88%	100.0%	0.0%		10%				<u> </u>
#50	0.300		70%	100.0%	0.0%		-				N.
#60	0.250	63%	63%	100.0%	0.0%		- 1			.	
#80	0.180		36%	100.0%	0.0%		0%	100,000	10.000	1.000	0.100
#100	0.150	24%	24%	100.0%	0.0%			100.000	10.000	1.000	0.100
#140	0.106		14%	100.0%	0.0%				Particle	Size (mm)	
#170	0.000	1	100/	100.00/	0.00/	II					

Comments:

#170

#200

Reviewed by:

Meghan Blodgett-Carrillo

6.2%

10%

6.2%

100.0%

100.0%

0.0%

0.0%

0.090

0.075



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

#170

#200

0.090

0.075

48.9%

Meghan Blodgett-Carrillo

Source: LDW21-GT53-GB-23.5-25 ft Sample#: B21-2154

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 15-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{c} D_{(5)} = 0.008 \\ D_{(10)} = 0.015 \\ D_{(15)} = 0.023 \\ D_{(30)} = 0.046 \\ D_{(50)} = 0.077 \\ \end{array}$ mm % Gravel = 0.0% % Sand = 51.1% mm % Silt & Clay = 48.9% mm mm Liquid Limit = n/a mm Plasticity Index = n/a $D_{(60)} = 0.098$ $D_{(60)} = 0.186$ mm

Sand Equivalent = n/a

Coeff. of Curvature, $C_C = 1.41$ Coeff. of Uniformity, $C_U = 6.38$ Fineness Modulus = 0.17

Plastic Limit = n/a Moisture %, as sampled = 33.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.186$	mm	Frac	cture %, 1 I	Face = n/a		
					D	oust Ratio = 39/79		Fractu	re %, 2+ Fa	aces = n/a		F
				AS	STM C136, AS	TM D6913, ASTM	I C117					
		Actual	Interpolated Cumulative					Gre	ain Size Distribu	ution		
Cian	e Size	Percent	Percent	Emana	Engag	-		ķ				
US	Metric	Passing	Passing	Specs Max	Specs Min		je jo	2 3 3 4 6 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5	3/8 7	82 2 2 8	8 8 8 8	39 R
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6.00"	150.00		100%	100.0%	0.0%		1				1	. II
4.00"	100.00		100%	100.0%	0.0%		H					ĺ
3.00"	75.00		100%	100.0%	0.0%		80%				+++-	₩
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1.50"	37.50		100%	100.0%	0.0%							
1.25"	31.50		100%	100.0%	0.0%		60%					-1
1.00"	25.00	100%	100%	100.0%	0.0%	o o						ļ
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing						ı
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3/8"	9.50	100%	100%	100.0%	0.0%		40%					
1/4"	6.30	10070	100%	100.0%	0.0%		40%					
#4	4.75	100%	100%	100.0%	0.0%		- []					
#8	2.36	10070	100%	100.0%	0.0%		30%					
#10	2.00	100%	100%	100.0%	0.0%							
#16	1.18	10070	100%	100.0%	0.0%							
#20	0.850	100%	100%	100.0%	0.0%		20%				111	-tt
#30	0.600	10070	99%	100.0%	0.0%							
#40	0.425	99%	99%	100.0%	0.0%		10%					
#50	0.300		98%	100.0%	0.0%							
#60	0.250	98%	98%	100.0%	0.0%		ł l					
#80	0.180		89%	100.0%	0.0%		0%	100.000	10.000	1.000	0-00-00	0.100
#100	0.150	85%	85%	100.0%	0.0%			100.000	10.000	1.000		0.100
#140	0.106	****	64%	100.0%	0.0%				Particle Size	e (mm)		
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100.0%

0.0%

0.0%

Comments: Reviewed by:

56%

48.9%



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT53-GB-25-28.6 ft

Sample#: B21-2155

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 15-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.003 \\ \textbf{D}_{(10)} = 0.008 \\ \textbf{D}_{(15)} = 0.013 \\ \textbf{D}_{(30)} = 0.049 \\ \textbf{D}_{(50)} = 0.093 \\ \textbf{D}_{(60)} = 0.116 \\ \textbf{D}_{(90)} = 0.316 \\ \textbf{Partice} = 11/26 \end{array}$ mm % Gravel = 0.0% % Sand = 57.7% mm % Silt & Clay = 42.3% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a mm

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 2.78$ Coeff. of Uniformity, $C_U = 15.33$ Fineness Modulus = 0.37 Plastic Limit = n/a

Moisture %, as sampled = 34.9% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

					D	$D_{(90)} = 0.310$ ust Ratio = 11/26	111111	Fracture 9					d Fractur	e %, 2+	
				AS		TM D6913, ASTM C	117							, =	
		1	Interpolated Cumulative		Í				ze Distribut	ion					
Sieve US	Size Metric	Percent Passing	Percent Passing	Specs Max	Specs Min		5 6 6 5	15.17. 1.27. 1.27. 5.08.77.	5 1 ± ± ±	2 2 2 2	# # 49 # # 89 # # 89	## ## 84 58			
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6.00"	150.00		100%	100.0%	0.0%						1				
4.00"	100.00		100%	100.0%	0.0%		ł III				1				1
3.00"	75.00		100%	100.0%	0.0%	80%	++				₩.				80.0%
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#20	0.850		100%	100.0%	0.0%										1
#30	0.600		100%	100.0%	0.0%										
#40	0.425	100%	100%	100.0%	0.0%	10%	+				####			NU	10.0%
#50	0.300		89%	100.0%	0.0%									1111	
#60	0.250		84%	100.0%	0.0%	0%					Ш				0.0%
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#100	0.150	75%	75%	100.0%	0.0%										
#140	0.106		56%	100.0%	0.0%				Particle Size	(mm)					
#170	0.090		49%	100.0%	0.0%										
#200	0.075	42.3%	42.3%	100.0%	0.0%	+ Sieve	Sizes	— Max	Specs	-	- Min Spe	ecs		Sieve Results	
Copyright	Spears Engineering & Tec	hnical Services PS, 1996-9	98												

Comments: Reviewed by: _



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soil Classification System, ASTM-2487 **Project #:** 21B233 Sampled By: Client SM, Silty Sand Client: Anchor QEA Date Tested: 15-Oct-21 Sample Color Source: LDW21-GT53-GB-25-28.6 ft Tested By: A. Eifrig brown Sample#: B21-2155 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp. Gr Sieve Analysis 2.48 Sample Weight: 75.36 **Grain Size Distribution** Hydroscopic Moist .: 0.35% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 75.10 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle 1.5" Reading Corrected Percent 100% 37.500 mm Minutes 1.25" 100% 31.500 mm Reading Passing Diameter 25.000 mm 0.0519 mm 22 30.8% 1.0" 100% 2 19 26.6% $0.0374\ mm$ 3/4" 100% 19.000 mm 17 23.8% 0.0239 mm 5/8" 100% 16.000 mm 16.8% 0.0142 mm 1/2" 100% 12.500 mm 30 12.6% 0.0102 mm 3/8" 100% 9.500 mm 0.0073 mm 60 9.8% 1/4" 100% 6.300 mm 240 5.6% 0.0037 mm 100% 4.750 mm #4 2.8% 0.0015 mm #10 100% 2.000 mm 1440 100% 0.850 mm #20 Liquid Limit: n/a % Gravel: 0.0% #40 100% 0.425 mm % Sand: 57.7% Plastic Limit: n/a #100 75% 0.150 mm % Silt: 35.2% Plasticity Index: n/a #200 42.3% 0.075 mm 0.074 mm % Clay: 7.1% Silts 41.8% 29.2% 0.050 mm 0.020 mm 20.9% 0.005 mm Clays 7.1% 3.4% $0.002 \ mm$ Colloids 1.8% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm 0.05 - 0.002 mm % Silt: < 0.002 mm % Clay: **USDA Soil Textural Classification** Sandy Loam All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval. **Comments:** Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT53-GB-28.6-30 ft

Sample#: B21-2156

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 15-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SP-SM, Poorly graded Sand with Silt

Sample Color: grayish-brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Space

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{c} \textbf{AS IM D43I} \\ D_{(5)} = 0.055 \\ D_{(10)} = 0.088 \\ D_{(15)} = 0.109 \\ D_{(30)} = 0.160 \\ D_{(50)} = 0.197 \\ D_{(60)} = 0.216 \\ D_{(90)} = 0.348 \\ Pario = 2/29 \end{array}$ mm % Gravel = 0.0% % Sand = 93.2% mm % Silt & Clay = 6.8% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a Coeff. of Curvature, $C_C = 1.34$ Coeff. of Uniformity, $C_U = 2.44$

Fineness Modulus = 0.92 Plastic Limit = n/a Moisture %, as sampled = 22.4% Req'd Sand Equivalent =
Req'd Fracture %, 1 Face =

requiracture 70, 11 acc -
Req'd Fracture %, 2+ Faces =

					D	ust Ratio =	2/29		Fracti	ıre %, 2+	Faces	= n/a		Re	q'd Fra	acture	%, 2+	Faces =	=
				AS	TM C136, AS	ΓM D6913,	ASTM C11	7											
			Interpolated						Gr	ain Size Dist	ribution								
			Cumulative		1	1													
Sieve		Percent	Percent	Specs	Specs		ь	9 4 4 9 9	2 8	3/8"	eo⊆ :	2882	8 8 8 8 8	3458					
US	Metric	Passing	Passing	Max	Min	1	100%			****		404	* * * * * *	-	птт		пт	T 100	0.0%
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#4	4.75	100%	100%	100.0%	0.0%		ŀ											1 1	
#8	2.36		100%	100.0%	0.0%		30%						++-+				╫╫	30.	.0%
#10	2.00	100%	100%	100.0%	0.0%		F											1 1	
#16	1.18		100%	100.0%	0.0%													1	
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#30	0.600	10070	99%	100.0%	0.0%		t							1					
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#140	0.106	2370	14%	100.0%	0.0%					Particle	e Size (mm)								
#170	0.090		10%	100.0%	0.0%														
#200	0.075	6.8%	6.8%	100.0%	0.0%		+ Sieve Size			Max Specs			- Min Sper	cs		cio	ive Resul	ts.	
	,			100.070	0.070		+ 3/0 vd 3/26	•		- max specs			- wiii spei			316	NESUI	-	
	Spears Engineering & Tecl			and ourselves, all reports are	cubmitted as the s64-	ntial property -f -	liante and authi-	tion for mul	digation -f	etatamente -	nalusior-	or avtra-t	r from e	rogardir -	OUR PAR	ete ie rac	and par-	ing our n-in	ton on-

Comments: Reviewed by:



Client:	Anchor QEA	Date:	October 25, 2021
Address:	21328 2nd Drive SE	Project:	Q.C Lower Duwamish Waterway
	Bothell, WA 98021	Project #:	21B233
Attn:	Garrett Timm	Sample #:	B21-2164-2174
Revised on:		Date sampled:	8-3-21 & 8-5-21

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	Please See Attached Reports		Sulfate Soundness	
	Proctor	-		Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	Please See Attached Report	X	Direct Shear	Please See Attached Reports
	Specific Gravity, Coarse		X	Specific Gravity, Soils	Please See Attached Reports
	Specific Gravity, Fine				
X	Hydrometer Analysis	Please See Attached Reports			
X	Atterberg Limits	Please See Attached Reports			
	_				

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted, Meghan Blodgett-Carrillo

WABO Supervising Laboratory Technician



Moisture Content - ASTM C566, ASTM D2216

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	-
Date Received: July 29, 2021	Sampled by: Client
Date Tested: October 18, 2021	Tested by: A. Eifrig

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B21-2164	LDW21-GT48-SPT-25-26.5 ft	233.1	1048.4	832.6	215.8	599.5	36.0%
B21-2165	LDW21-GT48-SPT-30-31.5 ft	182.3	1308.3	1004.2	304.1	821.9	37.0%
B21-2166	LDW21-GT53-SPT-10-11.5 ft	260.3	653.6	537.2	116.4	276.9	42.0%
B21-2167	LDW21-GT53-SPT-15-16.5 ft	270.1	1295.8	1089.8	206.0	819.7	25.1%
B21-2168	LDW21-GT53-SPT-20-21.5 ft	266.3	1049.6	853.9	195.7	587.6	33.3%
B21-2169	LDW21-GT53-SPT-25-26.5 ft	360.2	1271.6	1074.8	196.8	714.6	27.5%
B21-2170	LDW21-GT41-GH-0-1.3 ft	359.4	527.4	488.8	38.6	129.4	29.8%
B21-2171	LDW21-GT41-GH-1.3-2 ft	354.2	2105.6	1668.8	436.8	1314.6	33.2%
B21-2172	LWD21-GT42-GH-0-0.3 ft	341.5	409.5	366.7	42.8	25.2	169.8%
B21-2173	LWD21-GT42-GH-0.3-1.5 ft	356.9	581.1	525.1	56.0	168.2	33.3%
B21-2174	LWD21-GT42-GH-1.5-2.3 ft	224.0	439.0	407.7	31.3	183.7	17.0%
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is

Reviewed by:



Specific Gravity - ASTM D854

Project: Q.C Lower Duwamish Waterway	Client: Anchor QEA
Project #: 21B233	<u></u>
Date Received: July 29, 2021	Sampled by: Client
Date Tested: October 18, 2021	Tested by: A. Eifrig

1	I	I	1	I]			ſ	Mass of	l	i i	1		1 1
									Pycno filled	Mass of	Temp. of		Temp.	1
				Mass of Dry		Mass of	Volume of	Density of	w/ water &					Corrected
Sample #	Location	Tare	Tare	Soil	Pycno ID	Pycno	Pycno	Water @ Tx	soils	w/ water	*C	Soils	Factor	SpG
B21-2170	LDW21-GT41-GH-0-1.3 ft	416.85	491.39	74.5	TSA-020	195.0	499.5	0.99850	738.69	693.77	18.5	2.516483	1.00030	2.5172379
B21-2174	LDW21-GT42-GH-1.5-2.3 ft	415.34	491.53	76.2	TSA-015	187.6	499.5	0.99835	733.52	686.28	19.4	2.632154	1.00014	2.6325225
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Meghan Blodgett-Carrillo



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT41-GH-0-1.3 ft

Sample#: B21-2170

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 18-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.008 \\ \textbf{D}_{(10)} = 0.022 \\ \textbf{D}_{(15)} = 0.068 \\ \textbf{D}_{(30)} = 0.152 \\ \textbf{D}_{(50)} = 0.264 \\ \textbf{D}_{(60)} = 0.320 \\ \textbf{D}_{(90)} = 1.271 \\ \textbf{Partice} = 1/5 \end{array}$ mm % Gravel = 0.0% % Sand = 84.3% mm % Silt & Clay = 15.7% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

mm Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 3.31$ Coeff. of Uniformity, $C_U = 14.63$ Fineness Modulus = 1.44 Plastic Limit = n/a Moisture %, as sampled = 29.8% Req'd Sand Equivalent =

Req'd Fracture %, 1 Face =

					D	ust Ratio = 1/	5		Fractu	re %, 2+	Faces =	n/a		Req	'd Frac	ture %	, 2+ Fa	ces =
				AS	STM C136, AS	TM D6913, AS	ΓM C11	7										
			Interpolated						Gr	ain Size Distr	ibution							
		Cumulative	Cumulative															
Sieve		Percent	Percent	Specs	Specs		ь		, <u>2</u> ;	3/8"	80 9 19 19	889	8888	288				
US	Metric	Passing	Passing	Max	Min		100%	**************************************		or er ≥ ≠	** *	# # # # # #	****		г-тт			T 100.0%
12.00"	300.00		100%	100.0%	0.0%		-				1 N 1							1
10.00"	250.00		100%	100.0%	0.0%		- 1				111							1
8.00"	200.00		100%	100.0%	0.0%		90%	1			+++	HHH	++-	*****				90.0%
6.00"	150.00		100%	100.0%	0.0%		ŀ											1
4.00"	100.00		100%	100.0%	0.0%		80%					N.						80.0%
3.00"	75.00		100%	100.0%	0.0%		00%					ll i						00.0%
2.50"	63.00		100%	100.0%	0.0%		F					1						1
2.00"	50.00	100%	100%	100.0%	0.0%		70%	+-+	HHHH		+		╂		 			70.0%
1.75"	45.00		100%	100.0%	0.0%		- [1
1.50"	37.50		100%	100.0%	0.0%		- 1											1
1.25"	31.50		100%	100.0%	0.0%		60%	-					\vdash	₩				60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	D _E	ŀ						1					2
3/4"	19.00	100%	100%	100.0%	0.0%	% Possing	50%						1					50.0% lg
5/8"	16.00		100%	100.0%	0.0%	96	^{30%} F						ļ	mm				30.0% %
1/2"	12.50	100%	100%	100.0%	0.0%								1					1
3/8"	9.50	100%	100%	100.0%	0.0%		40%						1		<u> </u>			40.0%
1/4"	6.30		100%	100.0%	0.0%		-											1
#4	4.75	100%	100%	100.0%	0.0%		- 1						I					1
#8	2.36		100%	100.0%	0.0%		30%					-				-11111		30.0%
#10	2.00	100%	100%	100.0%	0.0%		ŀ						\					1
#16	1.18		89%	100.0%	0.0%		20%						1					20.0%
#20	0.850		84%	100.0%	0.0%		20% T											20.0%
#30	0.600		81%	100.0%	0.0%		- 1							*				1
#40	0.425	79%	79%	100.0%	0.0%		10%				+		₩.	###₽	*	-###		10.0%
#50	0.300		56%	100.0%	0.0%											\mathbb{H}		1
#60	0.250		48%	100.0%	0.0%		- 1										1	1
#80	0.180		35%	100.0%	0.0%		0%	100.00		10.000		ĕ'ĕ' 00	40 '80 1	100		0.010	11.	0.0%
#100	0.150	30%	30%	100.0%	0.0%			. 50.00	-		1.0		0.					
#140	0.106		21%	100.0%	0.0%					Particle	Size (mm)							
#170	0.090		19%	100.0%	0.0%													
#200	0.075	15.7%	15.7%	100.0%	0.0%	+	Sieve Size	s		Max Specs	_	 -	Min Specs			Sieve	Results	
Copyright	Spears Engineering & Tec	hnical Services PS, 1996-9	8															
l results apply only to a	ctual locations and material	ls tested. As a mutual prote	ction to clients, the public	and ourselves, all reports are	submitted as the confide	ential property of clients,	and authoriz	ation for pu	blication of	statements, co	nclusions or	extracts f	rom or reg	garding o	ur reports	is reserved	l pending o	ur written appro

Comments: Reviewed by: _



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Unified Soil Classification System, ASTM-2487 Project #: 21B233 Sampled By: Client SM, Silty Sand Client: Anchor QEA Date Tested: 18-Oct-21 Sample Color Source: LDW21-GT41-GH-0-1.3 ft Tested By: A. Eifrig brown Sample#: B21-2170 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Sp Gr: 2.52 Sieve Analysis Sample Weight: 100.37 **Grain Size Distribution** Hydroscopic Moist .: 0.83% Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 99.54 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle Reading Percent 1.5" 100% 37.500 mm Corrected Minutes 1.25" 100% 31.500 mm Reading Diameter Passing 13.4% 0.0539 mm 1.0" 100% 25.000 mm 13 11.5 11.9% 0.0385 mm 3/4" 100% 19.000 mm 10.5 10.8% 0.0245 mm 5/8" 100% 16.000 mm 0.0144 mm 15 7.7% 1/2" 100% 12.500 mm 30 6.7% 0.0102 mm 3/8" 100% 9.500 mm 6.5 0.0073 mm 60 4.6% 1/4" 100% 6.300 mm 240 2.6% 0.0037 mm 100% 4.750 mm 2.5 #4 2.000 mm 0.0015 mm #10 100% 1440 1.0% 84% 0.850 mm #20 0.0% Liquid Limit: n/a % Gravel: #40 79% 0.425 mm % Sand: 84.3% Plastic Limit: n/a #100 30% 0.150 mm % Silt: 12.4% Plasticity Index: n/a #200 15.7% 0.075 mm 0.074 mm % Clay: 3.3% Silts 15.6% 12.7% 0.050 mm 0.020 mm 9.4% 3.3% 0.005 mm Clays 1.4% 0.002 mm Colloids 0.7% 0.001 mm **USDA Soil Textural Classification** Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm **USDA Soil Textural Classification** All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or **Comments:**

Reviewed by:

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-2170
Sample Date:	8/3/2021
Test Date:	10/18/2021
Technician:	M. Carrillo

Sample Source: LDW21-GT41-GH-0-1.3 ft

Visual Soil Description: brown sand with silt and gravel

Type of Specimen: Remolded Cylindrical Shear Box

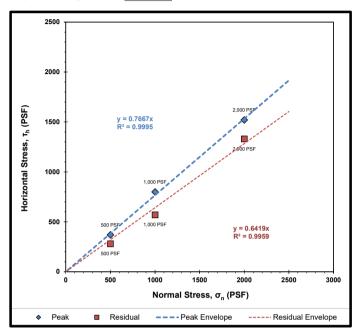
Specimen Diameter (in): 2.5

Summary of Sample	e Data:	σ _n =500 PSF
Initial Moisture Content (%):	28.1	
	Initial	Post-Consolidation
Dry Density (PCF):	109.2	111.5
Void Ratio:	0.543	0.510
Porosity (%):	35.2	33.8
Degree of Saturation (%):	saturated	saturated

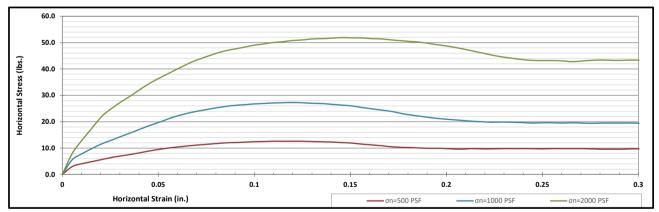
Summary of Sample	Data:	σ _n =1000 PSF
Initial Moisture Content (%):	27.3	
	Initial	Post-Consolidation
Dry Density (PCF):	110.2	115.1
Void Ratio:	0.529	0.464
Porosity (%):	34.6	31.7
Degree of Saturation (%):	saturated	saturated

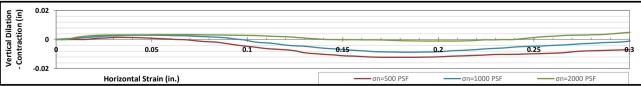
Summary of Samp	le Data:	σ _n =2000 PSF			
Initial Moisture Content (%):	28.4				
	Initial	Post-Consolidation			
Dry Density (PCF):	109.1	119.9			
Void Ratio:	0.545	0.405			
Porosity (%):	35.3	28.8			
Degree of Saturation (%):	saturated	saturated			

ESTIMATED STRI	ENGTH PARA	METERS
	PEAK	RESIDUAL
Angle of Internal Friction, φ (°):	37	33
Cohesion (PSF):	0	0



Failure Envelope Test Values:								
Normal Stress, σ_n (PSF): 500 1000 2								
Peak Horizontal Stress, τ _h (PSF):	370	800	1520					
Residual Horizontal Stress, τ _h (PSF):	280	570	1330					





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT41-GH-1.3-2.0 ft

Sample#: B21-2171

#140

#170

#200

Reviewed by:

0.106

0.090

0.075

17.1%

Meghan Blodgett-Carrillo

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 18-Oct-21

Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SM, Silty Sand Sample Color:

mm

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications

No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASTM D43} \\ \textbf{D}_{(5)} = 0.022 \\ \textbf{D}_{(10)} = 0.044 \\ \textbf{D}_{(15)} = 0.066 \\ \textbf{D}_{(30)} = 0.170 \\ \textbf{D}_{(50)} = 0.277 \\ \textbf{D}_{(60)} = 0.330 \\ \textbf{D}_{(90)} = 0.824 \end{array}$ mm % Gravel = 1.1% % Sand = 81.8% mm % Silt & Clay = 17.1% mm mm Liquid Limit = n/a mm Plasticity Index = n/a mm

Sand Equivalent = n/a Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 2.00$ Coeff. of Uniformity, $C_U = 7.51$ Fineness Modulus = 1.48

Plastic Limit = n/a Moisture %, as sampled = 33.2% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =

						$D_{(90)} = 0.824$	mm		racture %,		
						oust Ratio = 7/32		Frac	ture %, 2+	+ Faces	= n
				AS	STM C136, AS	TM D6913, ASTM	I C117				
		Actual	Interpolated					(Grain Size Dis	tribution	
61	~•	_	Cumulative	-	-						
	Size	Percent	Percent	Specs	Specs		6 of G	7 3 4 ± 1 2 3 ± 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	3/8, 2/4	. eoQ ;	8 2
US 12.00"	Metric 300.00	Passing	Passing 100%	Max 100.0%	Min 0.0%	4	100%			-	•
10.00"	250.00		100%	100.0%	0.0%						
8.00"	200.00		100%	100.0%	0.0%		90%				٠4
6.00"	150.00		100%	100.0%	0.0%		70,0				١
4.00"	100.00		100%	100.0%	0.0%		-				
3.00"	75.00		100%	100.0%	0.0%		80%				
2.50"	63.00		100%	100.0%	0.0%						
2.00"	50.00	100%	100%	100.0%	0.0%						
1.75"	45.00	10070	100%	100.0%	0.0%		70%				††
1.50"	37.50		100%	100.0%	0.0%						
1.25"	31.50		100%	100.0%	0.0%		60%				Ш
1.00"	25.00	100%	100%	100.0%	0.0%	0					
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing					
5/8"	16.00	10070	100%	100.0%	0.0%	P6 -	50%			+++-	₩
1/2"	12.50	100%	100%	100.0%	0.0%						
3/8"	9.50	100%	100%	100.0%	0.0%		40%				
1/4"	6.30	10070	99%	100.0%	0.0%		40,0				
#4	4.75	99%	99%	100.0%	0.0%		H				
#8	2.36		97%	100.0%	0.0%		30%			++-+-	₩
#10	2.00	97%	97%	100.0%	0.0%						
#16	1.18		92%	100.0%	0.0%						
#20	0.850	91%	91%	100.0%	0.0%		20%				\blacksquare
#30	0.600		83%	100.0%	0.0%						
#40	0.425	78%	78%	100.0%	0.0%		10%	_####	4	444	-44
#50	0.300		54%	100.0%	0.0%						
#60	0.250	45%	45%	100.0%	0.0%						
#80	0.180		32%	100.0%	0.0%		0%	00.000	10,000		.000
#100	0.150	26%	26%	100.0%	0.0%			00.000	10.000		.000
		1	1		1	II					

100.0%

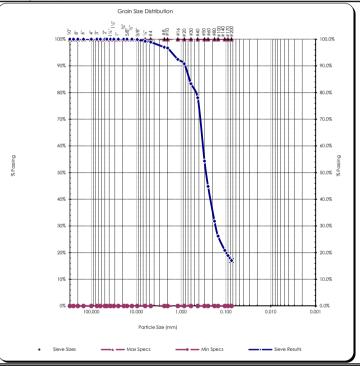
100.0%

100.0%

21%

19%

17.1%



Comments:			
	Manda Platest and Mo		

0.0%

0.0%

0.0%

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ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Sampled By: Client Silt with Organics **Project #:** 21B233 Date Tested: 18-Oct-21 Client: Anchor QEA Sample Color Source: LDW21-GT42-GH-0-0.3 ft Tested By: A. Eifrig Sample #: B21-2172 **Liquid Limit Determination** Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Unable to establish liquid limit Weight of Pan: Liquid Limit @ 25 Blows: Weight of Dry Soils: Plastic Limit: Plasticity Index, I_P: Weight of Moisture: % Moisture: N/A N/A Number of Blows: Weight of Wet Soils + Pan: Weight of Dry Soils + Pan: Cannot determined plastic limit Weight of Pan: Weight of Dry Soils: Weight of Moisture: % Moisture: **Liquid Limit Plasticity Chart** 0.7 100% 90% 0.6 0.5 Plasticity Index 60% 0.3 50% 0.2 0.1 20% 10% **Liquid Limit** 10 100

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Comments: Liquid limit cannot be established as the material displays rapid dilation. At lower moistures the material does not spread into the cup without tearing the soil cake. Plastic limit cannot be determined as the sample does not roll down to 1/8" threads before cracking or crumbling. Non-plastic.

Reviewed by:



Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT42-GH-0.3-1.5 ft Sample#: B21-2173

Date Received: 29-Jul-21 Sampled By: Client Date Tested: 18-Oct-21 Tested By: A. Eifrig

Visual Identification Sandy Silt with Clay Sample Color: brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

Meghan Blodgett-Carrillo

 $\begin{array}{l} \textbf{ASIM D431} \\ \textbf{D}_{(5)} = 0.000 \\ \textbf{D}_{(10)} = 0.001 \\ \textbf{D}_{(15)} = 0.002 \\ \textbf{D}_{(30)} = 0.005 \\ \textbf{D}_{(50)} = 0.017 \\ \textbf{D}_{(60)} = 0.037 \\ \textbf{D}_{(90)} = 1.643 \\ \textbf{Partice} = 39/50 \\ \end{array}$ mm % Gravel = 4.1% % Sand = 32.0% mm % Silt & Clay = 63.8% mm mm Liquid Limit = n/a mm Plasticity Index = n/a mm Sand Equivalent = n/a mm Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 0.79$ Coeff. of Uniformity, $C_U = 37.10$ Fineness Modulus = 0.92 Plastic Limit = n/a

Moisture %, as sampled = 33.3% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

						st Ratio = 39/50	Fracture %, 2+ Faces = n/a	Req'd Fracture %, 2+ Faces =
		Actual	Interpolated	AS	TM C136, AST	M D6913, ASTM C117		
		Cumulative				(Grain Size Distribution	
Sieve	Cino	Percent	Percent	Sugar	Encas		% :• :	
US	Metric	Passing		Specs Max	Specs Min		2,878 12.2 3.4 12.2 3.8 12.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2	######################################
12.00"	300.00	rassing	Passing 100%	100.0%	0.0%	100%	▘ ▘▘	100.0%
10.00"	250.00		100%	100.0%	0.0%			
						90%		90.0%
8.00"	200.00		100%	100.0%	0.0%	70%		70.0%
6.00"	150.00		100%	100.0%	0.0%	[]		
4.00"	100.00		100%	100.0%	0.0%	80%		80.0%
3.00"	75.00		100%	100.0%	0.0%			
2.50"	63.00	1000/	100%	100.0%	0.0%			N
2.00"	50.00	100%	100%	100.0%	0.0%	70%		70.0%
1.75"	45.00		100%	100.0%	0.0%	· ·		70,111 111111 1
1.50"	37.50		100%	100.0%	0.0%			
1.25"	31.50		100%	100.0%	0.0%	60%		60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	guis		
3/4"	19.00	100%	100%	100.0%	0.0%	50% 50%		50.0%
5/8"	16.00		100%	100.0%	0.0%	84		
1/2"	12.50	100%	100%	100.0%	0.0%			
3/8"	9.50	99%	99%	100.0%	0.0%	40%		40.0%
1/4"	6.30		97%	100.0%	0.0%	ļ		
#4	4.75	96%	96%	100.0%	0.0%			
#8	2.36		93%	100.0%	0.0%	30%		30.0%
#10	2.00	92%	92%	100.0%	0.0%	<u> </u>		
#16	1.18		87%	100.0%	0.0%	20%		20.0%
#20	0.850		85%	100.0%	0.0%	20%		20.0%
#30	0.600		83%	100.0%	0.0%			
#40	0.425	82%	82%	100.0%	0.0%	10%		10.0%
#50	0.300		78%	100.0%	0.0%			
#60	0.250		76%	100.0%	0.0%			
#80	0.180		74%	100.0%	0.0%	0%	100.000 10.000 1.000	0.100 0.010 0.001
#100	0.150	73%	73%	100.0%	0.0%		10.000 1.000	0.100 0.010 0.001
#140	0.106	,5,0	67%	100.0%	0.0%		Particle Size (mm)	
#170	0.090		66%	100.0%	0.0%			
#200	0.075	63.8%	63.8%	100.0%	0.0%	+ Sieve Sizes	— ▲ — Max Specs — ● — Min :	Specs Sieve Results
#200 Copyright		chnical Services PS, 1996-9		100.070	0.070			

Reviewed by: _



Hydrometer Report

Project: Q.C. - Lower Duwamish Waterway Date Received: 29-Jul-21 Visual Identification Project #: 21B233 Sampled By: Client Sandy Silt with Clay Client: Anchor QEA Date Tested: 18-Oct-21 Sample Color Source: LDW21-GT42-GH-0.3-1.5 ft Tested By: A. Eifrig brown Sample#: B21-2173 ASTM D7928, HYDROMETER ANALYSIS ASTM D6913 Assumed Sp Gr: 2.65 Sieve Analysis Sample Weight: 75.38 **Grain Size Distribution** 1.68% Hydroscopic Moist .: Soils Particle Sieve Percent ACCREDITED Adj. Sample Wgt: 74.13 Size Passing Diameter 3.0" 100% 75.000 mm 2.0" 100% 50.000 mm Hydrometer Soils Particle Reading Percent 1.5" 100% 37.500 mm Corrected Minutes Reading 1.25" 100% 31.500 mm Passing Diameter 0.0393 mm 49 61.1% 1.0" 100% 25.000 mm 45 56.1% 0.0288 mm 3/4" 100% 19.000 mm 42.5 53.0% 0.0187 mm 5/8" 100% 16.000 mm 15 34.5 43.0% 0.0115 mm 1/2" 100% 12.500 mm 30 30.5 38.0% 0.0084 mm 3/8" 99% 9.500 mm 97% 60 26 32.4% 0.0061 mm 1/4" 6.300 mm 240 22.4% 0.0032 mm 96% 4.750 mm 18 #4 2.000 mm 1440 13.7% #10 92% 0.0014 mm 11 0.850 mm 85% #20 Liquid Limit: n/a % Gravel: 4 1% #40 82% 0.425 mm % Sand: 32.0% Plastic Limit: n/a #100 73% 0.150 mm % Silt: 35.2% Plasticity Index: n/a #200 63.8% 0.075 mm 0.074 mm % Clay: 28.6% Silts 63.8% 62.3% 0.050 mm 0.020 mm 53.4% 0.005 mm Clays 28.6% 16.7% 0.002 mm Colloids 10.0% 0.001 mm **USDA Soil Textural Classification**

Particle Size % Sand: 2.0 - 0.05 mm % Silt: 0.05 - 0.002 mm % Clay: < 0.002 mm

USDA Soil Textural Classification

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or

Comments:		
	Magh Chilget and lo	
Reviewed by:	Meghan Blodgett-Carrillo	

Direct Shear Test Results:

ASTM D-3080



Project: Q.C. - Lower Duwamish Waterway

Project Number:	21B233
Laboratory Sample ID:	B21-2173
Sample Date:	8/3/2021
Test Date:	10-19-21 through 10-21-21
Technician:	M. Carrillo

 Sample Source:
 LDW21-GT42-GH-0.3-1.5 ft

 Visual Soil Description:
 brown clay with silt

 Type of Specimen:
 Remolded Cylindrical Shear Box

 Specimen Diameter (in):
 2.5

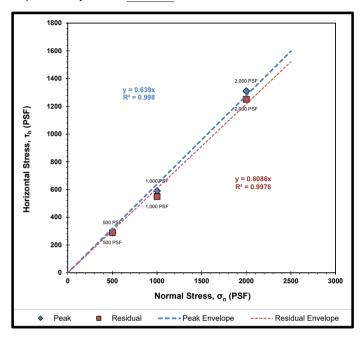
Specimen Height (in): 1
Rate of Strain (in/min): 0.0012
Estimated Specific Gravity of Solids: 2.65

Summary of Sampl	e Data:	σ _n =500 PSF			
Initial Moisture Content (%):	34.0				
	Initial	Post-Consolidation			
Dry Density (PCF):	102.5	106.8			
Void Ratio:	0.644	0.578			
Porosity (%):	39.2	36.6			
Degree of Saturation (%):	saturated	saturated			

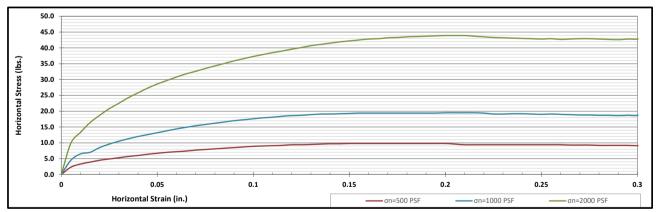
Summary of Sample	e Data:	σ _n =1000 PSF			
Initial Moisture Content (%):	31.5				
	Initial	Post-Consolidation			
Dry Density (PCF):	104.6	114.9			
Void Ratio:	0.611	0.467			
Porosity (%):	37.9	31.8			
Degree of Saturation (%):	saturated	saturated			

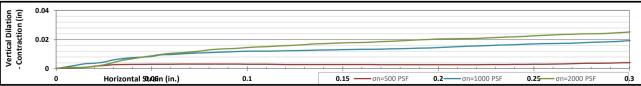
Summary of Sample	Data:	σ _n =2000 PSF
Initial Moisture Content (%):	28.9	
	Initial	Post-Consolidation
Dry Density (PCF):	107.0	120.1
Void Ratio:	0.574	0.403
Porosity (%):	36.5	28.7
Degree of Saturation (%):	saturated	saturated

ESTIMATED STRENGTH PARAMETERS								
	PEAK	RESIDUAL						
Angle of Internal Friction, φ (°):	33	31						
Cohesion (PSF):	0	0						



Failure Envelope Test Values:								
Normal Stress, σ _n (PSF):	500	1000	2000					
Peak Horizontal Stress, τ _h (PSF):	290	590	1310					
Residual Horizontal Stress, τ _h (PSF):	290	550	1250					





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Project: Q.C. - Lower Duwamish Waterway

Project #: 21B233 Client: Anchor QEA

Source: LDW21-GT42-GH-1.5-2.3 ft

Sample#: B21-2174

Date Received: 29-Jul-21 Sampled By: Client

Date Tested: 18-Oct-21 Tested By: A. Eifrig

Unified Soil Classification System, ASTM-2487

SP, Poorly graded Sand

mm

Sample Color:

brown



ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications No Specs

Sample Meets Specs? N/A

 $\begin{array}{l} \textbf{ASIM D43} \\ \textbf{D}_{(5)} = 0.079 \\ \textbf{D}_{(10)} = 0.130 \\ \textbf{D}_{(15)} = 0.167 \\ \textbf{D}_{(30)} = 0.251 \\ \textbf{D}_{(50)} = 0.334 \\ \textbf{D}_{(60)} = 0.376 \\ \textbf{D}_{(90)} = 0.733 \\ \textbf{Ratio} = 3447 \end{array}$ mm % Gravel = 0.0% % Sand = 95.4% mm % Silt & Clay = 4.6% mm mm Liquid Limit = n/a Plasticity Index = n/amm Sand Equivalent = n/a

Fracture %, 1 Face = n/a

Coeff. of Curvature, $C_C = 1.29$ Coeff. of Uniformity, $C_U = 2.90$ Fineness Modulus = 1.67

Plastic Limit = n/a Moisture %, as sampled = 17.0% Req'd Sand Equivalent = Req'd Fracture %, 1 Face =

						ıst Ratio =		Fracture %, 2+ I	aces = n/a	Req'd Fra	eture %, 2+	Faces =
				AS	TM C136, AST	M D6913, A	STM C117					
		Actual	Interpolated					Grain Size Distrib	oution			
		1	Cumulative		T			Ę.				
Sieve		Percent	Percent	Specs	Specs		D is is	3.5 17.1 17.1 17.1 17.1 14.4 14.4 14.4 14.4	2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3	8358		
US	Metric	Passing	Passing	Max	Min		100%	**********	4 4 4			100.0%
12.00"	300.00		100%	100.0%	0.0%							1
10.00"	250.00		100%	100.0%	0.0%		90%		N. I			90.0%
8.00"	200.00		100%	100.0%	0.0%		90%					90.0%
6.00"	150.00		100%	100.0%	0.0%				N			
4.00"	100.00		100%	100.0%	0.0%		80%					80.0%
3.00"	75.00		100%	100.0%	0.0%				 			
2.50"	63.00		100%	100.0%	0.0%				<u> </u>			
2.00"	50.00	100%	100%	100.0%	0.0%		70%					70.0%
1.75"	45.00		100%	100.0%	0.0%		F I					1
1.50"	37.50		100%	100.0%	0.0%							1
1.25"	31.50		100%	100.0%	0.0%		60%					60.0%
1.00"	25.00	100%	100%	100.0%	0.0%	guis						sing
3/4"	19.00	100%	100%	100.0%	0.0%	% Passing	50%					50.0% ₈₈
5/8"	16.00		100%	100.0%	0.0%	8<						1
1/2"	12.50	100%	100%	100.0%	0.0%		+ 1					<u> </u>
3/8"	9.50	100%	100%	100.0%	0.0%		40%		i			40.0%
1/4"	6.30		100%	100.0%	0.0%							1
#4	4.75	100%	100%	100.0%	0.0%							
#8	2.36		99%	100.0%	0.0%		30%		1			30.0%
#10	2.00	99%	99%	100.0%	0.0%							1
#16	1.18		98%	100.0%	0.0%		20%					20.0%
#20	0.850	97%	97%	100.0%	0.0%		20,0					1 20.0%
#30	0.600		82%	100.0%	0.0%					\		1
#40	0.425	72%	72%	100.0%	0.0%		10%			-		10.0%
#50	0.300		42%	100.0%	0.0%					***		
#60	0.250	30%	30%	100.0%	0.0%					I I I I I I I I I I I I I I I I I I I		
#80	0.180		17%	100.0%	0.0%		0%	0.000 10.000	1.000	0.100	0.010	0.0%
#100	0.150	12%	12%	100.0%	0.0%		100					
#140	0.106		8%	100.0%	0.0%			Particle S	ize (mm)			
#170	0.090		6%	100.0%	0.0%							
#200	0.075	4.6%	4.6%	100.0%	0.0%		+ Sieve Sizes	—_▲ — Max Specs	Min S	pecs	Sieve Results	
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Comments: Reviewed by: Meghan Blodgett-Carrillo