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Prepared for:
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c/o JHM Group of Companies
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TABLE OF CONTENTS

1.0	INTRODUCTION	. 1
	SITE AND PROJECT DESCRIPTION	
3.0	SUBSURFACE EXPLORATIONS	2
4.0	SUBSURFACE CONDITIONS	2
5.0	GEOTECHNICAL ENGINEERING RECOMMENDATIONS	3
6.0	CONSTRUCTION CONSIDERATIONS	5
	FUTURE SERVICES AND LIMITATIONS	

LIST OF ATTACHMENTS

Tables

1. Subsurface Data

Figures

- Site Location Map
 Subsurface Exploration Location Plan

Appendix

- A. Test Boring Logs
- B. Laboratory Test Results



1.0 INTRODUCTION

1.1 Summary

This report presents the results of subsurface explorations and our geotechnical design and construction recommendations for the proposed Marina Village Housing Complex Redevelopment located in Bridgeport, Connecticut.

The existing fill is not suitable for support of foundations and should be removed. Foundations should be designed as spread footings bearing on the naturally deposited sands or on compacted structural fill or crushed stone placed after removal of existing fill.

The slab-on-grade may be supported on a 12 inch thick layer of compacted structural fill. The existing fill may be left in place below floor slabs provided that intense proof-compaction of the subgrade, as discussed below, is completed prior to placement of the structural fill.

1.2 Scope of Work

Freeman Companies, LLC performed the following tasks:

- Engaged a drilling contractor to drill test borings and obtain soil samples.
- Observed the test borings.
- Arranged for laboratory testing of selected soil samples.
- Evaluated the subsurface conditions and prepared this report containing geotechnical design recommendations and construction considerations.

1.3 Authorization

Work was completed in accordance with our agreement dated April 14, 2015.

1.4 Elevation Datum

Survey information for the project site is not available at this time.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

The project site is bounded to north by Railroad Avenue, to the east by Park Avenue, to the south by Johnson Street and the west by Columbia Street., in Bridgeport, Connecticut as shown on Figure 1, Site Location Map. The existing Marina Village Housing Complex currently occupies the site. As of the date of this report, the structures in the project parcel, are generally uninhabited, with the exception of a few apartments. Demolition of the existing structures is scheduled to be completed by October 2015.

The site is generally level, with both paved and grassy areas. The site is shown on Figure 2, Subsurface Exploration Location Plan.



2.2 Project Description

The proposed redevelopment will include construction of eight new housing structures. We understand that some of the proposed structures will have a maximum of four stories with floor slabs located at the existing ground surface with no basements. Based on the master plan, this first phase will include 123 units and 164 parking spaces, as well as a grassy recreation area.

3.0 SUBSURFACE EXPLORATIONS

Ten test borings (B-1/MW-3 through B-10) were drilled by New England Boring Contractors, Inc. of Glastonbury, Connecticut on May 12 through 14, 2015. Borings were completed with hollow-stem augers to depths ranging from 8 feet to 20.7 feet below the existing ground surface and were terminated at the predetermined depths. Borings B-1/MW-3, B-4/MW-1, and B-9/MW-2 were finished as environmental monitoring wells. The remaining borings were backfilled with cuttings upon completion.

Boring locations were determined by taping from existing structures. A Freeman Companies environmental scientist monitored the drilling, classified the soil samples, and prepared the test boring logs included in Appendix A. Boring locations are shown on Figure 2, Subsurface Exploration Location Plan.

Four grain size distribution analyses and one constant head (fixed wall) permeability test were performed on soil samples recovered from the borings by Geotesting Express of Acton, Massachusetts. Results of laboratory testing are provided in Appendix B.

4.0 SUBSURFACE CONDITIONS

The borings encountered topsoil, asphalt, fill, and sand, as described below. Subsurface conditions are known only at the boring locations and may differ significantly between borings. See the attached Table 1 for boring specific subsurface data.

Topsoil/ Asphalt – Topsoil was described as light brown to brown silty SAND (SM). Up to 1.1 feet of topsoil was encountered in the borings conducted in grassy areas. Asphalt thickness ranged from 1 inch to 3 inches.

Fill – Fill was described as very loose to dense, dark brown to light brown, silty SAND with gravel (SM), varying to poorly graded sand with gravel (SP), asphalt, crushed brick, concrete, and other manmade material debris. Standard Penetration Test N-Values ranged from 2 to 47 blows per foot (bpf). The fill extended to depths below ground surface ranging from 0 feet (B-9) to greater than 9 feet (B-8). Environmental testing indicated that the fill is environmentally impacted. Please reference the report titled "Environmental Evaluations and Materials Management Report" prepared by Freeman Cos., dated May 2015 for discussion on environmental impacts.

Sand – Sand was encountered in each of the borings, and was described as loose to very dense, tan to brown, poorly graded sand with silt and gravel (SP) varying to silty sand with gravel (SM). Standard Penetration Test N-Values ranged from 6 to 69 blows per foot (bpf).



Silt – A silt layer was encountered in Borings B-1/MW-3, B-2 and B-3 at a depth of approximately 16.5 feet. The silt is described as light brown, sandy silt (ML). The thickness of this deposit was not determined.

Groundwater – Soil samples were wet at depths ranging from 6 to 11 feet below the existing ground surface. Groundwater was measured in the monitoring wells at a depth of 6.4 feet to 7.6 feet after four to five days. Laboratory testing also indicated that the groundwater is environmentally impacted.

Groundwater level measurements represent conditions at the time of the explorations and may not represent static conditions. Groundwater levels will fluctuate with season, precipitation, nearby construction activities, and other conditions.

5.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

5.1 Foundation Design

The existing fill is variable in consistency and density. Therefore, we recommend that the existing fill be removed below footings within the bearing zone which is defined by a 1 horizontal to 1 vertical (1H:1V) line sloped outward and downward from points located one foot outside the bottom exterior edge of the footing on all sides.

Foundations should be designed as spread footings bearing on the naturally deposited sand or on compacted structural fill or crushed stone wrapped in a geotextile separation fabric placed over the sand after removal of the unsuitable existing fill.

Footings should be designed for a maximum allowable bearing pressure of 4,000 pounds per square foot (psf). The allowable bearing pressure applies to footings having a minimum lateral dimension of at least 3 feet. For smaller footings, the recommended allowable bearing pressure should be reduced by the ratio of actual minimum footing size to 3 feet. At the recommended bearing pressure, total and differential settlements are anticipated to be less than 1 inch and ¾ inch, respectively. Most settlement will occur during construction as dead load is applied.

Exterior footings should bear a minimum of 3.5 feet below the lowest adjacent ground surface for frost protection. Footings at heated interior locations may be designed to bear 2 feet below the proposed top of floor slab, however, building shut downs and power failures should be considered.

5.2 Floor Slab Design

The final floor elevation is not known at this time, but it is anticipated that it will be at or near the existing grade as no basement space is planned. The floor slab may be designed as a slab-on-grade bearing on a minimum 12 inch thick layer of compacted structural fill.

Existing fill may remain in place beneath the floor slabs provided that intense proof compaction of the subgrade is completed prior to placement of the compacted structural fill. The subgrade should be compacted with a minimum of 10 passes of a 10 ton vibratory drum roller. Any subgrades that are soft or yielding during proof compaction should be removed and replaced with compacted structural fill.

5.3 Foundation Drainage



The floor slab will be at or near existing grade. Water levels in the monitoring wells indicate that groundwater is a minimum of 6 feet below grade. Existing grade should be below floor grade and slope away from the building. Therefore, underslab or foundation drainage will not be necessary.

5.4 Seismic Design

Soils at the site are classified as *Stiff Soil Profile* for earthquake design purposes, and are not susceptible to liquefaction. The corresponding site class is D. Design seismic coefficients are 0.270g for short period (S_s) and 0.064g for one second period (S_1), per the 2009 Amendment to the Connecticut State Building Code.

5.5 Infiltration

We understand that project stormwater disposal will include infiltration. The existing fill on-site is not suitable for infiltration and will require removal and replacement with compacted Structural Fill or Crushed Stone over a geotextile fabric. Infiltration should assume flow into Structural Fill and the sand. A laboratory fixed wall permeability was completed on a composite sample of the sands. The results indicate a permeability of 2.0 x 10-2 centimeters per second (cm/sec).

The proposed infiltration area will be located in the grassy recreation area in the middle of the site, south of the parking area. The thickness of existing fill was 8 feet to 9 feet in this area. Groundwater levels noted in the monitoring wells were approximately 6 feet to 7 feet below existing grade.

5.6 Backfill Materials

Structural Fill - Structural Fill should be used for fill within the building footprint. Structural Fill should consist of hard, durable sand and gravel, free of clay, organic matter, surface coatings, recycled materials, asphalt, and other deleterious materials, and meet the requirements of ConnDOT M.02.01, Granular Fill. The gradation should be M.02.06 grading A. Structural Fill shall be compacted in maximum 9-inch-thick, loose lifts to at least 95 percent of the maximum dry density determined in accordance with ASTM D1557.

Crushed Stone – Crushed Stone should consist of hard, durable, crushed or broken stone, free from recycled materials, asphalt, loam or clay. Crushed Stone should meet the gradation requirements of ConnDOT M.01.01, No. 6. Crushed stone should be placed in maximum 12-inch-thick loose lifts and compacted with at least 4 to 6 passes of a double-drum, walk-behind, vibratory compactor.

Common Fill – Common fill for general site filling outside the limits of structures should consist of mineral soil free from organic matter, recycled materials, asphalt, loam or clay, have a maximum particle size of 6 inches, and be capable of being placed and compacted. Common fill should be compacted in maximum 9-inch-thick, loose lifts to at least 92 percent of the maximum dry density determined in accordance with ASTM D1557.

Geotextile Fabric – Geotextile fabric should be a non-woven product similar to Mirafi 140N, or an approved equal product.



6.0 CONSTRUCTION CONSIDERATIONS

6.1 Subgrade Preparation

Foundation subgrade materials will consist of compacted structural fill placed after removal of unsuitable fill. Bearing surfaces should be free of standing water, frost, and loose soil before placement of reinforcing steel and concrete. It is recommended that Freeman Companies observe subgrade preparation activities.

6.2 Excavation and Dewatering

Excavation of up to 9 feet of unsuitable existing fill will be required beneath the building footings. Conventional heavy construction equipment should be suitable for excavation in existing soil materials. Excavation should conform to OSHA excavation regulations contained in 29 CFR Part 1926, latest edition. Subgrades should be excavated in such a way to minimize disturbance, such as using a smooth faced bucket.

Groundwater is expected to be encountered during over-excavation activities for foundation construction or during other deep excavations at the site. If dewatering quantities are excessive Crushed Stone could be used in lieu of Structural Fill. We anticipate that excavation dewatering may be accomplished by pumping from properly filtered sumps discharged according to federal, state, and local regulations. The site should be graded to direct runoff away from excavations.

Specifications should require the contractor to maintain groundwater one foot below the bottom of excavation at all times.

6.3 Temporary Lateral Support

Open cut excavations appear feasible for the majority of excavations, provided there is adequate space to slope the excavation. Temporary lateral support of excavations may be necessary where excavations extend below groundwater, for utility excavations, or where excavations are close to existing structures, roads, or utilities. Trench boxes, steel sheeting or soldier piles and lagging may be feasible. Excavations and excavation support should be designed and constructed in conformance all OSHA, State, and Federal Regulations.

6.4 Freezing Conditions

If construction is performed during freezing weather, special precautions will be required to prevent the subgrade from freezing. Freezing of soil beneath foundations and slabs during construction may result in settlement when the soil thaws.

Subgrades should be free of frost prior to placement of concrete for footings. Frost-susceptible soils that have frozen should be removed and replaced with compacted Structural Fill or geotextile fabric and Crushed Stone. The footing and the soil adjacent to the footing should be protected from freezing until they are backfilled.

Soils placed as fill should be free of frost, as should be the ground on which it is placed. Floor slabs should be heated or insulated during freezing weather to prevent freezing of the subgrade.

6.5 Backfilling and Compaction



Fill placed within the building limits should consist of Structural Fill or Crushed Stone wrapped in a geotextile fabric.

6.6 Use of On-Site Excavated Soils

The existing fill is not suitable for reuse as compacted Structural Fill but could be used as Common Fill provided that environmental requirements can be met. Please reference environmental report for direction on storage and disposal of the existing fill materials.

6.7 Site Disturbance

The existing fill will be sensitive to disturbance from construction equipment, due to the fines and debris content. Soils could easily become disturbed, and the ground surface could become excessively muddy and unstable due to traffic by heavy construction equipment, particularly during or immediately following periods of inclement weather. Project specifications should require that the Contractor maintain stable site conditions at all times.

7.0 FUTURE SERVICES AND LIMITATIONS

7.1 Future Engineering Services

Freeman Companies should be engaged during final design to:

- Review final design drawings and prepare an earthwork specification.
- Provide consultation to the design team on geotechnical issues on an as-needed basis.

Freeman Companies should be engaged during construction to:

- Review contractor submittals related to geotechnical issues.
- Provide construction monitoring to verify that soil conditions exposed in excavations are in general conformance with our design assumptions, to observe that the subgrades for the footings and floor slabs are prepared in the intended manner, and that fill materials are properly placed and compacted.

7.2 Limitations

This report was prepared for the exclusive use of Bridgeport Community Renewal Associates, LP, and the project design team. The recommendations provided herein are based on the project information provided at the time of this report and may require modification if there are any changes in the nature, design, or location of the facility.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, express or implied, is made.

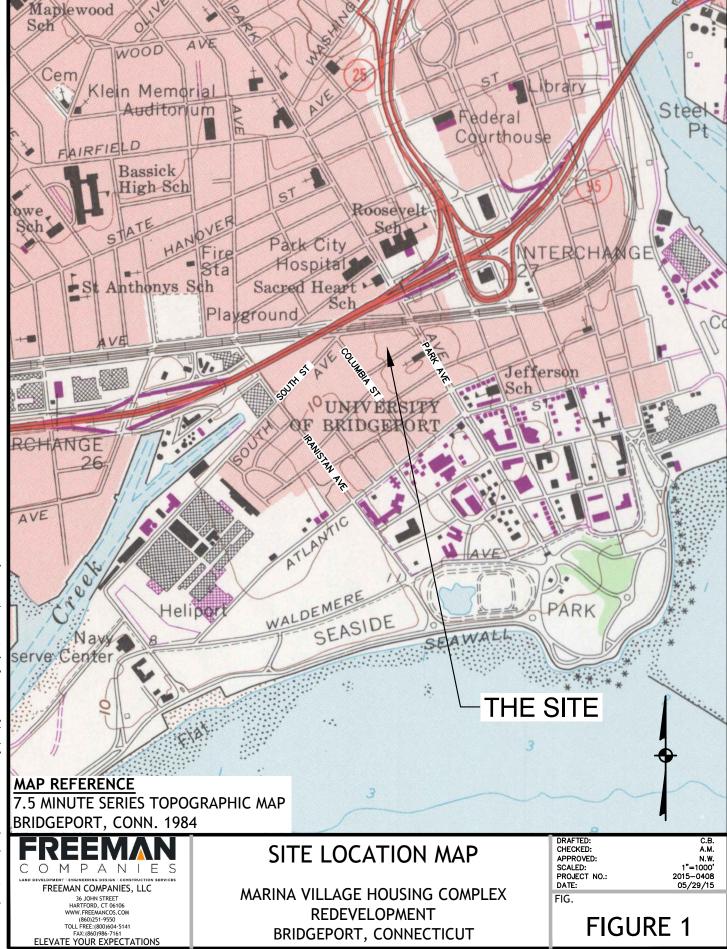
2015-0408 Marina Village Housing Complex Redevelopment Bridgeport, Connecticut

Table 1
Subsurface Data

		Pavement/				Groundwater
Boring No.	Depth (ft.)	Topsoil	Fill	Sand	Silt	Depth
B-1/MW	17	0.08	7	9	>1	6.4
B-2	17	0.8	3	13.3	>.7	8
B-3	17	0.2	5	11.4	>0.6	8
B-4/MW	17	0.08	4	>13		7.56
B-5	8	1.1	7.6	>8		6.5
B-6	10	0.2	8.5	>1.5		7
B-7	8	0.3	4.4	>3.6		6
B-8	12	0.5	10	>2		6.5
B-9/MW	17			>17		6.41
B-10	20.7		8.5	>12.2		11

Notes:

- 1. Groundwater levels are approximate, except in those borings designated as monitoring wells, and may not represent static groundwater levels.
- 2. "--" Not Encountered



ppanies, LLC . Y:\2015\2015-0408 — Marina Village\DWC\Figure 1 and 2.dwg May 28, 2015-2:08pm Plotted By: cbarzola



APPENDIX A

TEST BORING LOGS

VERTICAL DATUM:	IM:	TING: STAT	WATED GROUND SURFAC	OFFSET: DE ELEV. (FT):	EXPLORATION B-1/MW-3 PAGE 1 of 1
Drilling Information DATE START / END: CONTRACTOR: New EQUIPMENT: AUGER ID/OD: 4.25 HAMMER TYPE: Sat WATER LEVEL DEPTH GENERAL NOTES: ABBREVIATIONS: ID=	on 5/14/2015 - 5/14/ v England Boring in / N/A fety Hammer S (ft): ▼ 8.00 Inside Diameter	DRILLER:	Mike St. John D: N/A / N/A EIGHT (Ibs): 140 /2015 U = Undistrubed Tube S		= Pocket Torvane Shear Strength
Pen	Outside DiameterPenetration LengtRecovery Length		SC = Sonic Core		= Field Vane Shear Strength A, NM = Not Applicable, Not Measured
Elev. Depth (ft) (ft) Casing Pen. (bpf) or Core Rate (mpf)	SAMF Sample a Depti	Pen./ Rec. (in) Blows Count or RQD	Test Data ORAPHIC LOG	Sample Description & Classification	H ₂ 0 Depth WELL CONSTRUCTION DETAILS
-	S-1 0.25 to 2.25	24/6 3-2-7-	~100% gr (0.3'- 3') S coarse, ~' medium; b (3'- 7') SIL sand, fine ~15% fine	POORLY GRADED GRAVEL (GP); avel, coarse; dry, black, FILL. BILTY SAND (SM); ~75% sand, fine to 15% fines, ~10% gravel, fine to 0 orown, FILL, with crushed brick. TY SAND WITH GRAVEL (SM); ~50% to medium, ~35% gravel, coarse, s: brown. FILL, with crushed brick.	backfill cuttings 6" bentonite seal. 1/4 bag
- 5 - - - - - 10	S-3 8 to 10	24/20 9-12- 12-14	glass, blac	ck material (odor). OORLY GRADED SAND (SP); ~85% dium to coarse, ~10% gravel, fine, ~5%	▼ #2 sand for sand pack. 3 bags. 2" diamter PVC Screen, 0.010 slot size
- - - 15 -	S-4 V 15 to 17	24/18 5-8-14- 20	sand, fine	SANDY SILT (ML); ~60% fines, ~40% to medium; brown. Exploration at 17 feet	17' bottom depth of boring, backfill cuttings, PVC plug
- - 20 - - -					
Stratification lines represent boundary between soil types gradual. Water level reading at times and under condition Fluctuations of groundwater other factors than those pres measurements were made.	, transitions may be s have been made s stated. may occur due to			omplex Redeve	Freeman Companies, LL0 66 John Street Hartford, CT 06102 860) 251-9550 www.freemancos.com

E	Explo	ration	Loca	ation		EASTI	NG:		STATI	ON:	OFFSET:	Е	EXPLORATION
\ \	IORIZ /ERT	ZONTA ICAL D	L DAT	UM: 1:				STA	ATION CENT TIMATED GI	ROU	OFFSET: INE: ID SURFACE ELEV. (FT):		B-2 PAGE 1 of 1
	OCA Drilli	TION: ng Info	rmat				015				TOTAL DEPTH (FT): 17.0		1,402,1011
		RACTOR		ew Englar	nd E	Boring	[DRILLER:	Mike St. Jol	nn	LOGGED BY (Person): J. He EXPLORATION TYPE/METHOL		em Auger
Δ	UGE	R ID/OD	: N/A	A / N/A			(CASING IE	D/OD: N/A /	N/A	CORE INFO:		
				Safety Han				HAMMER	WEIGHT (lbs):		0 HAMMER DROP (inch): 30		
		RAL NO		= Inside D	iame	eter	bpf = E	Blows per Fo	oot U	= Undi	strubed Tube Sample WOH = Weight of Hammer		cket Torvane Shear Strength
			Pe	D = Outside en. = Penet ec. = Recov	ratio very	on Length Length	S = Sp DP = [Minute per F olit Spoon Direct Push	Sample W	OR = V	Core RQD = Rock Quality Desig ic Core PID = Photoionization Dete Veight of Rods Q _v = Pocket Penetrometer	ctor NA, NM	ld Vane Shear Strength = Not Applicable, Not Measured
			Casing Pen. (bpf)		П	SAMPL	E INFO	RMATIO	N) LOG	Sample		
	Elev. (ft)	Depth (ft)	or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Test Data	GRAPHIC LOG	Description & Classification		H ₂ 0 epth Remarks
				S-1	V	0 to	24/19	2-6-13- 6		1/ \	TOPSOIL		
15		- - - 5 - - - -		S-2	X X	4 to 6 8 to 10	24/23	2-1-1-3			(1'- 1.5') POORLY GRADED SAND WIT GRAVEL (SP); ~70% sand, fine to coars gravel, fine to coarse, ~5% fines; tan, FII asphalt pieces. (1.5'- 3') POORLY GRADED SAND WIT GRAVEL (SP); ~50% sand, fine to coarse gravel, fine to coarse, ~5% fines; brown, crushed concrete and asphalt. (3'- 4.9') SILTY SAND (SM); ~70% sand. coarse, ~30% fines; brown. (4.9'- 16.3') POORLY GRADED SAND (\$~95% sand, medium to coarse, ~5% fines	e, ~25% _L, H e, ~45% FILL, , fine to	<u>.</u>
FREEMAN COMPANIES PROJECT 2015-0408 - MARINA VILLAGE.GPJ GINT STD US LAB.GDT 5/29/15 ヨ空田亀の字の		- - - 15 - -		S-4	X	15 to 17	24/24	15-14- 16-18			(16.3'- 17') SILT (ML); ~80% fines, ~20% wet, light brown. Bottom of Exploration at 17 feet	s sand;	
NIES PROJECT 2015-0408 - MA		20 - - -											
SOMP.	oundar	y betweer	n soil typ	nt approximes, transitio	ns r	,		•			nan Companies, LLC		man Companies, LLC
J QH at	radual. t times	Water levand unde	el readii r condition	ngs have be ons stated. er may occu	een	made			: Marina Vi		Housing Complex Redeve	Hartf	ohn Street ford, CT 06102
FREE	ther fac		those pr	resent at the					ER : 2015-0		LAND DEVELOPMENT: ENGINEERING DESIGN	CONSTRUCTION SERVICES (800) 251-9550 .freemancos.com

E:	xplo ORT	oration	Loca	ation		EASTI	NG:		STATI	ON:	OFFSET:		EXPL	ORATION
H	ORIZ	ZONTA	L DAT	UM:				ST/	ATION CENT	ERL	OFFSET: INE: ND SURFACE ELEV. (FT):			B-3
L	OCA	ATION:		'					I IIWA I ED GI	100	VD SORFACE ELEV. (F1).		PAC	GE 1 of 1
D/ C(E(Al	ATE ONTI QUIP UGEI	RACTOR MENT: R ID/OD	/ END: R: _N	5/12/20 ew Englar A / N/A safety Han	nd E	Boring		CASING ID	_Mike St. Jol D/OD: _N/A / WEIGHT (lbs):	N/A	EXPLORATION TYPE/METHO CORE INFO:	erpich D: Hollow	Stem Au	uger
w	/ATE	R LEVE	L DEPT	HS (ft):				AWWILK	VEIOITI (IDS).		TIAMMEN DIOT (IIICII). 30			
-		RAL NO	S: ID OI Pe	= Inside D D = Outside en. = Penet ec. = Recov	e Dia ratio	ameter on Length	mpf = S = Sp	Blows per Fo Minute per Fo Dit Spoon Direct Push	Foot C :	= Rocl	strubed Tube Sample WOH = Weight of Hamme QD = Rock Quality Designic Core PID = Photoionization Det Weight of Rods Q _v = Pocket Penetrometer	gnation $F_v =$ ector NA,	Field Van	orvane Shear Strength e Shear Strength Applicable, Not Measured
			Casing Pen.			SAMPL	E INFO	RMATIO	N	90				
	lev. (ft)	Depth (ft)	(bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Test Data	GRAPHIC LOG	Sample Description & Classification		H ₂ 0 Depth	Remarks
		-		S-1	M M	0.2 to 2.2		8-8-5-9 2-4-3-4			ASPHALT (2 in.) (0.2'- 2.2') POORLY GRADED SAND W GRAVEL (SP); ~60% sand, medium to a concert, asphalt and brick pieces (fill). (2.2'- 5') SILTY SAND (SM); ~60% sand coarse, ~25% gravel, fine, ~15% fines; FILL, conrete, asphalt and brick pieces (fill).	coarse, FILL, I, fine to dry, tan,		
رې د		- 5 - - - - 10		S-3	\bigwedge	8 to 10	24/24	6-5-7-8			(5'- 12.5') POORLY GRADED SAND (S sand, coarse, ~5% fines; dry, tan, FILL.	P); ~95%	Ţ	
GPJ GINT STD US LAB.GDT 5/29/15		_ _ _ _ 15		S-4		15 to 17	24/24	22-24- 27-28			(12.5'- 16.4') POORLY GRADED SAND ~85% sand, medium to coarse, ~10% g fine, ~5% fines; wet, brown. (16.4'- 17') SILT (ML); ~60% fines, ~40%	ràvel,		
MARINA VILLAGE.		_ 20									wet, light brown. Bottom of Exploration at 17 feet			
FREEMAN COMPANIES PROJECT 2015-0408 - MARINA VILLAGE.GPJ GINT STD US LAB.GDT 录 유 과 학생 중 설		20 _ _ _												
FREEMAN COMP od at the pot oth oth me	oundar adual. times uctuati her fac	ry betweer Water lev and unde ions of gro	n soil typ vel readii r conditio oundwate those pr	nt approximes, transitions have been stated. er may occuresent at the	ns r een ur di	made	PROJEC CITY/ST	T NAME: ATE: Br		lage -	man Companies, LLC Housing Complex Redevel	NIES (8)	John artford, 60) 25	Companies, LLC Street CT 06102 1-9550 emancos.com

Explo NORT	oration THING: ZONTA	L DAT	ation		EASTII	NG:	STA	STA	TION:	OFFSET: INE: ND SURFACE ELEV. (FT):		EXPLORATION B-4/MW-1	
VERT	ICAL D ATION:	DATUN	1:				ES1	TIMATED (GROUI	ND SURFACE ELEV. (FT):		PAGE 1 of 1	—
Drillin DATE CONT EQUIF AUGE HAMM WATE GENE	ng Info START RACTOI PMENT: R ID/OD	PE: SL DEPT	5/13/2 ew Engla 25 in / N/A	nd E	er 8.00 5/	13/2015 bpf = 1	CASING ID	18/2015 oot	/ N/A s): <u>1</u> 4	EXPLORATION TYPE/METHO CORE INFO: HAMMER DROP (inch): 30 strubed Tube Sample WOH = Weight of Hamme	erpich D: Hollow rr S _v =	Stem Auger Pocket Torvane Shear Strengf Field Vane Shear Strength	gth
		Re	ec. = Reco	very		DP = I	olit Spoon Direct Push S	Sample	WOR = \	nic Core PID = Photoionization Det Weight of Rods Q_v = Pocket Penetrometer		NM = Not Applicable, Not Mea	asure
Elev. (ft)	Depth (ft)	Casing Pen. (bpf) or Core Rate (mpf)	Sample No.			Pen./ Rec. (in)	Blows Count or RQD	Test Data	GRAPHIC LOG	Sample Description & Classification		H ₂ 0 Depth DETAILS	
	-	(S-1	V	0.1 to	24/2	20-9- 10-4		₩ ₩	ASPHALT (1 in.) (0.1'- 0.4') POORLY GRADED GRAVEL		d dackf	
	_		S-2		2.1 2 to 4	24/9	4-2-3-3			~60% gravel, medium to coarse, ~40% fine; FILL. (0.4'- 2.1') POORLY GRADED GRAVEL SAND (GP); ~60% gravel, medium to co ~40% sand, fine; dry, black, FILL.	WITH parse,	6" bento seal. bag	nite
	_ 5 _		S-3		4 to 6	24/15	4-6-8- 12		X X X X X X X X X X X X X X X X X X X	(2.1'- 2.5') SILTY SAND (SM); ~60% sat ~40% fines; dry, tan, FILL. (2.5'- 4') POORLY GRADED SAND WIT AND GRAVEL (SM); ~70% sand, fine, ~ fines, ~10% gravel, coarse, angular; dry FILL, asphalt pieces. (4'- 9') POORLY GRADED SAND WITH GRAVEL (SP); ~90% sand, fine to coars	TH SILT -20% , brown,	▼# san for sa	and
	- - - 10		S-4	X	8 to 10	24/24	4-9-14- 43			gravel, fine; wet, tan. (9'- 12.5') SILTY SAND (SM); ~50% sar medium, ~40% fines, ~10% gravel, fine coarse; wet, light brown.	id, fine to	Pack 2" diamt PVC Scree 0.010 slot si	ter en,
Stratifica boundar gradual. at times Fluctuat other far measur	_ _ _ 15		S-5	X	15 to 17	24/14	18-13- 16-18			(12.5'- 17') SILTY SAND WITH GRAVE ~65% sand, medium to coarse, ~20% fil ~15% gravel, fine to coarse; wet, gray.		17' bottor depth boring backf	n of g,
	_ _ _			/ \						Bottom of Exploration at 17 feet		cuttin PVC plug	
	20 												
Stratifica boundar gradual at times Fluctuat other far measure	ry between . Water levand under ions of gro	n soil typ vel readii er conditio oundwate those pr	nt approxir es, transiti ngs have tons stated er may occresent at the	ons i been cur d	may be made made ue to	PROJEC	T NAME: ATE: Br		/illage CT	nan Companies, LLC Housing Complex Redevel	36 N I E S (86	eeman Companies, John Street Intford, CT 06102 60) 251-9550 ww.freemancos.com	

Expl	oration	1 Loc	ation	_								EXPL	ORATION
HORI	THING: ZONTA	L DA	ΓUM:	E#	ASTIN	NG:	ST	STATI ATION CEN	ON: FERL	OFFSET:	_		B-5
VER	FICAL D	DATUN	Λ:				ES	TIMATED G	ROUI	ND SURFACE ELEV. (FT):	_		GE 1 of 1
LOCA	ATION:										_	FA	<u></u>
DATE	RACTO	/ END: R: _N	tion 5/12/20 lew Englar	nd Borii	ng		ORILLER:	Mike St. Jo	hn	TOTAL DEPTH (FT): 8.0 LOGGED BY (Person): EXPLORATION TYPE/MET	J. Herpich	<i>ı</i> Stem A	uger
AUGE	R ID/OD	: N/	A / N/A			(D/OD: N/A /		CORE INFO:			
		_	Safety Han THS (ft):				HAMMER 1	WEIGHT (lbs)	: 14	HAMMER DROP (inch):	30		
	RAL NO				30 3/1	12/2013							
ABBR	EVIATION	0 P	D = Inside D D = Outside en. = Penet ec. = Recov	Diame	ter ength	mpf = S = Sp	Blows per Fo Minute per f blit Spoon Direct Push	Foot C So	= Rock	strubed Tube Sample Core No Core Weight of Rods WOH = Weight of Har RQD = Rock Quality E PID = Photoionization Q _v = Pocket Penetrom	Designation $F_v = 0$	Field Var	orvane Shear Strength ne Shear Strength t Applicable, Not Measured
		Casing Pen.	1	SA	MPL	E INFO	RMATIO	N	F0G				
Elev. (ft)	Depth (ft)	(bpf) or Core Rate (mpf)	Sample No.	Type (epth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Test Data	GRAPHIC	Sample Description & Classification		H ₂ 0 Depth	Remarks
			S-1	IVI	0 to	24/21	2-6-13- 17		N. 7	TOPSOIL (13 in.)			
	-		S-2	M	2 to 4	24/22	25-15- 32-23			(1.1'- 2') SILTY SAND (SM); ~50% s fines, ~0% gravel; dry, dark brown, F of brick and asphalt. (2'- 2.75') WELL GRADED SAND (S sand, fine to coarse; dry, light brown,	TILL, Pieces W): ~100%		
	- - 5		S-3	IVI	4 to 6	24/19	17-8-5- 6			(2.75'- 4.8') SILTY SAND (SM); ~80% ~20% fines; dry, dark brown, FILL, w asphalt, roof felt, and concrete. (4.8'- 5.4') SANDY SILT (ML); ~70% sand, fine to coarse; moist, dark brov	ith brick, fines, ~30%		
	-		S-4	IVI	6 to 8	24/24	4-3-3- 18			(5.4'- 6') SILTY SAND (SM); ~80% s coarse, ~20% fines; moist, tan, FILL. (6'- 6.4') SANDY SILT (ML); ~70% fin sand, fine to coarse; wet, dark brown	nes, ~30%	T	
.B.GDT 5/29/15	- - 10 - -									(6.4'- 6.7') SILTY SAND (SM); ~80% medium to coarse, ~20% fines; wet, (6.7'- 7.6') SILTY SAND WITH GRAY ~50% sand, medium to coarse, ~30% ~20% gravel, fine; wet, tan, FILL. (7.6'- 8') SILTY SAND (SM); ~85% s medium, ~15% fines; wet, tan. Bottom of Exploration at 8 feet	tan, FILL. /EL (SM); 6 fines,		
GINT STD USLA	- - 15												
JA VILLAGE.GPJ	_												
5-0408 - MARIN	20 												
FREEMAN COMPANIES PROJECT 2015-0408 - MARINA VILLAGE.GPJ GINT STD US LAB.GDT and the property of the property	-												
PANIE					<u>.</u>								
Stratific bounda	ry betweer	n soil typ	ent approxim	ns may						man Companies, LLC			n Companies, LLC Street
at times	and unde	r conditi	ings have be ions stated. er may occu					: <u>Marina Vi</u> ridgeport, C		Housing Complex Redeve	H	artford	, CT 06102
other fa		those p	resent at the					ER: 2015-0		LAND DEVILOPMENT ENGINEER	NS DESIGN CONSTRUCTION SERVICES (8		1-9550 emancos.com

Expl	oration	Loca	ation									EXPL	ORATION
HOR	THING: ZONTA	L DAT	UM:	_	EASTI	NG:	ST	STATI ATION CENT	ON: ERL	OFFSET: INE: ND SURFACE ELEV. (FT):		ı	B-6
VER	TICAL D	ATUN	1:				ES	TIMATED GE	ROUI	ND SURFACE ELEV. (FT):	-		GE 1 of 1
LOC	ATION:											PAG	3E 1 0f 1
DATE	RACTO	/ END: R: <u>N</u>	5/13/20	nd E	Boring		ORILLER:	Mike St. Joh	nn	TOTAL DEPTH (FT): 10.0 LOGGED BY (Person): J. He EXPLORATION TYPE/METHOL		Stem A	uaer
AUGE	R ID/OD	: N/A	A / N/A				CASING IE	0/OD: N/A /	N/A			0.0	ago.
HAM	IER TYP	E : _S	afety Ham	nme	er	+	HAMMER	WEIGHT (lbs):	_14	HAMMER DROP (inch): 30			
	R LEVE		THS (ft):		27.00 5/	13/2015							
	EVIATION	S: ID OI Pe	= Inside Di D = Outside en. = Penetr ec. = Recov	Dia ratio	ameter on Length	mpf = S = Sp	Blows per Fo Minute per F blit Spoon Direct Push	Foot C :	= Rock	strubed Tube Sample Core Core RQD = Rock Quality Design Core PID = Photoionization Dete Q _v = Pocket Penetrometer	nation $F_v =$ ctor NA,	Field Van	orvane Shear Strength the Shear Strength the Applicable, Not Measured
		Casing Pen.			SAMPL	E INFO	RMATIO	N	90:				
Elev. (ft)	Depth (ft)	(bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Test Data	GRAPHIC LOG	Sample Description & Classification		H ₂ 0 Depth	Remarks
	_		S-1	V	0 to 2	24/19	13-17- 11-14			ASPHALT (2 in.) (0.2'- 4.7') SILTY SAND WITH GRAVEL ~65% sand, fine to coarse, ~20% fines, ~	15%		
	_		S-2	$\langle \rangle$	2 to 4	24/19	13-22- 105-30			gravel, fine to coarse, dark brown, FILL, concrete, brick, and black material.	with		
	- - 5		S-3	$\langle \rangle$	4 to 6	24/21	15-2-2- 2			(4.7'- 4.8') SILT WITH SAND (ML); ~50% fine, ~50% fines; tan, FILL.	sand,		
	_		S-4	\bigvee	6 to 8	24/19	2-1-1-1			(4.8'- 6') SILT WITH SAND (ML); ~70% s fine to coarse, ~30% fines; gray, FILL, wi concrete, brick, black material, unknown material.	th	Ţ	
	-		S-5	\bigvee	8 to 10	24/24	8-10- 15-19			(6'- 7.6') SILTY SAND (SM); ~70% sand, coarse, ~30% fines; tan, FILL. (7.6'- 8.5') SILTY SAND (SM); ~85% san coarse, ~15% fines; gray, FILL, with cond	d, fine to		
CI /87/C	- 10 -									brick, black material, unknown white mat (8.5'- 10') POORLY GRADED SAND (SF sand, fine to coarse, ~2% fines; tan. Bottom of Exploration at 10 feet			
	- - 15												
GE GPJ G	_												
KINA VILLA	_												
0-0408 - MA	— 20 –												
JECT 201	-												
ANIES PRO													
bounda gradua at times Fluctua	ry betweer I. Water level and under tions of gro	n soil typ vel readii r conditio oundwate	nt approxim- es, transition ngs have be ons stated. er may occuresent at the	ns r een ır dı	made per per per per per per per per per pe	PROJEC	T NAME ATE: Bi	: Marina Vil	lage	nan Companies, LLC Housing Complex Redeve	36 Ha N I E S ONNTRUCTION BERVICES	John artford 30) 25	Companies, LLC Street CT 06102 1-9550
r measur	rements we				ĮF	'KUJEC	INUMB	ER : 2015-0	408		WV	vw.free	emancos.com

Explo	ration	Loca	tion										EXP	LORATION
NORT	HING:				EASTI	NG:		STAT	ION:		OFFSET:			
HORIZ	ZONTA	L DAT	UM:				ST.	ATION CEN	TERL	INE:	OF F1 F1/ (FT):			B-7
								TIMATED G	ROUI	ND SURFA	CE ELEV. (FT):		PA	GE 1 of 1
	ng Info			045	- E400	045					TOTAL DEDTIL (ET) 0.0			
					5 - 5/12/20 Boring		ORII I FR	Mike St. Jo	ohn	-	TOTAL DEPTH (FT): 8.0 LOGGED BY (Person): J. He	ernich		
	MENT:	. <u></u>	zw Erigiai	IU L	Johns	'	JINIELEIN.	Wilke Ot. 30	71111		EXPLORATION TYPE/METHOD		Stem A	uger
AUGE	R ID/OD:	N/A	1 / N/A				CASING II	D/OD: N/A	N/A		CORE INFO:			
		_			er		HAMMER	WEIGHT (lbs)): <u>1</u> 4	40	HAMMER DROP (inch): 30			
	r Levei Ral no		HS (ft):		4 6.00 5/	/12/2015								
	VIATION		= Inside D	iame	eter	bnf = [Blows per F	not U	l = Undi	strubed Tube \$	Sample WOH = Weight of Hammer	S.=	Pocket 1	Forvane Shear Strength
		OI Pe) = Outside	e Dia ratio	ameter on Length	mpf = S = Sp	Minute per l blit Spoon Direct Push	Foot C S	= Rock C = So		RQD = Rock Quality Design PID = Photoionization Determined	nation $F_v =$	Field Va	
		Casing			SAMPL	E INFO	RMATIO	N	99					
Elev. (ft)	Depth (ft)	Pen. (bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Test Data	GRAPHIC LOG		Sample Description & Classification		H₂0 Depth	Remarks
			S-1	1/	0	24/17	9-21-		$\times\!\!\times$	APHALT				
	_			IXI	to 2		21-39		\otimes		') SILTY SAND WITH GRAVEL nd, fine to medium, ~20% grave			
	_		0.0	\square		04/04	44.0.4		\otimes	coarse, ~	·15% fines; brown, FILL, with as	phalt,		
			S-2	M	2 to	24/24	11-8-4- 5		\otimes	piastic, a	nd black materials.			
	_			Μ	4				\otimes					
	_		S-3	H	4	24/24	2-2-2-2		\bowtie					
	- 5			IXI	to 6						SILTY SAND WITH GRAVEL (S nd, fine to medium, ~20% grave			
	_			\square							es; moist, tan.		Ţ	
			S-4	M	6 to	24/20	4-16- 21-14				SILTY SAND WITH GRAVEL (S nd, fine, ~20% fines, ~10% grav			
	_			М	8					medium t	to coarse; wet.			
	_			H		+			12.54		POORLY GRADED SAND (SP) edium to coarse, ~5% fines; wet,			
	_									Bottom o	f Exploration at 8 feet			
	— 10													
	10													
	_													
	_													
	_													
	_													
	 15													
	_													
	_													
	_													
	_													
	— 20													
	_													
	_													
	_													
	_													
			nt approximes, transitio			LOGGE	BY (Co	nsultant):	Freer	nan Comp	anies, LLC	Fre	eemai	n Companies, LLC
gradual.	Water lev	el readir	ngs have b	een							Complex Redeve	36	John	Street

gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

FREEMAN COMPANIES PROJECT 2015-0408 - MARINA VILLAGE.GPJ GINT STD US LAB.GDT 5/29/15

CITY/STATE: Bridgeport, CT
PROJECT NUMBER: 2015-0408

Hartford, CT 06102 C O M P A N I E S (860) 251-9550 www.freemancos.com

Explo	ration	Loca	ation		FAOTU	NO.		0.7	A T.O.	N	OFFOFT		EXPI	ORATION
HORIZ	HING: ZONTAI	L DAT	UM:		EASIII	NG:	ST	STA	A I IO ENTE	N: RL	OFFSET:			B-8
VERT	ICAL D	ATUN	1:				ES	TIMATED	GRO	DUN	ND SURFACE ELEV. (FT):			GE 1 of 1
	TION:												PA	JE 1 OI 1
	ng Info													
					5 - 5/13/20 Boring		ORII I FR	Mike St	John		TOTAL DEPTH (FT): 12.0 LOGGED BY (Person): J. He	rnich		
	MENT:		ew Englai	IU L	Joining	'	JINIELEIN.	Wilke Ot	. 301111		EXPLORATION TYPE/METHOD		Stem A	uger
AUGE	R ID/OD:	N/A	A / N/A			(CASING I	D/ OD : N	/A / N/	Ά	CORE INFO: HAMMER DROP (inch): 30			
						i 13/2015		WEIGHT (I	bs):	_14	HAMMER DROP (inch): 30			
	RAL NO		110 (11).		<u> </u>	10/2010								
ABBRE	VIATION		= Inside D				Blows per F				strubed Tube Sample WOH = Weight of Hammer			orvane Shear Strength
		Pe	D = Outside en. = Penet ec. = Reco	tratio	on Length	S = Sp	Minute per l olit Spoon Direct Push		SC =	Sor	Core RQD = Rock Quality Design plic Core PID = Photoionization Deter Veight of Rods Q _v = Pocket Penetrometer \$100.000 Q _v = Pocket Penetrometer \$100.000	ctor NA, I		t Applicable, Not Measured
		Casing		_	SAMPL	E INFO	RMATIO	N		၅				
Elev.	Depth	Pen. (bpf)				Don /	Blows		-	GRAPHIC LOG	Sample		H₂0	Damada
(ft)	(ft)	Or Core	Sample No.	ype	Depth (ft)	Pen./ Rec.	Count	Test Data		APH	Description & Classification		Depth	Remarks
		Rate (mpf)	110.		(11)	(in)	RQD	Data		GR,				
			S-1	M	0 to	24	9-12-8- 16		<u> </u>	<i>√ 1 /</i> ,	TOPSOIL (6 in.)			
	_			M	2				8	\boxtimes	(0.5'- 2') POORLY GRADED SAND WITH GRAVEL (SP); ~60% sand, fine to coarse	e, ~30%		
	-		S-2	\mathbb{H}	2	24	5-5-4-4			$\stackrel{\times}{\otimes}$	gravel, fine to coarse, ~10% fines; dry, Fl brick, concrete, and black material.	LL, with		
	_			Ш	to 4					\bowtie	(2'- 4') POORLY GRADED SAND WITH			
	_			\square	7					\bigotimes	GRAVEL (SP); ~70% sand, medium to co ~30% gravel, fine to coarse; dry, tan, FILI	L, black		
	_		S-3	M	4 to	24	7-7-9-8			\bowtie	material. (4'- 7') POORLY GRADED SAND WITH			
	 5			М	6				8	\bowtie	GRAVEL (SP); ~75% sand, fine to coarse gravel, fine to coarse, ~5% fines; moist, of			
	_		S-4	\mathbb{H}	6	24	5-5-4-3		8	\bowtie	brown, FILL, with brick, black material, ur		▼	
	_			IXI	to 8				×	$\stackrel{\times\!\!\!\times}{\otimes}$	white material. (7'- 10') SILTY SAND WITH GRAVEL (SI	M).	_	
	_		S-5	\square	8	24	100/2"			\bowtie	~60% sand, fine to coarse, ~20% gravel, coarse, ~20% fines; wet, dark brown, FIL	fine to		
	_		3-3	M	to	24	100/2			\boxtimes	brick, black material, unknown white mate			
	40			M	10				8	\bowtie				
	— 10		S-6	M	10 to	24	11-15- 16-21				(10'- 12') SILTY SAND WITH GRAVEL (\$ ~55% sand, fine to coarse, ~30% gravel,			
	_			IXI	12		1021				coarse, ~15% fines; wet, brown.	iiiic to		
	-			H					- 1		Bottom of Exploration at 12 feet			
	_										•			
	_													
	45													
	 15													
	_													
	-													
	_													
	_													
	00													
	— 20													
	_													
	_													
	_													
	_													
			nt approximes, transition			OGGE	BY (Co	nsultant)	:_Fr	een	nan Companies, LLC	Fre	emai	Companies, LLC
gradual.	Water lev	el readir	ngs have b	een							Housing Complex Redeve	36	John	Street

gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

FREEMAN COMPANIES PROJECT 2015-0408 - MARINA VILLAGE.GPJ GINT STD US LAB.GDT 5/29/15

CITY/STATE: Bridgeport, CT
PROJECT NUMBER: 2015-0408



Hartford, CT 06102 C O M P A N I E S (860) 251-9550 www.freemancos.com

NOR1	ZONTA	L DAT	UM:				ST	OFFSET:				
VERI	ICAL D	ATUN	1:				ES	TIMATED GI	ROU	ND SURFACE ELEV. (FT):		AGE 1 of 1
Drilli DATE CONT EQUIF AUGE HAMN WATE	NG INFO START / RACTOR PMENT: R ID/OD IER TYP	END: END: R:	5/14/2 ew Engla 55 in / N//	2015 and E	- 5/14/20 Boring er	015 	ORILLER: CASING IE	Mike St. Jo D/OD: N/A / WEIGHT (lbs)	N/A	EXPLORATION TYPE/METHOD: CORE INFO:	Hollow Stem	Auger
ABBRI	EVIATION	OI Pe	= Inside I D = Outsiden. = Pene ec. = Reco	de Dia etratio	ameter on Length	mpf = S = Sp	Blows per Fo Minute per I blit Spoon Direct Push	Foot C S0	= Roc C = So OR =	istrubed Tube Sample k Core nic Core Weight of Rods WOH = Weight of Hammer RQD = Rock Quality Designa PID = Photoionization Detect Q _v = Pocket Penetrometer Str	ion $F_v = Field V_v$ or NA, NM = N	Torvane Shear Strength ane Shear Strength lot Applicable, Not Measure
		Casing Pen.			SAMPL	E INFO	RMATIO	N	LOG	Sample		WELL
Elev. (ft)	Depth (ft)	(bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Test Data	GRAPHIC	Sample Description & Classification	H ₂ 0 Depth	DETAILO
			S-1		0 to 2	24/20	14-16- 24-24			(0'- 9.5') SILTY SAND WITH GRAVEL (SN ~55% sand, fine to coarse, ~30% fines, ~1 gravel, fine to medium; moist, brown.); 5%	backfill cuttings 6" bentonits seal. 1/4 bag.
	- - - - 10		S-2		4 to 6 8 to 10		14-19- 17-21 21-30- 39-33			(9.5'- 10') SILTY SAND WITH GRAVEL (S ~55% sand, fine to coarse, ~30% fines, ~1 gravel, fine to medium; moist, black, odor. (10'- 17') SILTY SAND WITH GRAVEL (S' ~55% sand, fine to coarse, ~30% fines, ~1 gravel, fine to medium; moist, brown.	5% 1);	#2 sand for sand pack. 2" diamter PVC Screen, 0.010 slot size
	- - 15 -		S-4	X	15 to 17	24/22	32-41- 72-100			Bottom of Exploration at 17 feet		17' bottom depth of
	- - - 20 -											boring, backfill cuttings PVC plug
boundar gradual at times Fluctuat other fa	ation lines ry betweer . Water lev and unde tions of gro ctors than ements we	n soil typ vel readii r conditio oundwate those pr	es, transiti ngs have tons stated er may occ esent at th	ons r been cur du	made	PROJEC CITY/ST	T NAME ATE: B		llage	man Companies, LLC Housing Complex Redeve	36 John Hartford (860) 2	an Companies, Ll n Street d, CT 06102 51-9550 eemancos.com

Explo	ration	Loca	ation		FASTI	NG.		ST	ΔΤΙΩΝ:	OFFSET:			EXPL	ORATION
HORIZ	ZONTAI	_ DAT	UM:		. LAO11		ST	ATION CE	ENTERL	OFFSET: _			Е	3-10
VERT	ICAL D	ATUN	1:				ES	IIMATED	GROUN	ID SURFACE ELEV. (FT):				GE 1 of 1
	ng Info			2015	5 - 5/13/2	015				TOTAL DEBTU	(ET). 20.7			
					Boring		ORILLER:	Mike St.	. John	TOTAL DEPTH (LOGGED BY (Pe	·	pich		
EQUIP	MENT:									EXPLORATION	TYPE/METHOD	: Hollow	Stem A	uger
)/OD: <u>N/</u>						
					er Z 11.00	1 5/13/2015		WEIGHT (II	DS): 14	HAMMER DROP	(incn): <u>30</u>			
	RAL NOT													
ABBRE	EVIATIONS	OI Pe	= Inside I D = Outsiden. = Pene ec. = Reco	de Di etratio	ameter on Length	mpf = S = Sp	Blows per Fo Minute per I blit Spoon Direct Push	-oot	C = Rock SC = Sor	Core RQD = R nic Core PID = Ph	Veight of Hammer ock Quality Design otoionization Detec ket Penetrometer S	ation $F_v = 1$ tor NA, I	Field Var	orvane Shear Strength ne Shear Strength t Applicable, Not Measured
		Casing			SAMPI	E INFO	RMATIO	N						
Elev. (ft)	Depth (ft)	Pen. (bpf) or Core	Sample No.	ype	Depth (ft)	Pen./ Rec.	Blows Count or	Test Data	문	Samp Descript Classific	ion &		H₂0 Depth	Remarks
		Rate (mpf)	140.		(11)	(in)	RQD	Data	GR/					
			S-1	\mathbb{V}	0 to	24/10	11-6-6- 5			(0'- 3.5') SILTY SAND WIT ~40% sand, fine to coarse,				
	-			Ň	2					gravel, fine to medium; dry		-070		
	-			\vdash										
	-													
	_		S-2		,	24/24	20.47			(3.5'- 8.5') SILTY SAND W ~40% sand, fine to medium				
	— 5		3-2	M	to	24/24	20-17- 20-16			gravel, fine to coarse; dry,	brown.	-2070		
				Λ	6									
	_													
	-													
	-		S-3		8	24/20	16-32-							
	-			ΙX	to 10		30-40			(8.5'- 20.7') SILTY SAND V ~60% sand, fine to coarse.				
	— 10			\triangle						medium, ~20% fines; wet,				
													T	
	-													
	-													
	-													
	— 15			L	45	04/04								
			S-4	M	15 to	24/24	57-77- 59-129							
				Λ	17									
	-													
	-													
	_													
	— 20		S 5		20	8/8	20							
			S-5	+	20 to	0/0	30- 140/2" ₋			Bottom of Exploration at 20	0.67 feet			
					20.7]				, , , , , , , , , , , , , , , , , , , ,				
	-													
Stratifica	ition lines i	epreser	nt approxi	nate	T.	000=	 					F		Companies IIC
boundar gradual.	y between Water lev	soil type el readir	es, transiti ngs have l	ons i	may be					nan Companies, LLC Housing Complex Redeve	EDEEM	_ 36	John	Companies, LLC Street
at times Fluctuati	and under ions of gro	condition	ons stated er may occ	cur d	ue to			idgeport,			C O M P A N	Ha	rtford (0) 25	, CT 06102 1-9550
	ctors than tements we			ne tin				ER : 201						emancos.com

FREEMAN COMPANIES PROJECT 2015-0408 - MARINA VILLAGE.GPJ GINT STD US LAB.GDT 5/29/15



APPENDIX B LABORATORY TEST RESULTS



Project:

Marina Village Housing Redevelopment Location: Bridgeport, CT

Boring ID: B-2 Sample Type: bag Tested By: jbr 05/27/15 Sample ID: S3 Test Date: Checked By: emm

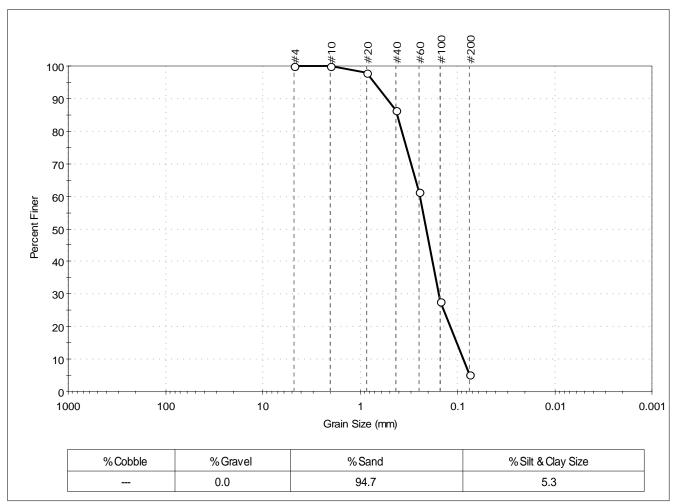
8-10 ft Depth: Test Id: 333328

Test Comment:

Sample Description: Moist, brownish yellow sand with silt

Sample Comment:

Particle Size Analysis - ASTM D422



Sieve Name	Sieve Size, mm	Sieve Size, mm Percent Finer		Complies	
#4	4.75	100			
#10	2.00	100			
#20	0.85	98			
#40	0.42	87			
#60	0.25	61			
#100	0.15	28			
#200	0.075	5.3			

<u>Coefficients</u>					
D ₈₅ = 0.4112 mm	$D_{30} = 0.1550 \text{ mm}$				
D ₆₀ = 0.2446 mm	$D_{15} = 0.1011 \text{ mm}$				
D ₅₀ = 0.2101 mm	$D_{10} = 0.0867 \text{ mm}$				
$C_u = 2.821$	$C_{c} = 1.133$				

Project No:

GTX-303192

Classification **ASTM** N/A

Fine Sand (A-3 (1)) <u>AASHTO</u>

<u>Sample/Test Description</u> Sand/Gravel Particle Shape: ROUNDED

Sand/Gravel Hardness: HARD

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Project: Location:

Marina Village Housing Redevelopment Bridgeport, CT

Boring ID: B-4 Sample Type: bag Tested By: jbr 05/27/15 Sample ID: S5 Test Date: Checked By: emm

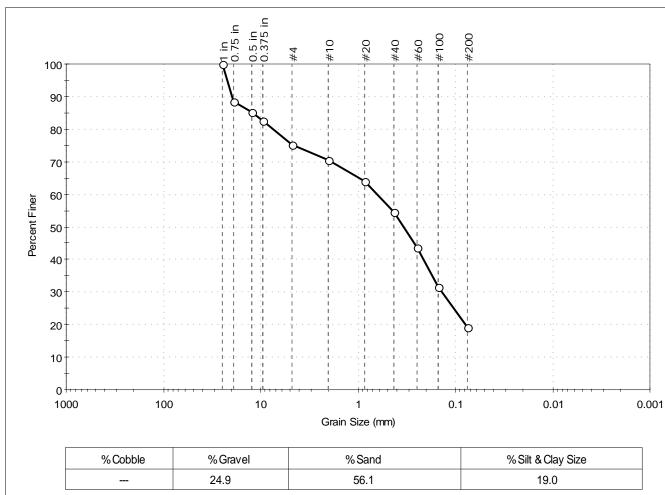
Test Id: Depth: 15-17 ft

Test Comment:

Sample Description: Moist, light gray silty sand with gravel

Sample Comment:

Particle Size Analysis - ASTM D422



Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies			
						D ₈₅ = 12.1	370
1 in	25.00	100				D ₁₀ = 0.63	76
0.75 in	19.00	89			1	$D_{60} = 0.03$	70
0.5 in	12.50	85				$D_{60} = 0.63$ $D_{50} = 0.34$ $C_u = N/A$	18
0.375 in	9.50	82				Cu =N/A	
#4	4.75	75			1		
#10	2.00	71				ACTNA	NI/
#20	0.85	64				<u>ASTM</u>	N/
#40	0.42	54					
#60	0.25	44			1	AASHTO	CII

<u>Coefficients</u>					
D ₈₅ = 12.1370 mm	$D_{30} = 0.1382 \text{ mm}$				
D ₆₀ = 0.6376 mm	$D_{15} = N/A$				
D ₅₀ = 0.3418 mm	$D_{10} = N/A$				
$C_u = N/A$	$C_C = N/A$				
Classification					

Project No:

333329

GTX-303192

<u>Classification</u> /A

AASHTO Silty Gravel and Sand (A-2-4 (0))

<u>Sample/Test Description</u> Sand/Gravel Particle Shape: ROUNDED

Sand/Gravel Hardness: HARD

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0.15

0.075

31

#100

#200



Project:

Marina Village Housing Redevelopment Location: Bridgeport, CT

Boring ID: B-7 Sample Type: bag Tested By: jbr Test Date: 05/27/15 Sample ID: S4 Checked By: emm

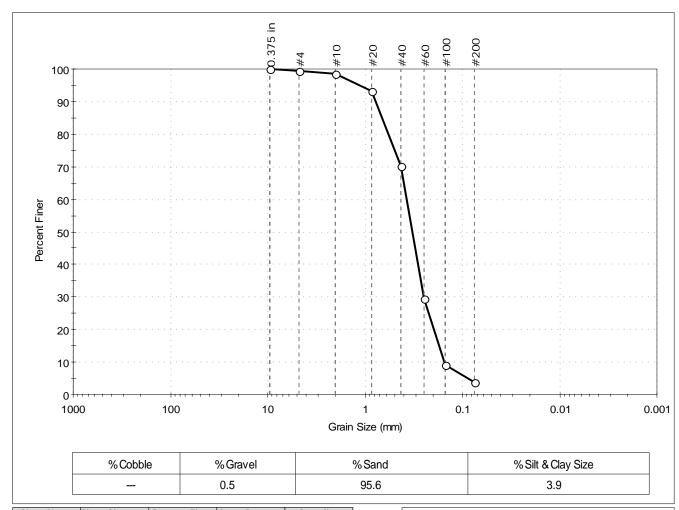
Depth: 6-8 ft Test Id: 333330

Test Comment:

Sample Description: Moist, brownish yellow sand

Sample Comment:

Particle Size Analysis - ASTM D422



Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	98		
#20	0.85	93		
#40	0.42	70		
#60	0.25	30		
#100	0.15	9		
#200	0.075	3.9		

<u>Coefficients</u>					
$D_{85} = 0.6636 \text{ mm}$	$D_{30} = 0.2513 \text{ mm}$				
$D_{60} = 0.3720 \text{ mm}$	$D_{15} = 0.1739 \text{ mm}$				
$D_{50} = 0.3264 \text{ mm}$	$D_{10} = 0.1536 \text{ mm}$				
$C_u = 2.422$	$C_c = 1.105$				

Project No:

GTX-303192

<u>Classification</u> Poorly graded sand (SP) <u>ASTM</u>

Fine Sand (A-3 (1)) <u>AASHTO</u>

<u>Sample/Test Description</u> Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness: ---

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Project: Location: Bridgeport, CT

Marina Village Housing Redevelopment

Boring ID: B-10 Sample Type: bag Tested By: jbr 05/27/15 Sample ID: S5 Test Date: Checked By: emm

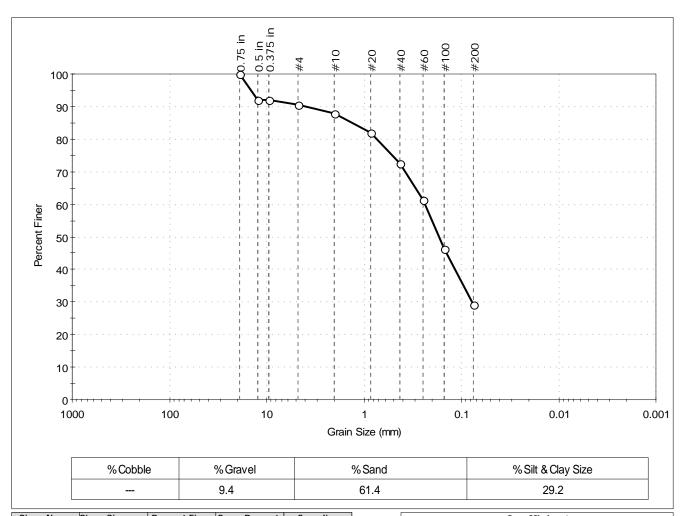
20-22 ft Depth: Test Id: 333331

Test Comment:

Sample Description: Moist, brown silty sand

Sample Comment:

Particle Size Analysis - ASTM D422



Sieve Name	Sieve Size, mm Percent Finer		Spec. Percent	Complies	
0.75 in	19.00	100			
0.5 in	12.50	92			
0.375 in	9.50	92			
#4	4.75	91			
#10	2.00	88			
#20	0.85	82			
#40	0.42	73			
#60	0.25	61			
#100	0.15	46			
#200	0.075	29			

<u>Coefficients</u>					
$D_{85} = 1.3240 \text{ mm}$	$D_{30} = 0.0775 \text{ mm}$				
$D_{60} = 0.2386 \text{ mm}$	$D_{15} = N/A$				
$D_{50} = 0.1696 \text{ mm}$	$D_{10} = N/A$				
$C_u = N/A$	$C_c = N/A$				

Project No:

GTX-303192

Classification <u>ASTM</u> N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

<u>Sample/Test Description</u> Sand/Gravel Particle Shape: ROUNDED

Sand/Gravel Hardness: HARD

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Project Name: Marina Village Housing Redevelopment

Project Location: Bridgeport, CT

GTX #: 303192

Start Date: 05/28/15 Tested By: jcw
End Date: 05/29/15 Checked By: emm

Boring #: B-4/Combined

Sample #: S4
Depth: 6-10 ft

Visual Description: Moist, yellowish brown sand with gravel

Permeability of Granular Soils (Constant Head) by ASTM D2434

Sample Type: Remolded

Sample Information: Maximum Dry Density: --- pcf

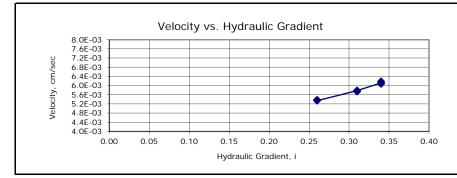
Optimum Moisture Content: --- %
Compaction Test Method: --Classification (ASTM D2487): --Assumed Specific Gravity: 2.65

Sample Preparation / Test Setup:

Test specimen compacted with moderate effort at air-dried moisture content. Material > 3/8-inch removed from sample prior to testing (0% of sample).

Parameter	Initial	Final
Height, in	4.03	4.03
Diameter, in	3.98	3.98
Area, in ²	12.4	12.4
Volume, in ³	50.1	50.1
Mass, g	1239	1575
Bulk Density, pcf	94.2	120
Moisture Content, %	0.9	28.3
Dry Density, pcf	93.3	93.3
Degree of Saturation, %		97.0
Void Ratio, e		0.77

	Reading	Volume of		Flow Rate,		Permeability,	Temp.,	Correction	Permeability @
Date	#	Flow, cc	Flow, sec	cc/sec	Gradient	cm/sec	°C	Factor	20 °C, cm/sec
5/28	1	4.3	10	0.43	0.26	2.1E-02	19.1	1.023	2.1E-02
5/28	2	4.3	10	0.43	0.26	2.1E-02	19.1	1.023	2.1E-02
5/28	3	4.3	10	0.43	0.26	2.1E-02	19.1	1.023	2.1E-02
5/28	4	4.6	10	0.46	0.31	1.9E-02	19.1	1.023	1.9E-02
5/28	5	4.6	10	0.46	0.31	1.9E-02	19.1	1.023	1.9E-02
5/28	6	4.6	10	0.46	0.31	1.9E-02	19.1	1.023	1.9E-02
5/28	7	4.9	10	0.49	0.34	1.8E-02	19.1	1.023	1.8E-02
5/28	8	4.9	10	0.49	0.34	1.8E-02	19.1	1.023	1.8E-02
5/28	9	5.0	10	0.50	0.34	1.8E-02	19.1	1.023	1.9E-02



PERMEABILITY @ 20 $^{\circ}$ C = 2.0 x 10⁻² cm/sec

Note: This standard has been withdrawn by ASTM with no replacement.