Pawcatuck River, Rhode Island
Coastal Storm Risk Management
Feasibility Study

Appendix A: Environmental Documentation

Pawcatuck River, Rhode Island
Coastal Storm Risk Management
Feasibility Study

Appendix A1: 2016 Benthic Survey

Sediment Sampling and Benthic Community Analysis
In Support of Feasibility Investigation Final

Misquamicut Beach
Westerly, RI

US Army Corps
of Engineers ®
New England District

June 2015

SEDIMENT SAMPLING AND BENTHIC COMMUNITY ANALYSIS IN SUPPORT OF FEASIBILITY INVESTIGATION

MISQUAMICUT BEACH
WESTERLY, RHODE ISLAND

JUNE, 2016

Prepared by:

Engineering/Planning Division
Environmental Resources Section
U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

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SUMMARY

Surveys to document the grain size and benthic communities of the Misquamicut Beach project area were conducted on September 25, 2015. The grain size data showed that the sediments in the high-, mid-, and low-intertidal areas were predominately a mix of fine sands and medium sands. The low-intertidal areas also had minor fractions of coarse sands and gravel. The benthic communities in the high-intertidal area were generally azoic or consisted of typical opportunistic annelid species (oligochaetes) and nematodes. The communities in the mid-intertidal areas were similar and were generally azoic or consisted of a few typical sandy beach species (oligochaetes, nematodes, and mole crabs). The low-intertidal communities were dominated by typical opportunistic annelid species (oligochaetes and spionid polychaetes). All intertidal zones displayed low diversity and low abundance of organisms.

1.0 INTRODUCTION

The Misquamicut Beach study area is in Westerly, Rhode Island (see inset of Figure 1). The New England District (NAE) of the US Army Corps of Engineers (USACE) is currently examining Misquamicut Beach as a possible area for the placement of sand. The area studied encompasses an approximately 2.25 mile span of Misquamicut Beach (Figure 1).

In September 2015, field studies were conducted to provide baseline information on benthic resources of the study area as well as document the existing physical properties (grain size) of the beach sediments. This report describes the field methods employed, site conditions encountered, and the results of the grain size and benthic community analysis.

2.0 MATERIALS AND METHODS

Sediment and benthic sampling efforts were conducted on September 25, 2015 by staff from the Environmental Resource Section of NAE. Work was carried out from shore during low tide. Positioning was achieved using a Trimble GeoXM Differential Global Positioning System (DGPS) with an accuracy of 3 meters or less.

Benthic and Sediment Sampling

Eight transects (Figure 1) were established within the project area to collect samples for benthic community analysis and sediment grain size. General locations of the transects were selected prior to the start of field activities, however specific locations of the transects were established and recorded in the field. Samples were collected on September 25, 2015 at low tide. A sample for benthic community analysis and a sediment sample for grain size analysis were taken at the high-intertidal level, the mid-intertidal level, and the low-intertidal tide level along all transects. A 0.003 m^2 sized benthic core sampler was used to collect samples at each location.

Each sample for benthic community analysis was sieved with seawater thorough a 0.5 mm sieve and preserved in 10% formaldehyde with 0.1% rose Bengal stain. Samples were kept in formaldehyde solution until they were processed in the New England District's environmental laboratory. At the time of processing the samples were washed on a 0.5 mm sieve to remove the preservative and remaining fine sediment. The material was then sorted under a low-power dissecting microscope where organisms were removed from the sediments and transferred to jars containing 70% ethanol. Organisms were identified to the lowest taxon possible and enumerated.

Grain size analysis was completed by the NAE environmental laboratory. Samples were prepared according to the guidance in ASTM D421-85 (Re-approved 2002), Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants, and analyzed according to ASTM D422-63 (Re-approved 2002), Standard

Test Method for Particle-Size Analysis of Soils using sieve nos. 4, 10, 40, 100, 200. There were no deviations from the established laboratory testing protocols.

3.0 RESULTS AND DISCUSSION

This section summarizes results obtained from benthic community analysis of sediments and the physical testing of sediments from the vicinity of the Misquamicut Beach project area.

3.1 Benthic Community Analysis

Twenty-eight cores for benthic community analysis were processed at the New England District's Environmental Laboratory. Counts of invertebrate organisms by sample station are summarized in Tables 1, 2, and 3. A total of five different taxa were observed in the 28 samples.

High-intertidal Stations

The benthic communities in the high-intertidal area were generally azoic or consisted of typical sandy beach species. Three of the eight stations sampled did not have species present. In the 5 stations where species were present, the community was represented by two taxa, oligochaetes and nematodes. Data on the benthos collected at the high-intertidal stations are presented in Table 1.

Mid-intertidal Stations

The benthic communities in the mid-intertidal area were generally azoic or consisted of typical sandy beach species. Five of the eight stations sampled did not have species present. In the 3 stations where species were present, the community was represented by three taxa, oligochaetes, nematodes, and mole crabs (*Emerita talpoida*). Data on the benthos collected at the mid-intertidal stations are presented in Table 2.

Low-intertidal Stations

The low-intertidal communities were dominated by two typical sandy beach annelid species (*Spio setosa* and oligochaetes). Data on the benthos collected at the low-intertidal stations are presented in Table 3.

3.2 Grain Size Analysis

Twenty-four sediment samples were analyzed for grain size distribution (ASTM D 422-63, reapproved 2002) in the New England District's Environmental Laboratory. The results of the grain size analysis are summarized in Table 4. Complete testing results are provided in the grain size data presented as Appendix A.

The sediments collected from all stations were generally represented by various fractions of fine sand, medium sand, course sand, and gravel. The data show that the 8 stations located in the high-intertidal areas were dominated by fine sands with various fractions of medium sands. The 8 stations in the mid-intertidal areas contained a mix of both fine and medium sands, while the 8 stations located in the low-intertidal areas were dominated by fine sands but contained various portions of medium sands, coarse sands, and gravel.

41°19'0"N
41°20'0"N
71°49'0"W
71°48'0"W
T1
T2
T3
T4
T5
T6
T7
T8
FIGURE 1:
MISQUAMICT BEACH, WESTERLY, RI
SEPTEMBER 2015 SAMPLE TRANSECTS
US Army Corps of Engineers New England District
0 0.1 0.2 0.3 0.4 0.5 Miles
0 500 1,000 2,000 3,000 4,000 Feet
1:12,000
2014 AERIAL IMAGERY
GCS NAD 1983
Stonington
Westerly
Charlestown

015.

	HIGH-INTERTIDAL									
TRANSECT NUMBER	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**		
ANNELIDA										
OLIGOCHAETA										
Unidentified Oligochaeta	4	*	*	*	*	127	5	*		
NEMATODA										
Unidentified Nematoda	16	3	*	*	6	19	7	*		
INDIVIDUALS / SAMPLE	**20**	**3**	*****	*****	**6**	**146**	**12**	*****		
SPECIES / SAMPLE	**2**	**1**	*****	*****	**1**	**2**	**2**	*****		

Table 2. Benthic invertebrates collected from the mid-intertidal locations at Misquamicut Beach Study Area on Sept. 25, 2015. Numbers are per 0.003 m^2

	MID-INTERTIDAL									
TRANSECT NUMBER	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**		
ANNELIDA										
OLIGOCHAETA										
Unidentified Oligochaeta	35	*	*	*	*	*	*	*		
ARTHROPODA										
CRUSTACEA										
Emerita talpoida	*	*	1	*	*	*	*	2		
NEMATODA										
Unidentified Nematoda	2	*	*	*	*	*	*	*		
INDIVIDUALS / SAMPLE	**37**	*****	**1**	*****	*****	*****	*****	**2**		
SPECIES / SAMPLE	**2**	*****	**1**	*****	*****	*****	*****	**1**		

Table 3. Benthic invertebrates collected from the low-intertidal locations at Misquamicut Beach Study Area on Sept. 25, 2015. Numbers are per 0.003 m^2

	LOW-INTERTIDAL									
TRANSECT NUMBER	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**		
ANNELIDA										
POLYCHAETA										
Spio setosa	*	1	1	13	1	3	2	*		
OLIGOCHAETA										
Unidentified Oligochaete sp.	8	6	*	1	6	1	1	2		
ARTHROPODA										
AMPHIPODA										
Ampelisca sp.	*	*	*	*	*	*	*	3		
NEMATODA										
Unidentified Nematoda	*	*	*	*	1	2	*	*		
INDIVIDUALS / SAMPLE	**8**	**7**	**1**	**14**	**8**	**6**	**3**	**5**		
SPECIES / SAMPLE	**1**	**2**	**1**	**2**	**3**	**3**	**2**	**2**		

Table 4: Summary of Grain Size Results

Station Name	Sample ID	%Cobble	%Gravel		%Sand			%Fines
			Coarse	Fine	Coarse	Medium	Fine	
Transect 1 – High-intertidal	T1-H	0.0	0.0	0.0	0.1	13.7	86.3	0.0
Transect 2 – High-intertidal	T2-H	0.0	0.0	0.0	0.0	25.5	74.5	0.0
Transect 3 – High-intertidal	T3-H	0.0	0.0	0.0	0.0	8.6	91.3	0.0
Transect 4 – High-intertidal	T4-H	0.0	0.0	0.0	0.0	10.0	90.0	0.0
Transect 5 – High-intertidal	T5-H	0.0	0.0	0.0	0.0	16.1	83.9	0.0
Transect 6 – High-intertidal	T6-H	0.0	0.0	0.0	0.0	23.7	76.2	0.0
Transect 7 – High-intertidal	T7-H	0.0	0.0	0.0	0.0	25.8	74.2	0.0
Transect 8 – High-intertidal	T8-H	0.0	0.0	0.0	0.0	0.4	99.6	0.0
Transect 1 – Mid-Intertidal	T1-M	0.0	0.0	0.0	0.5	22.6	76.9	0.0
Transect 2 – Mid-Intertidal	T2-M	0.0	0.0	0.0	0.6	33.9	65.4	0.0
Transect 3 – Mid-Intertidal	T3-M	0.0	0.0	0.0	0.2	25.3	74.4	0.0
Transect 4 – Mid-Intertidal	T4-M	0.0	0.0	0.1	1.4	51.1	47.5	0.0
Transect 5 – Mid-Intertidal	T5-M	0.0	0.0	0.1	0.6	23.8	75.4	0.0
Transect 6 – Mid-Intertidal	T6-M	0.0	0.0	0.0	0.2	42.1	57.7	0.0
Transect 7 – Mid-Intertidal	T7-M	0.0	0.0	0.0	0.1	24.0	75.8	0.0
Transect 8 – Mid-Intertidal	T8-M	0.0	0.0	0.0	0.1	13.7	86.1	0.0
Transect 1 – Low-Intertidal	T1-L	0.0	0.0	4.0	7.0	46.9	42.1	0.0
Transect 2 – Low-Intertidal	T2-L	0.0	2.5	3.2	2.6	34.6	57.1	0.0
Transect 3 – Low-Intertidal	T3-L	0.0	0.0	0.3	2.2	26.1	71.3	0.1
Transect 4 – Low-Intertidal	T4-L	0.0	0.0	1.1	4.4	44.8	49.6	0.0
Transect 5 – Low-Intertidal	T5-L	0.0	0.0	0.4	2.4	27.0	70.2	0.0
Transect 6 – Low-Intertidal	T6-L	0.0	0.0	0.4	1.2	25.7	72.7	0.1
Transect 7 – Low-Intertidal	T7-L	0.0	0.0	0.0	0.4	29.1	70.4	0.0
Transect 8 – Low-Intertidal	T8-L	0.0	0.0	0.0	1.0	8.9	90.0	0.1

APPENDIX A – GRAIN SIZE CURVES

US Army Corps of Engineers
New England District

NAE ENVIRONMENTAL LABORATORY
Project Name: Misquamicut Beach
Project Location: Westerly, RI

Date Collected: 09/25/15
Date Recieved: 09/28/15
Date Analyzed: 11/30/15

Preparation Method: ASTM D421-85 (reapproved 2002)

Analysis Method: ASTM D 422-63 (reapproved 2002) - Sieve Nos. 4, 10, 40, 100, 200

Lab SOP: Particle Size Analysis of Sediments - Without Hydrometer (October 2011)

Received By: RBL **Analyzed By:** LAJ **Checked By:** RBL

Discussion: Twenty-four samples were received by the lab upon completion of field activities. There were no deviations from the established laboratory testing protocols during preparation or analysis.

Summary of Results:

Sample ID	%Cobble	%Gravel		%Sand			%Fines
		Coarse	Fine	Coarse	Medium	Fine	
T1-H	0.0	0.0	0.0	0.1	13.7	86.3	0.0
T2-H	0.0	0.0	0.0	0.0	25.5	74.5	0.0
T3-H	0.0	0.0	0.0	0.0	8.6	91.3	0.0
T4-H	0.0	0.0	0.0	0.0	10.0	90.0	0.0
T5-H	0.0	0.0	0.0	0.0	16.1	83.9	0.0
T6-H	0.0	0.0	0.0	0.0	23.7	76.2	0.0
T7-H	0.0	0.0	0.0	0.0	25.8	74.2	0.0
T8-H	0.0	0.0	0.0	0.0	0.4	99.6	0.0
T1-M	0.0	0.0	0.0	0.5	22.6	76.9	0.0
T2-M	0.0	0.0	0.0	0.6	33.9	65.4	0.0
T3-M	0.0	0.0	0.0	0.2	25.3	74.4	0.0
T4-M	0.0	0.0	0.1	1.4	51.1	47.5	0.0
T5-M	0.0	0.0	0.1	0.6	23.8	75.4	0.0
T6-M	0.0	0.0	0.0	0.2	42.1	57.7	0.0
T7-M	0.0	0.0	0.0	0.1	24.0	75.8	0.0
T8-M	0.0	0.0	0.0	0.1	13.7	86.1	0.0
T1-L	0.0	0.0	4.0	7.0	46.9	42.1	0.0
T2-L	0.0	2.5	3.2	2.6	34.6	57.1	0.0
T3-L	0.0	0.0	0.3	2.2	26.1	71.3	0.1
T4-L	0.0	0.0	1.1	4.4	44.8	49.6	0.0
T5-L	0.0	0.0	0.4	2.4	27.0	70.2	0.0
T6-L	0.0	0.0	0.4	1.2	25.7	72.7	0.1
T7-L	0.0	0.0	0.0	0.4	29.1	70.4	0.0
T8-L	0.0	0.0	0.0	1.0	8.9	90.0	0.1

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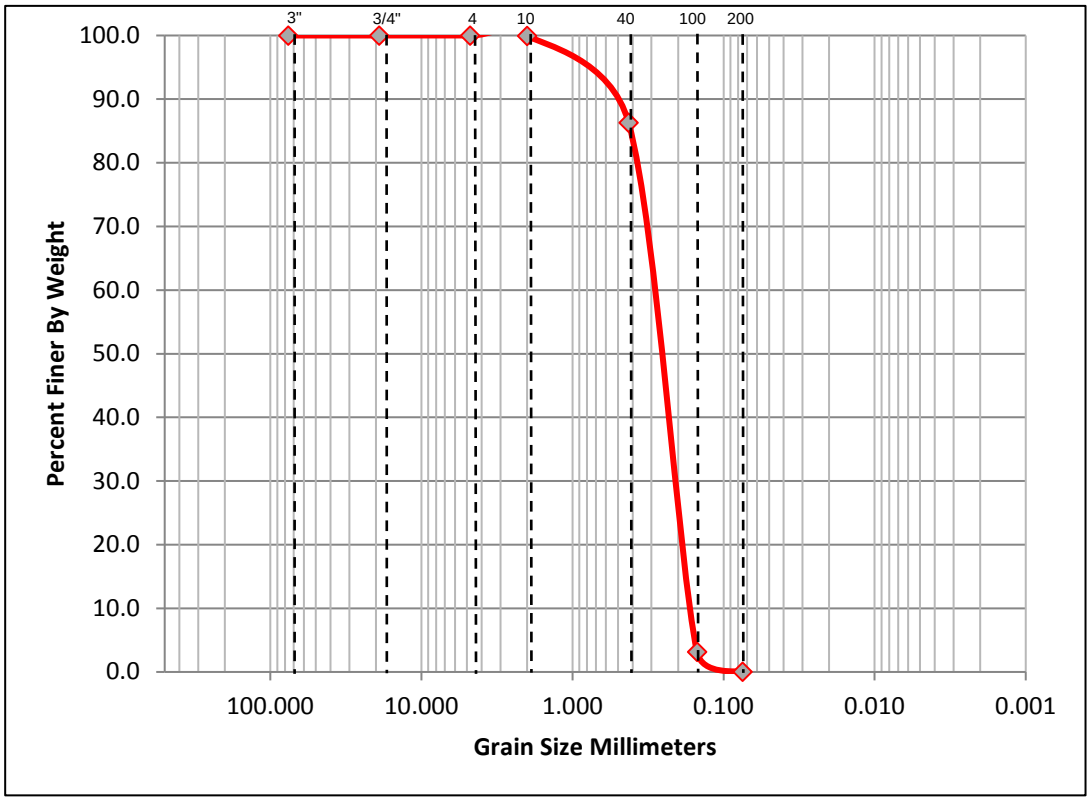
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T1-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	13.7	86.3	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1727	0.1892	0.2388	0.3050	0.3380	0.4207	8.18	1.96

Original Sample Weight (g)			573.4	Post Wash Weight (g)			-
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	506.7	506.7	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	542.8	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.2	463.5	0.3	0.1	0.1	99.9
#40	0.425	354.6	432.9	78.3	13.7	13.7	86.3
#100	0.150	325.5	802.3	476.8	83.2	96.9	3.1
#200	0.075	313.4	331.3	17.9	3.1	100.0	0.0
Sample Notes:							

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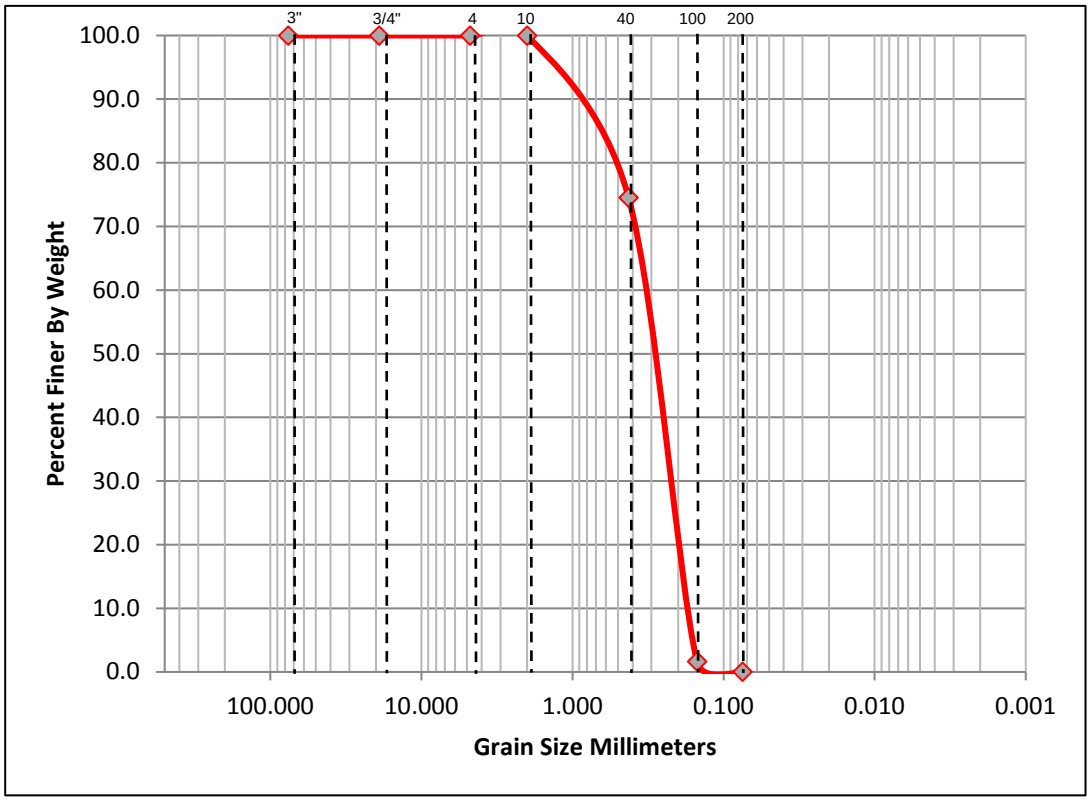
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T2-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	25.5	74.5	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1815	0.2004	0.2570	0.3325	0.3702	1.0738	7.65	2.04

Original Sample Weight (g)			761.9	Post Wash Weight (g)			*
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	506.7	506.7	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	542.8	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.2	463.4	0.2	0.0	0.0	100.0
#40	0.425	354.7	548.7	194.0	25.5	25.5	74.5
#100	0.150	325.5	880.7	555.2	72.9	98.4	1.6
#200	0.075	313.5	325.9	12.4	1.6	100.0	0.0
Sample Notes:							

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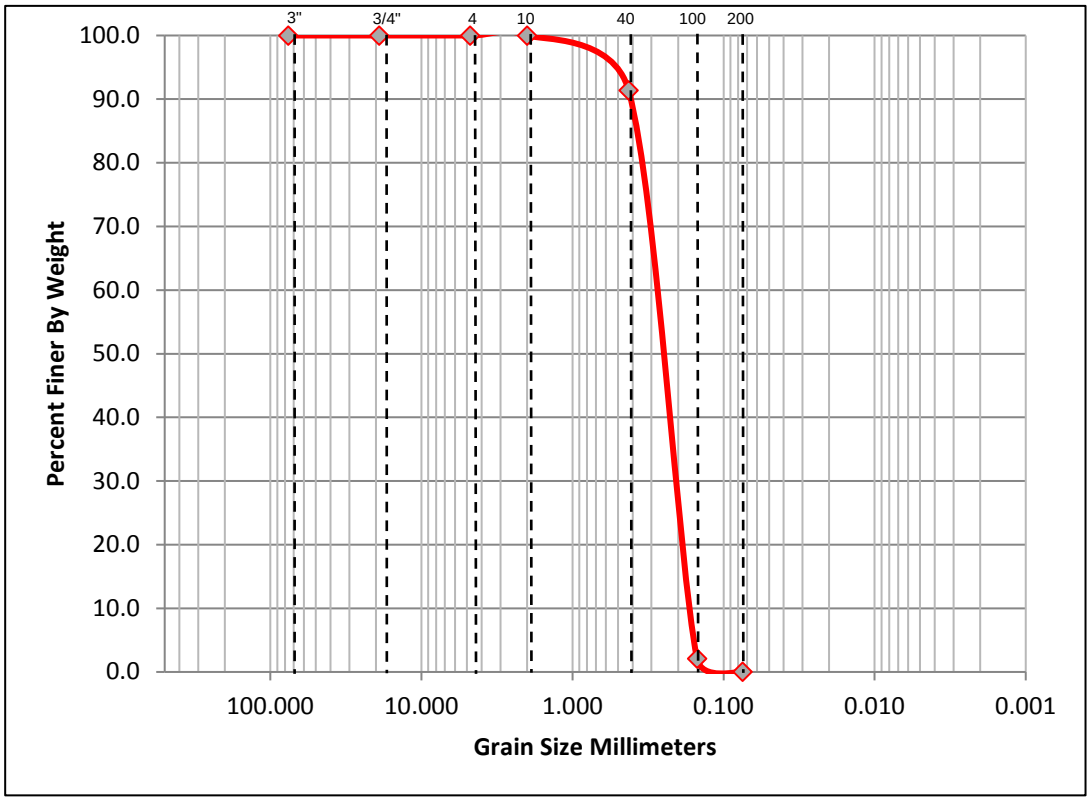
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T3-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	8.6	91.3	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1743	0.1897	0.2359	0.2976	0.3284	0.4054	8.24	1.88

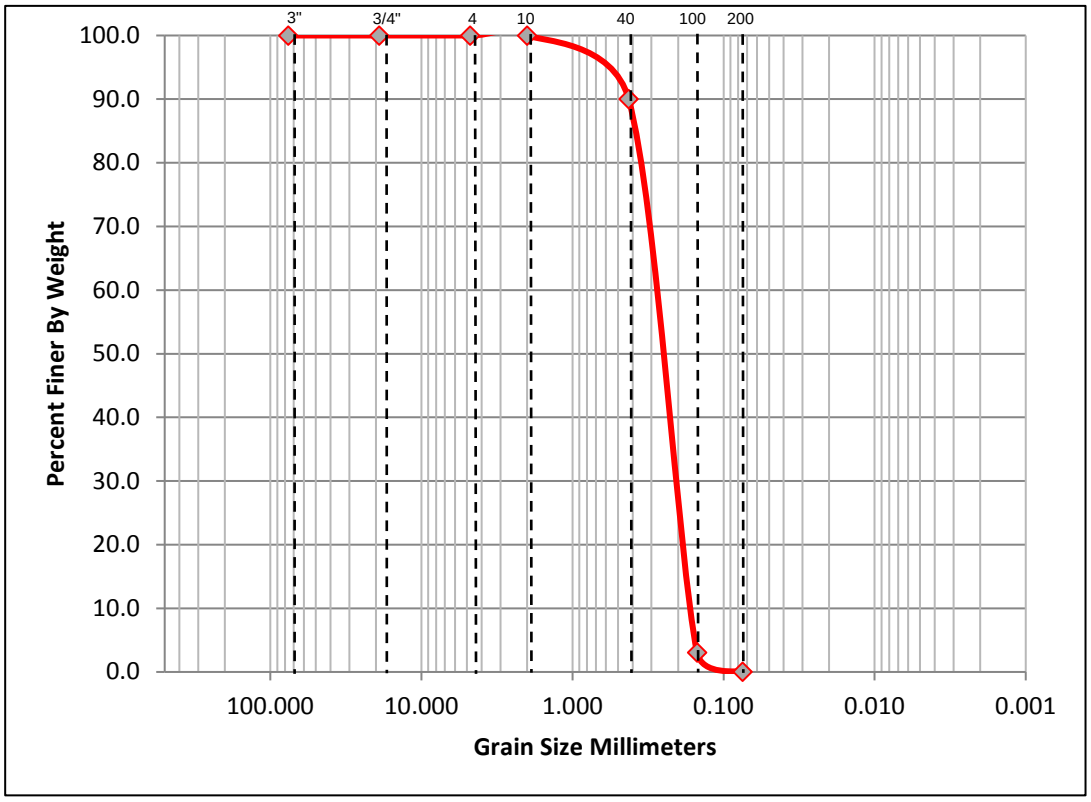
Original Sample Weight (g)			588.3	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.3	463.3	0.0	0.0	0.0	100.0
#40	0.425	354.8	405.6	50.8	8.6	8.6	91.4
#100	0.150	325.6	850.7	525.1	89.3	97.9	2.1
#200	0.075	313.5	325.8	12.3	2.1	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T4-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	10.0	90.0	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1719	0.1877	0.2352	0.2984	0.3301	0.4092	8.29	1.92

Original Sample Weight (g)			570.6	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	493.6	493.6	0.0	0.0	0.0	100.0
#10	2.000	470.1	470.1	0.0	0.0	0.0	100.0
#40	0.425	353.0	410.0	57.0	10.0	10.0	90.0
#100	0.150	328.8	824.9	496.1	86.9	96.9	3.1
#200	0.075	316.4	333.7	17.3	3.0	100.0	0.0
Sample Notes:							

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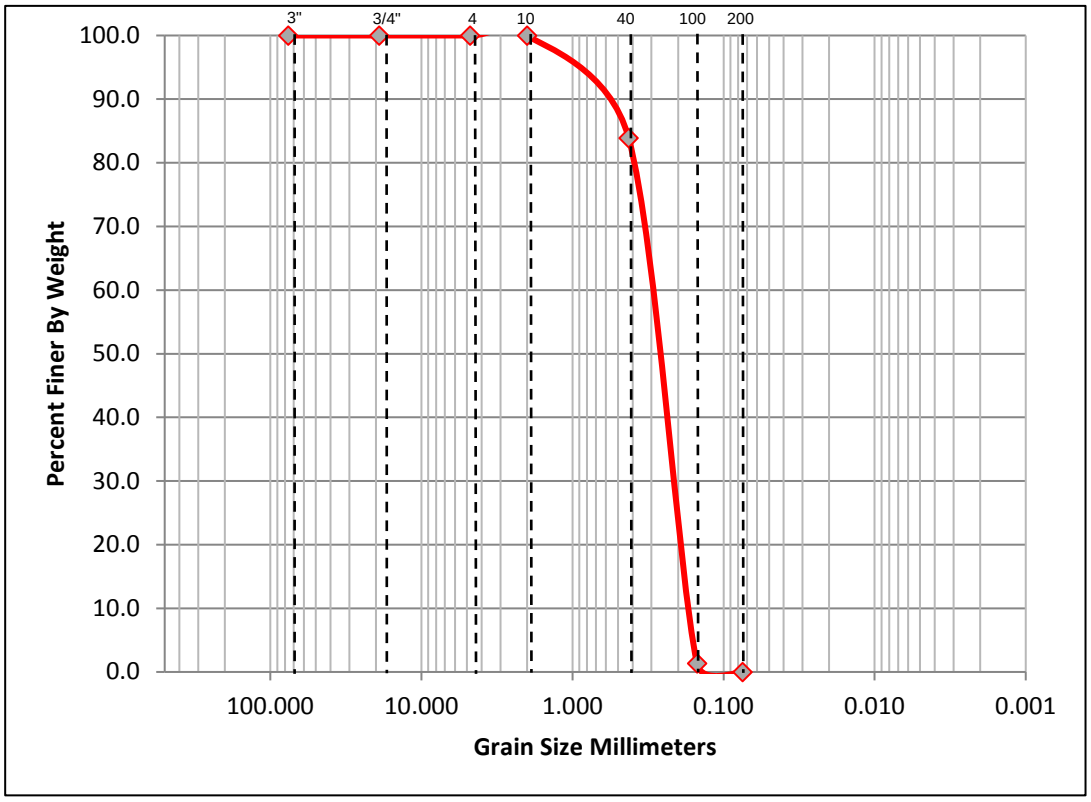
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T5-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	16.1	83.9	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1788	0.1955	0.2455	0.3121	0.3454	0.5330	7.95	1.93

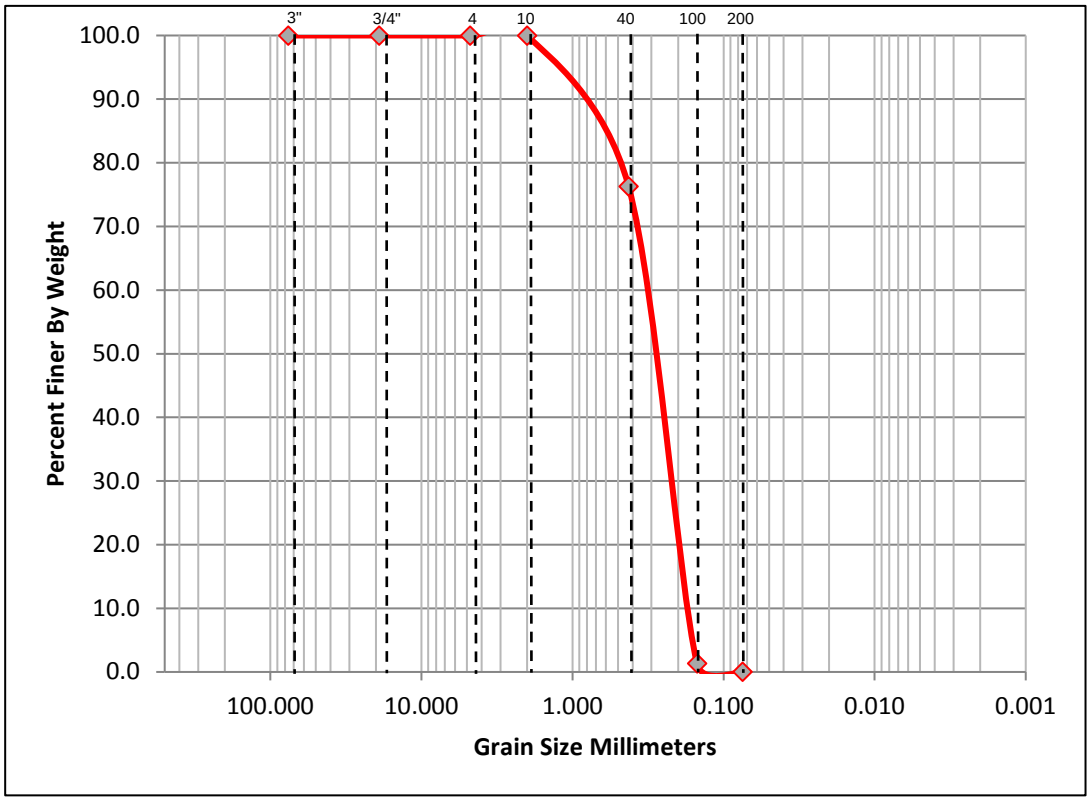
Original Sample Weight (g)			670.0	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.3	463.3	0.0	0.0	0.0	100.0
#40	0.425	354.8	462.7	107.9	16.1	16.1	83.9
#100	0.150	325.6	878.7	553.1	82.6	98.7	1.3
#200	0.075	313.5	322.5	9.0	1.3	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T6-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	23.7	76.2	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1818	0.2002	0.2552	0.3286	0.3653	1.0054	7.68	2.01

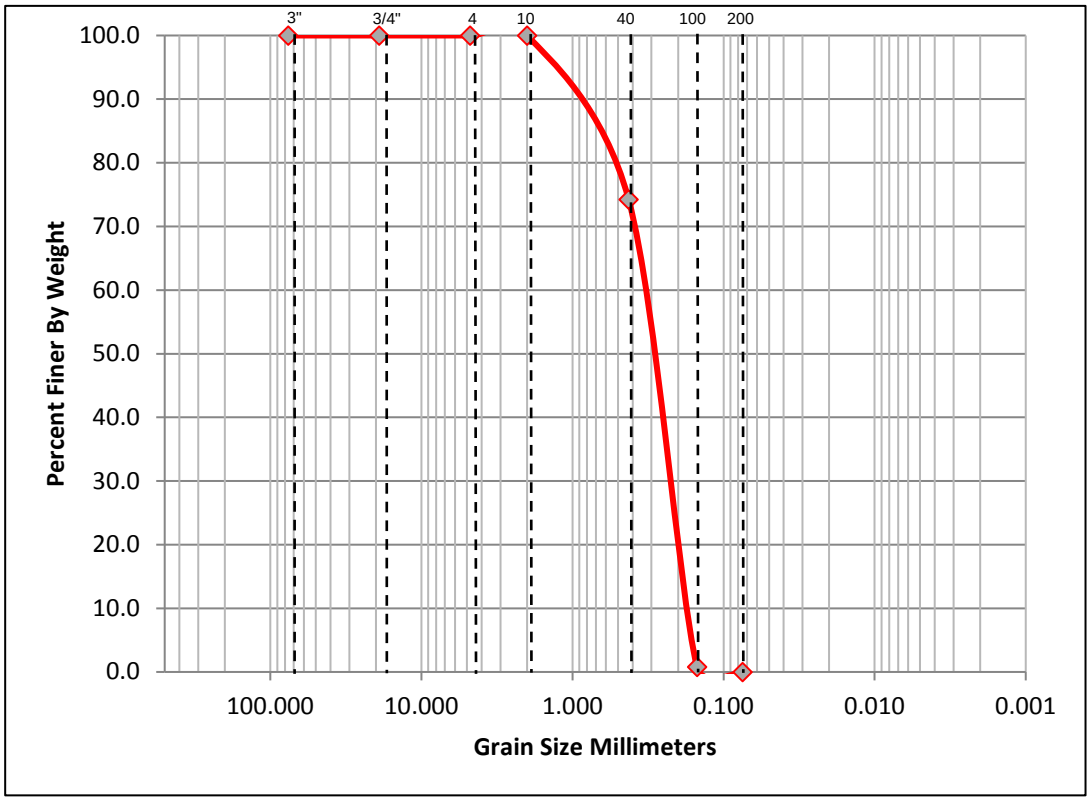
Original Sample Weight (g)			718.3	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	542.8	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.2	463.4	0.2	0.0	0.0	100.0
#40	0.425	354.6	524.9	170.3	23.7	23.7	76.3
#100	0.150	325.5	863.8	538.3	74.9	98.7	1.3
#200	0.075	313.5	322.9	9.4	1.3	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T7-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	25.8	74.2	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1845	0.2033	0.2594	0.3343	0.3717	1.0834	7.56	2.01

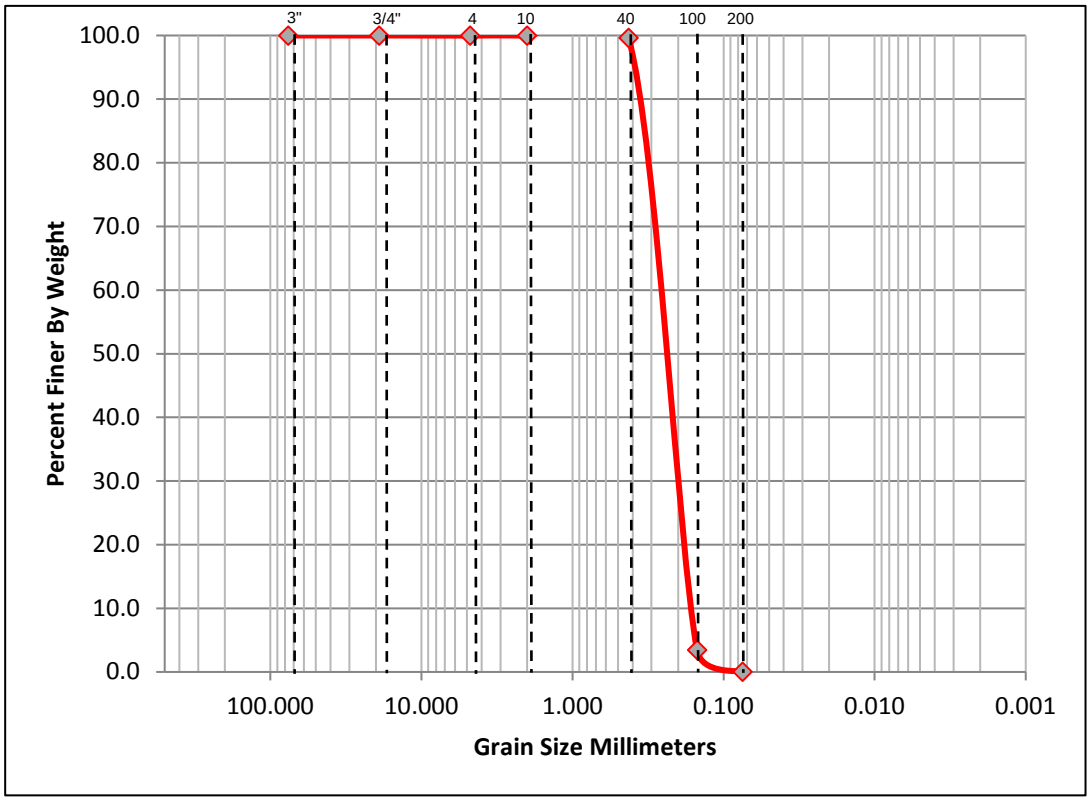
Original Sample Weight (g)			606.8	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.3	463.3	0.0	0.0	0.0	100.0
#40	0.425	354.8	511.2	156.4	25.8	25.8	74.2
#100	0.150	325.6	771.3	445.7	73.5	99.2	0.8
#200	0.075	313.5	318.2	4.7	0.8	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T8-H

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	99.6	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1688	0.1831	0.2260	0.2832	0.3118	0.3832	8.59	1.85

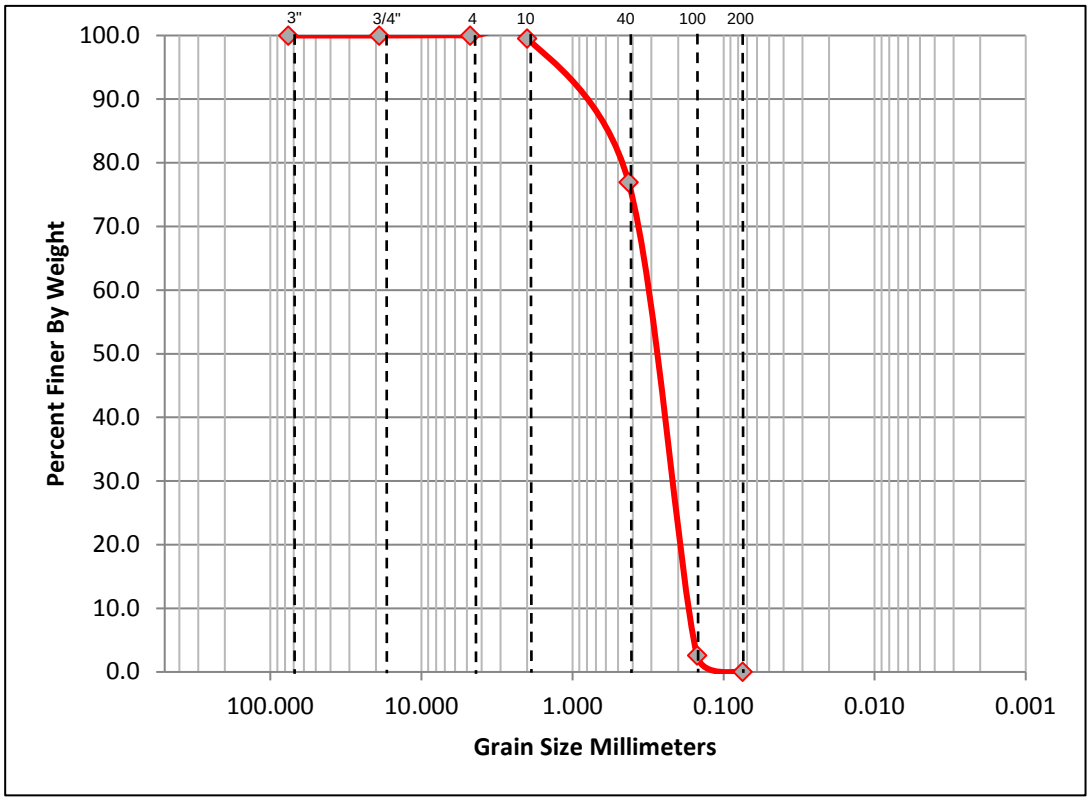
Original Sample Weight (g)			612.4	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	506.7	506.7	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	542.8	0.0	0.0	0.0	100.0
#4	4.750	493.5	493.6	0.1	0.0	0.0	100.0
#10	2.000	470.1	470.1	0.0	0.0	0.0	100.0
#40	0.425	353.0	355.3	2.3	0.4	0.4	99.6
#100	0.150	328.6	917.6	589.0	96.2	96.6	3.4
#200	0.075	316.4	337.2	20.8	3.4	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T1-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	22.6	76.9	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1774	0.1959	0.2514	0.3254	0.3624	0.9876	7.82	2.04

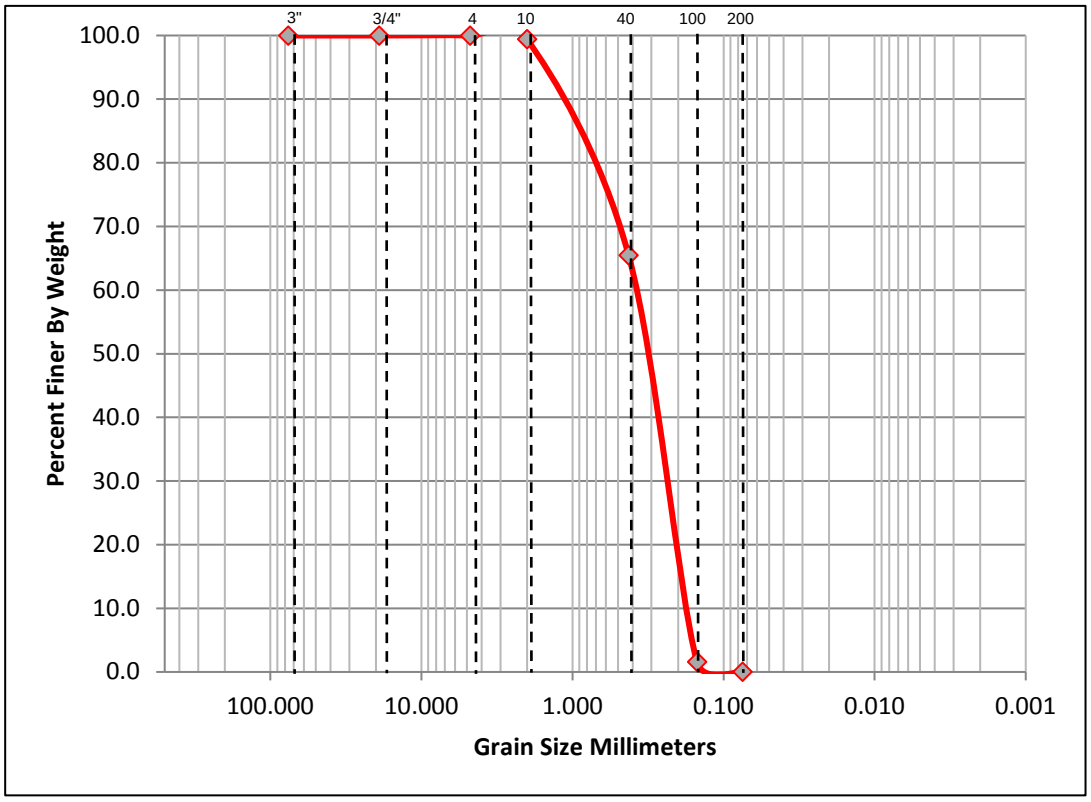
Original Sample Weight (g)			763.2	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	493.6	493.6	0.0	0.0	0.0	100.0
#10	2.000	470.1	473.7	3.6	0.5	0.5	99.5
#40	0.425	353.0	525.5	172.5	22.6	23.1	76.9
#100	0.150	328.7	895.9	567.2	74.3	97.4	2.6
#200	0.075	316.5	336.3	19.8	2.6	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T2-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.6	33.9	65.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1863	0.2078	0.2724	0.3585	0.4015	1.3317	7.28	2.16

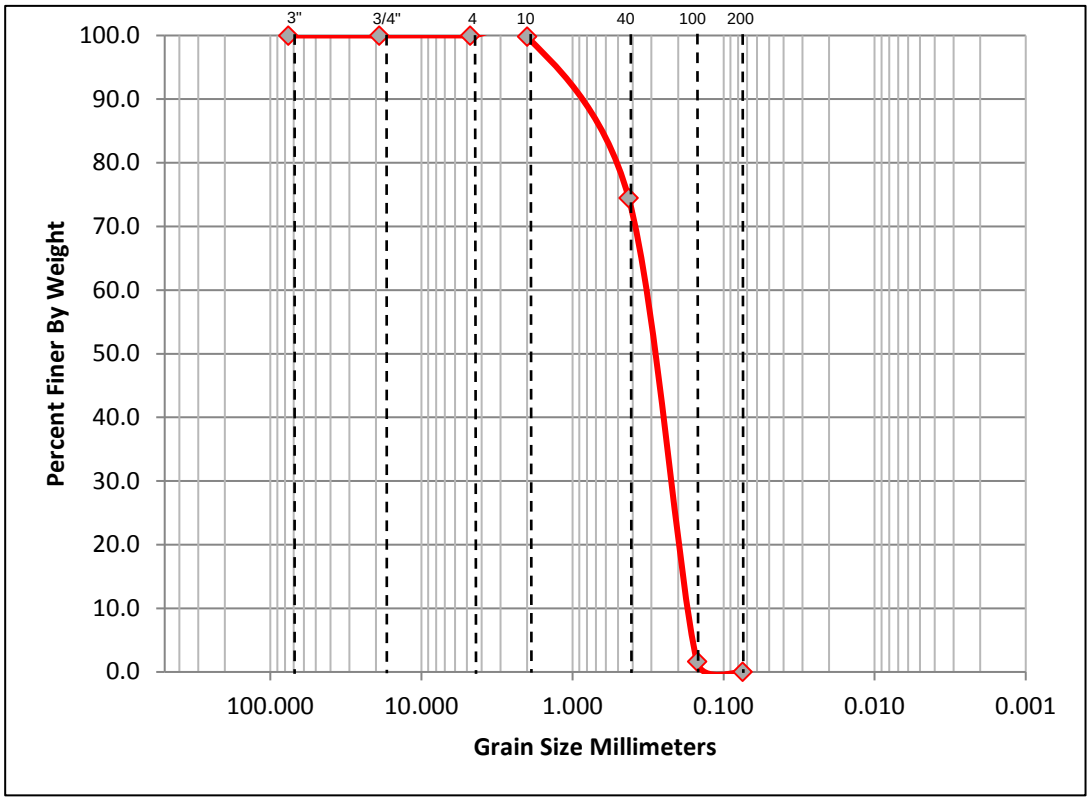
Original Sample Weight (g)			637.5	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	493.6	493.6	0.0	0.0	0.0	100.0
#10	2.000	470.1	473.9	3.8	0.6	0.6	99.4
#40	0.425	353.0	569.4	216.4	33.9	34.5	65.5
#100	0.150	328.8	736.1	407.3	63.9	98.4	1.6
#200	0.075	316.4	326.2	9.8	1.5	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T3-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	25.3	74.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1816	0.2005	0.2571	0.3326	0.3704	1.0796	7.64	2.04

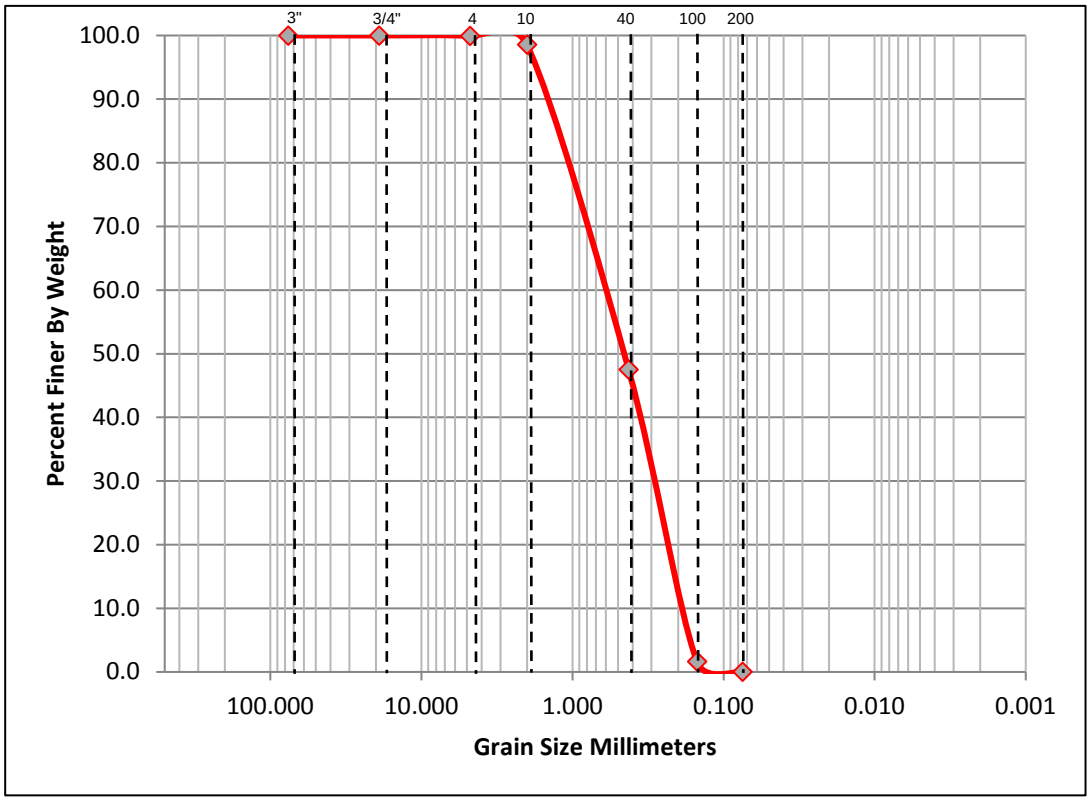
Original Sample Weight (g)			609.9	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	493.6	493.6	0.0	0.0	0.0	100.0
#10	2.000	470.1	471.3	1.2	0.2	0.2	99.8
#40	0.425	353.0	507.5	154.5	25.3	25.5	74.5
#100	0.150	328.8	773.1	444.3	72.8	98.4	1.6
#200	0.075	316.4	326.1	9.7	1.6	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T4-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	1.4	51.1	47.5	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.2001	0.2301	0.3201	0.5022	0.8107	1.5819	3.95	4.05

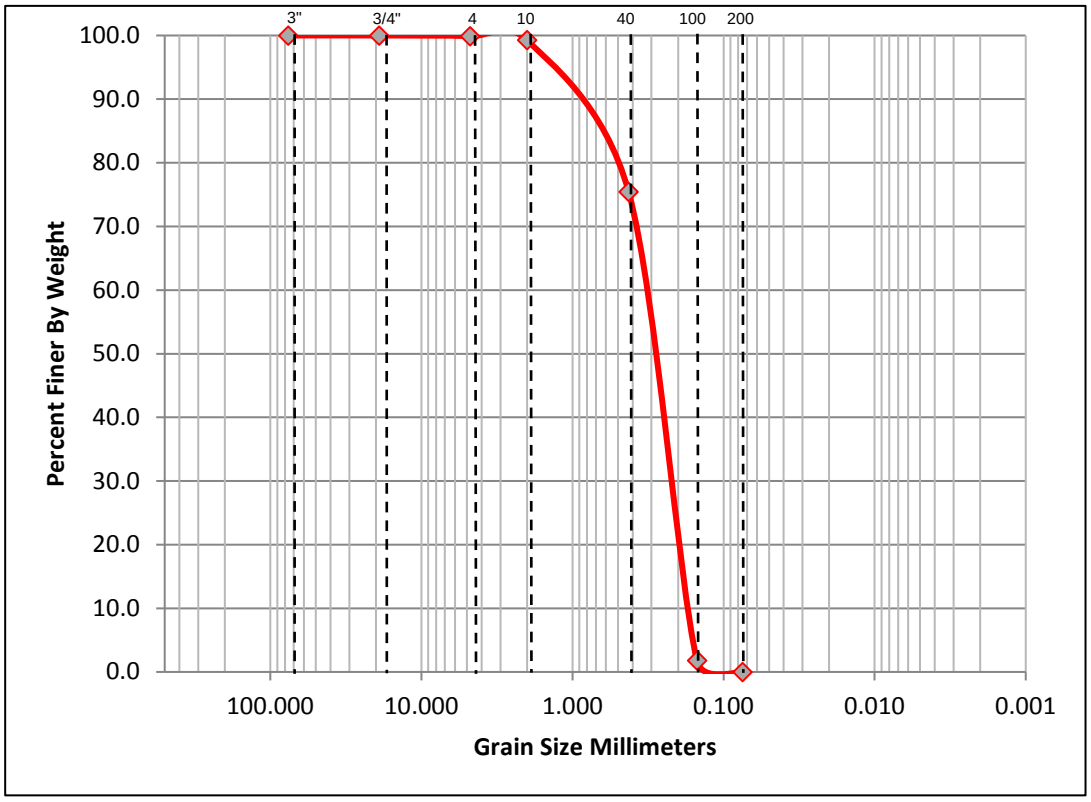
Original Sample Weight (g)			830.6	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	488.8	489.5	0.7	0.1	0.1	99.9
#10	2.000	463.3	474.6	11.3	1.4	1.4	98.6
#40	0.425	354.8	778.9	424.1	51.1	52.5	47.5
#100	0.150	325.6	706.5	380.9	45.9	98.4	1.6
#200	0.075	313.5	326.8	13.3	1.6	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T5-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.6	23.8	75.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1807	0.1994	0.2554	0.3301	0.3674	1.0577	7.69	2.03

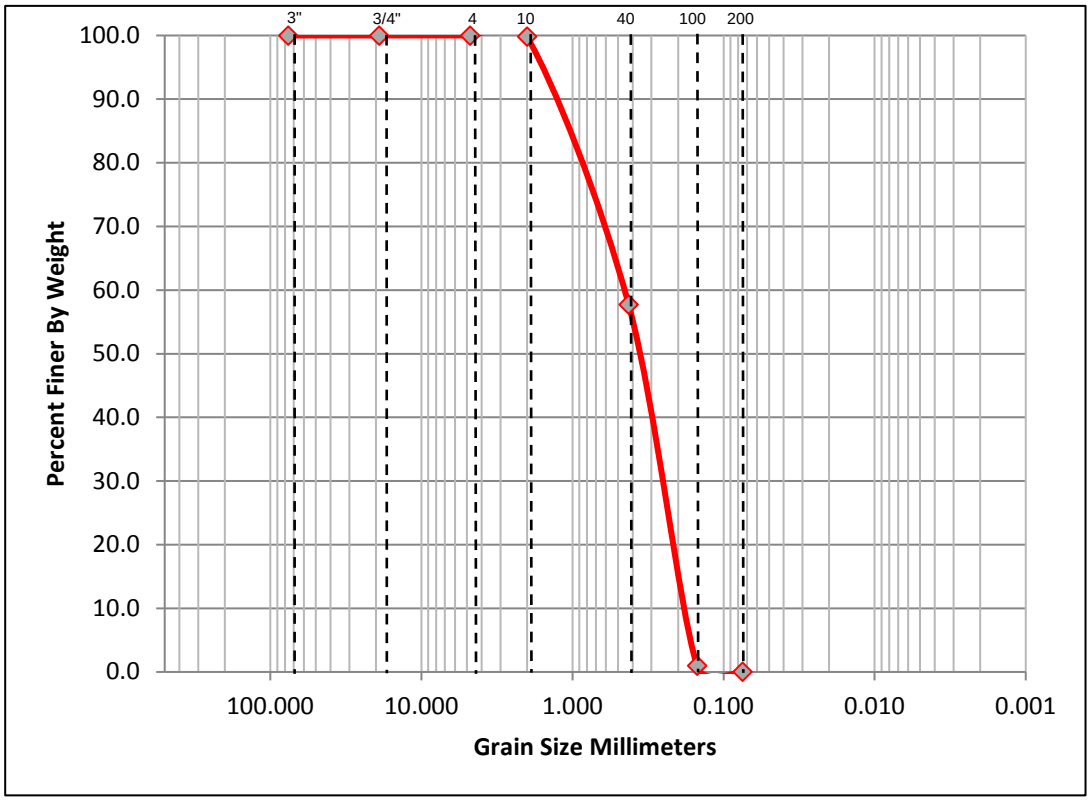
Original Sample Weight (g)			793.6	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	488.8	489.6	0.8	0.1	0.1	99.9
#10	2.000	463.3	468.4	5.1	0.6	0.7	99.3
#40	0.425	354.8	543.9	189.1	23.8	24.6	75.4
#100	0.150	325.6	910.2	584.6	73.7	98.2	1.8
#200	0.075	313.5	327.5	14.0	1.8	100.0	0.0

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T6-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	42.1	57.7	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1937	0.2179	0.2906	0.3875	0.5096	1.4456	5.89	2.63

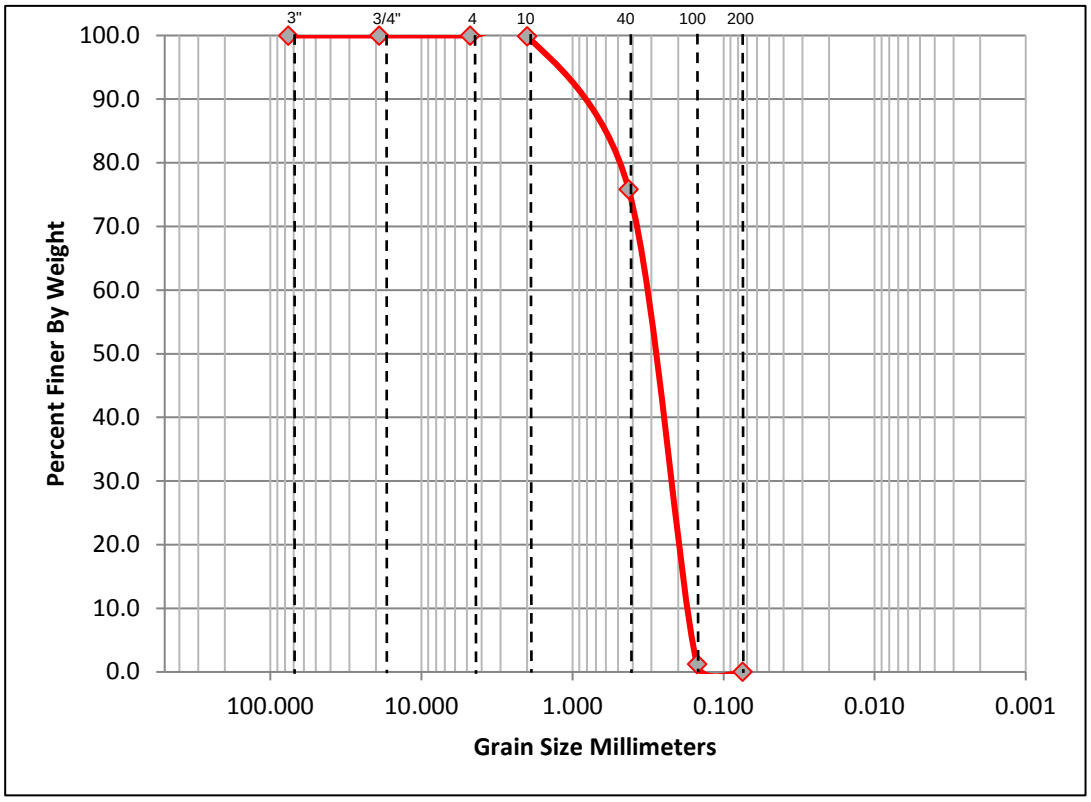
Original Sample Weight (g)			775.9	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.3	464.8	1.5	0.2	0.2	99.8
#40	0.425	354.8	681.2	326.4	42.1	42.3	57.7
#100	0.150	325.6	765.9	440.3	56.7	99.0	1.0
#200	0.075	313.5	321.1	7.6	1.0	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T7-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	24.0	75.8	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1823	0.2008	0.2561	0.3298	0.3666	1.0255	7.66	2.01

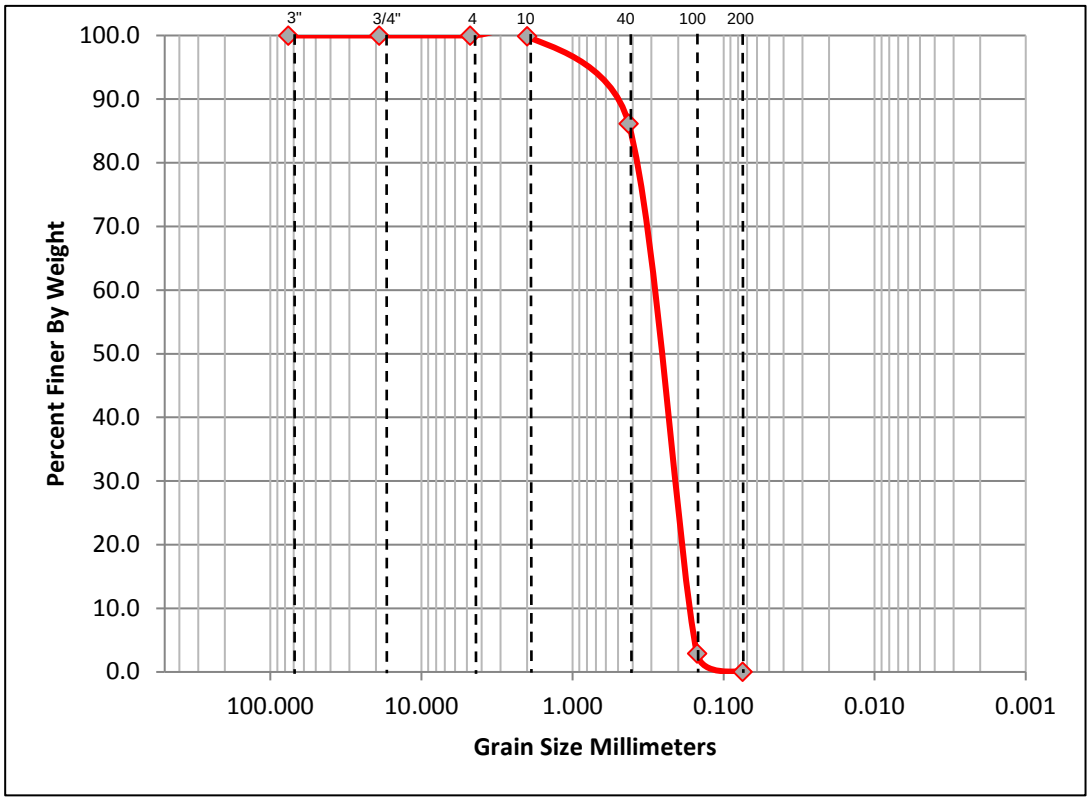
Original Sample Weight (g)			619.5	Post Wash Weight (g)			0
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	493.6	493.6	0.0	0.0	0.0	100.0
#10	2.000	470.1	470.9	0.8	0.1	0.1	99.9
#40	0.425	353.0	501.9	148.9	24.0	24.2	75.8
#100	0.150	328.8	791.0	462.2	74.6	98.8	1.2
#200	0.075	316.4	323.9	7.5	1.2	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T8-M

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	13.7	86.1	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1735	0.1900	0.2395	0.3056	0.3386	0.4212	8.16	1.95

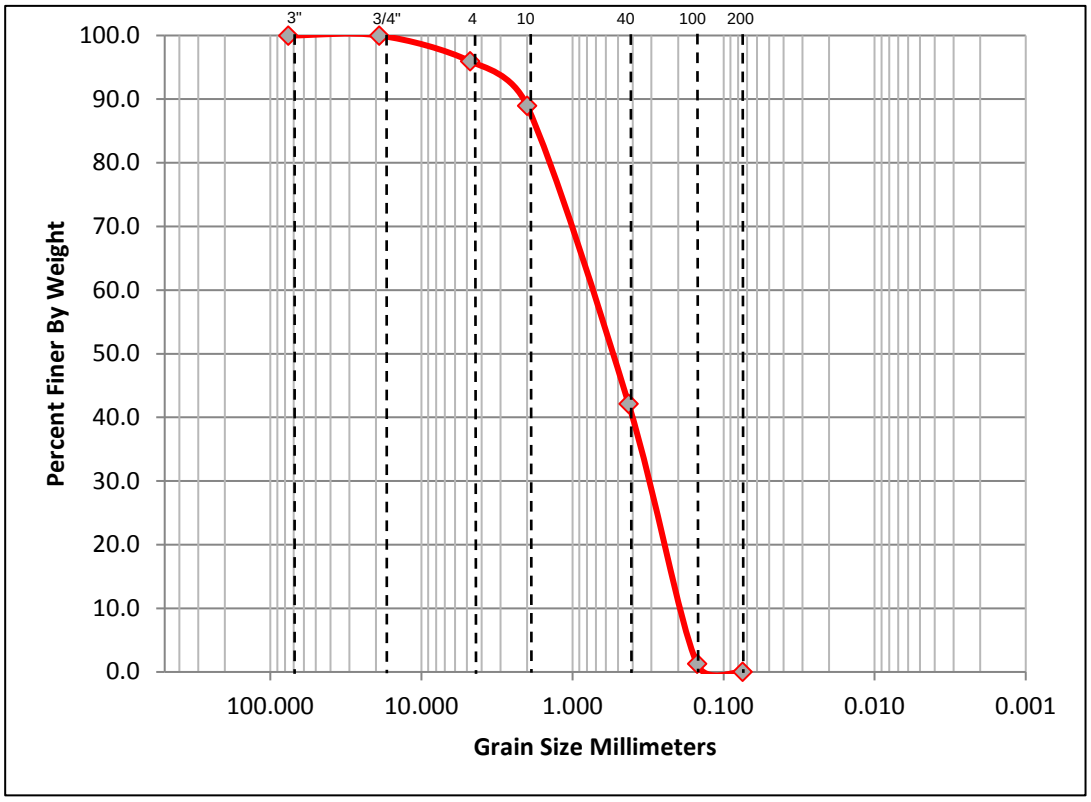
Original Sample Weight (g)			729.8	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	506.7	506.7	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	542.8	0.0	0.0	0.0	100.0
#4	4.750	493.6	493.6	0.0	0.0	0.0	100.0
#10	2.000	470.1	471.0	0.9	0.1	0.1	99.9
#40	0.425	352.9	453.0	100.1	13.7	13.8	86.2
#100	0.150	328.6	936.3	607.7	83.3	97.1	2.9
#200	0.075	316.4	337.2	20.8	2.9	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T1-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.0	7.0	46.9	42.1	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.2087	0.2424	0.3434	0.6902	1.0262	1.8662	3.21	4.92

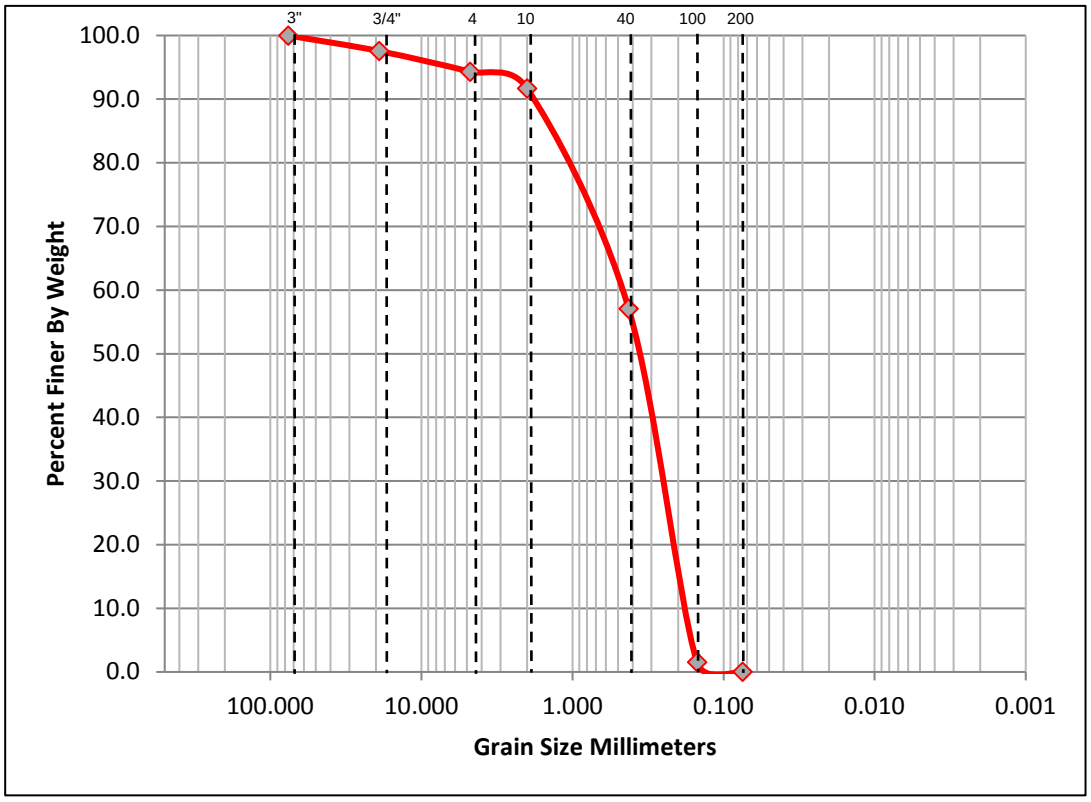
Original Sample Weight (g)			780.6	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	488.8	520.4	31.6	4.0	4.0	96.0
#10	2.000	463.3	517.7	54.4	7.0	11.0	89.0
#40	0.425	354.8	720.7	365.9	46.9	57.9	42.1
#100	0.150	325.6	644.3	318.7	40.8	98.7	1.3
#200	0.075	313.5	323.3	9.8	1.3	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T2-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.5	3.2	2.6	34.6	57.1	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1919	0.2166	0.2909	0.3899	0.5574	1.6954	5.44	2.91

Original Sample Weight (g)			1236.1	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	573.0	30.3	2.5	2.5	97.5
#4	4.750	488.8	528.9	40.1	3.2	5.7	94.3
#10	2.000	463.3	495.6	32.3	2.6	8.3	91.7
#40	0.425	354.8	782.5	427.7	34.6	42.9	57.1
#100	0.150	325.6	1012.2	686.6	55.5	98.5	1.5
#200	0.075	313.5	332.2	18.7	1.5	100.0	0.0

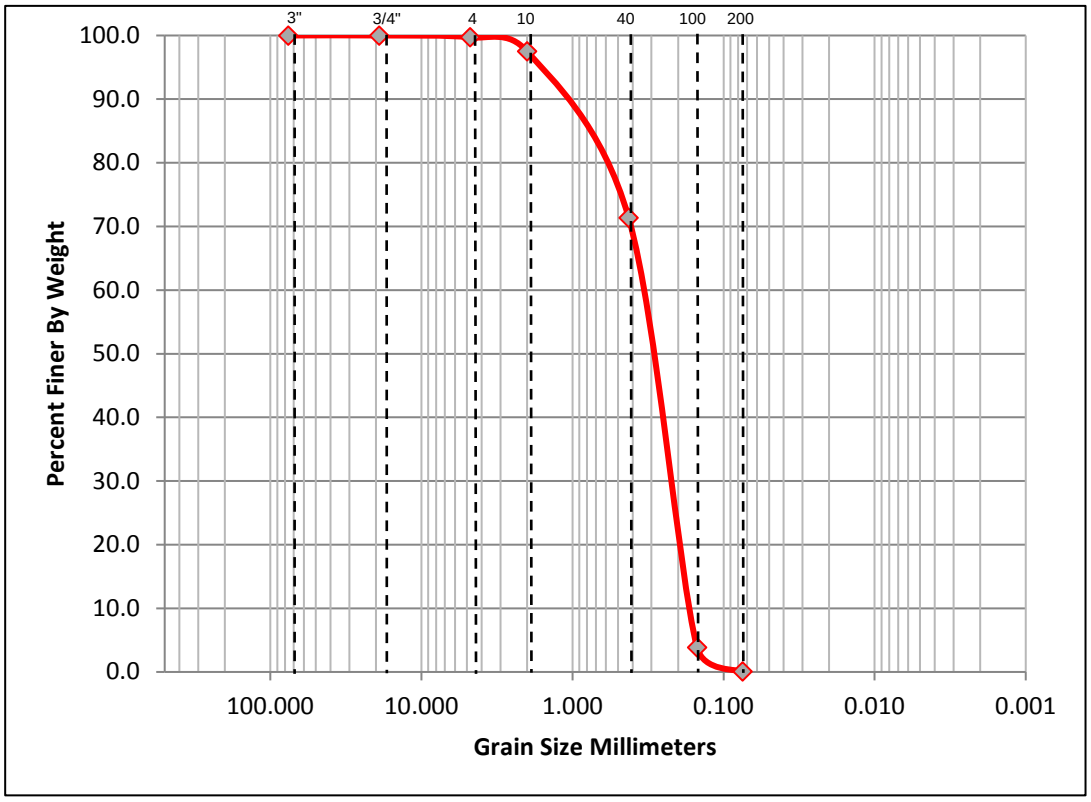
Sample Notes:

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T3-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	2.2	26.1	71.3	0.1	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1750	0.1954	0.2565	0.3379	0.3787	1.2462	7.74	2.16

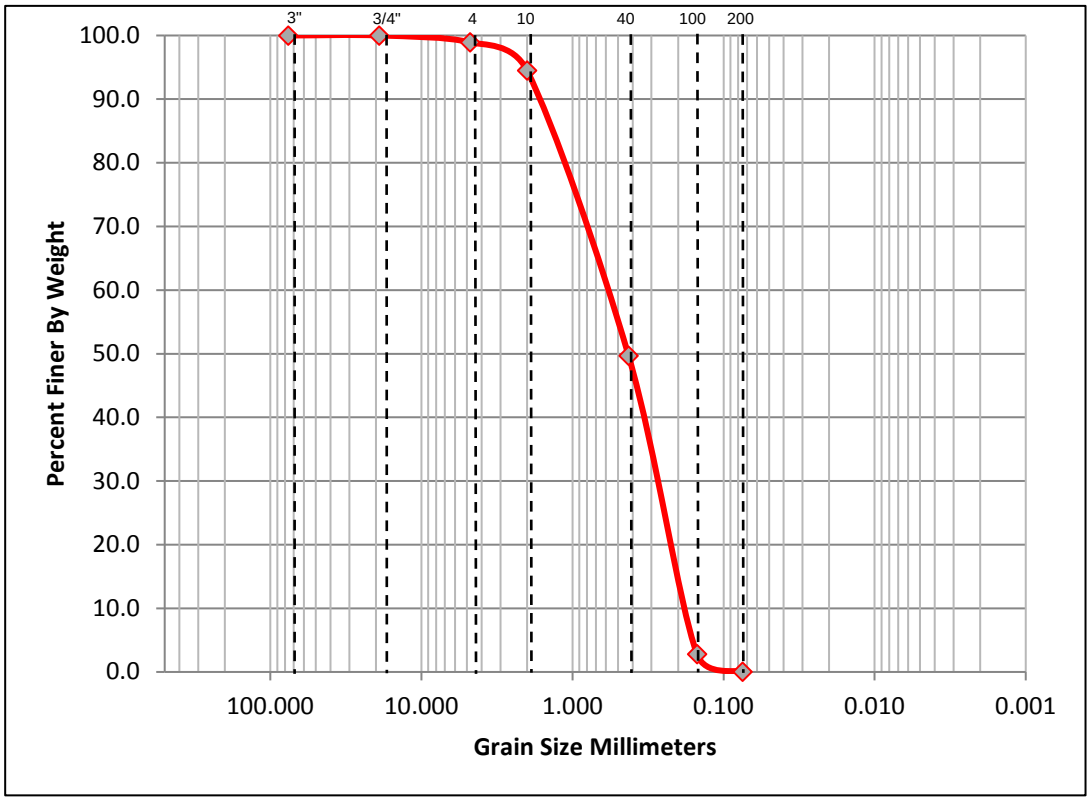
Original Sample Weight (g)			943.8	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	493.6	496.4	2.8	0.3	0.3	99.7
#10	2.000	470.1	490.8	20.7	2.2	2.5	97.5
#40	0.425	353.0	599.7	246.7	26.1	28.6	71.4
#100	0.150	328.8	965.9	637.1	67.5	96.1	3.9
#200	0.075	316.4	352.3	35.9	3.8	99.9	0.1
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T4-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.1	4.4	44.8	49.6	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1923	0.2216	-	-	-	-	-	-

Original Sample Weight (g)			1089.5	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	0.0	0.0	0.0	0.0	0.0	100.0
#4	4.750	493.6	505.3	11.7	1.1	1.1	98.9
#10	2.000	470.1	518.3	48.2	4.4	5.5	94.5
#40	0.425	353.0	841.6	488.6	44.8	50.3	49.7
#100	0.150	328.8	839.3	510.5	46.9	97.2	2.8
#200	0.075	316.4	346.5	30.1	2.8	100.0	0.0

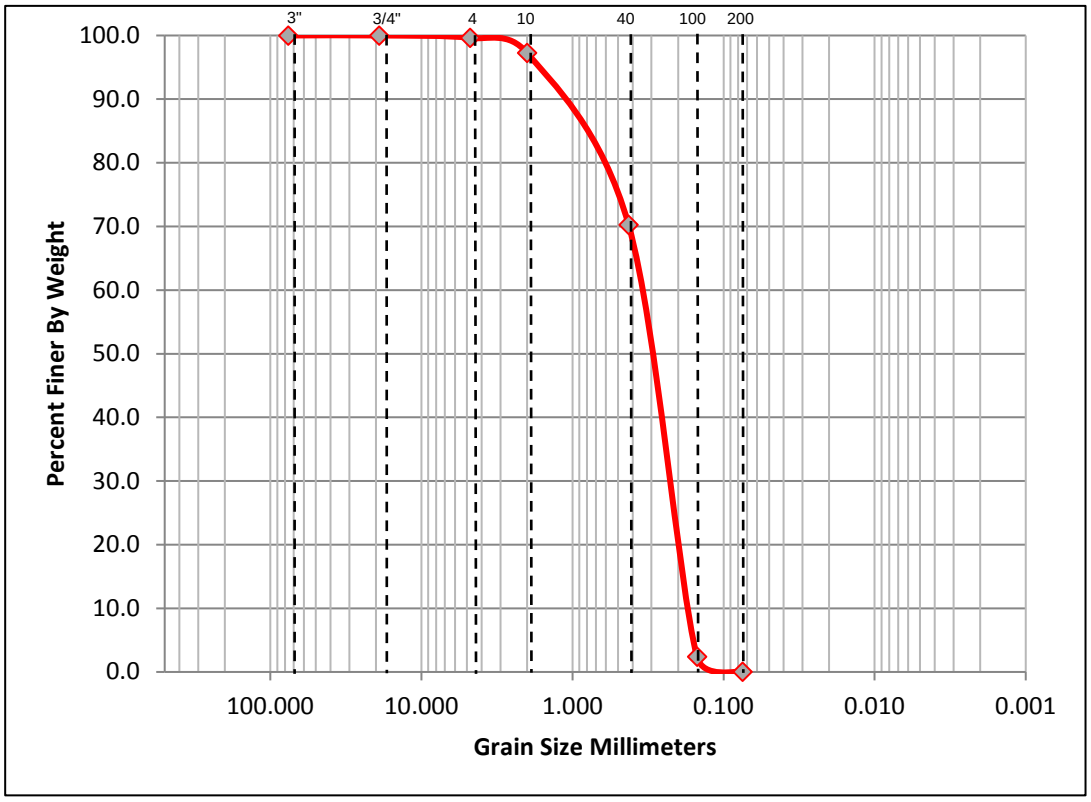
Sample Notes:

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T5-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	2.4	27.0	70.2	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1809	0.2011	0.2619	0.3430	0.3835	1.2855	7.55	2.12

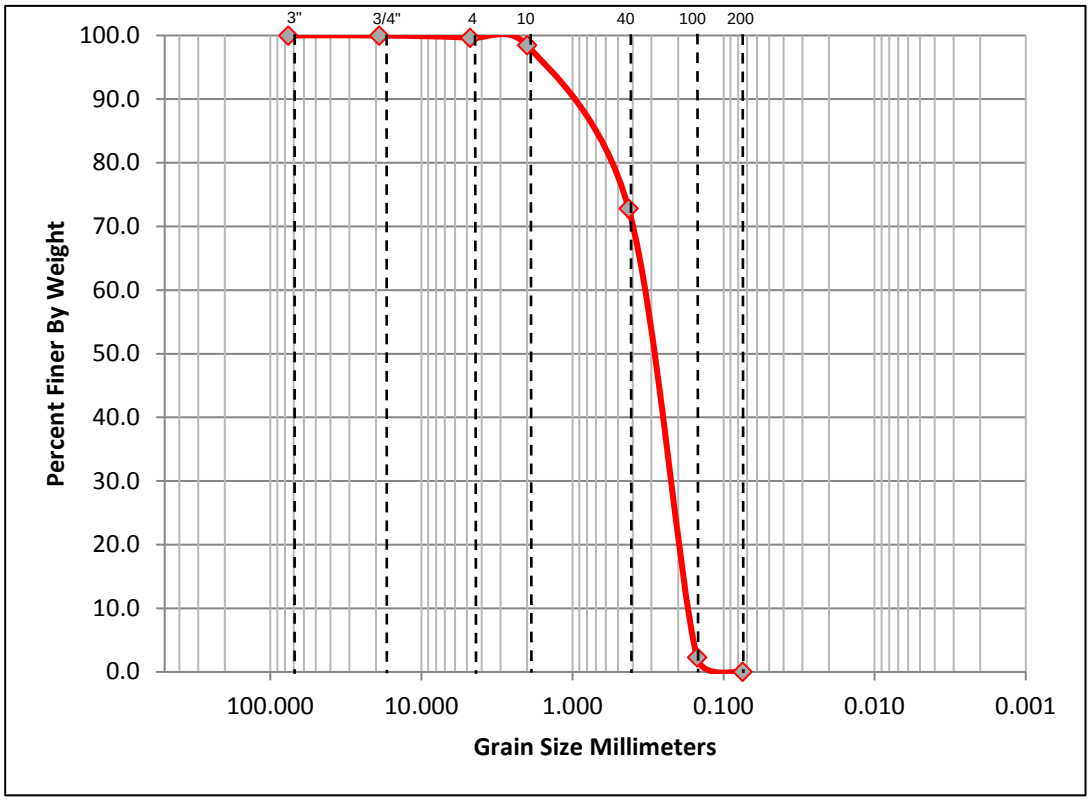
Original Sample Weight (g)			1059.2	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	493.6	497.7	4.1	0.4	0.4	99.6
#10	2.000	470.1	495.0	24.9	2.4	2.7	97.3
#40	0.425	353.0	639.3	286.3	27.0	29.8	70.2
#100	0.150	328.8	1047.4	718.6	67.8	97.6	2.4
#200	0.075	316.4	341.3	24.9	2.4	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T6-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	1.2	25.7	72.7	0.1	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1800	0.1995	0.2580	0.3361	0.3751	1.1745	7.64	2.08

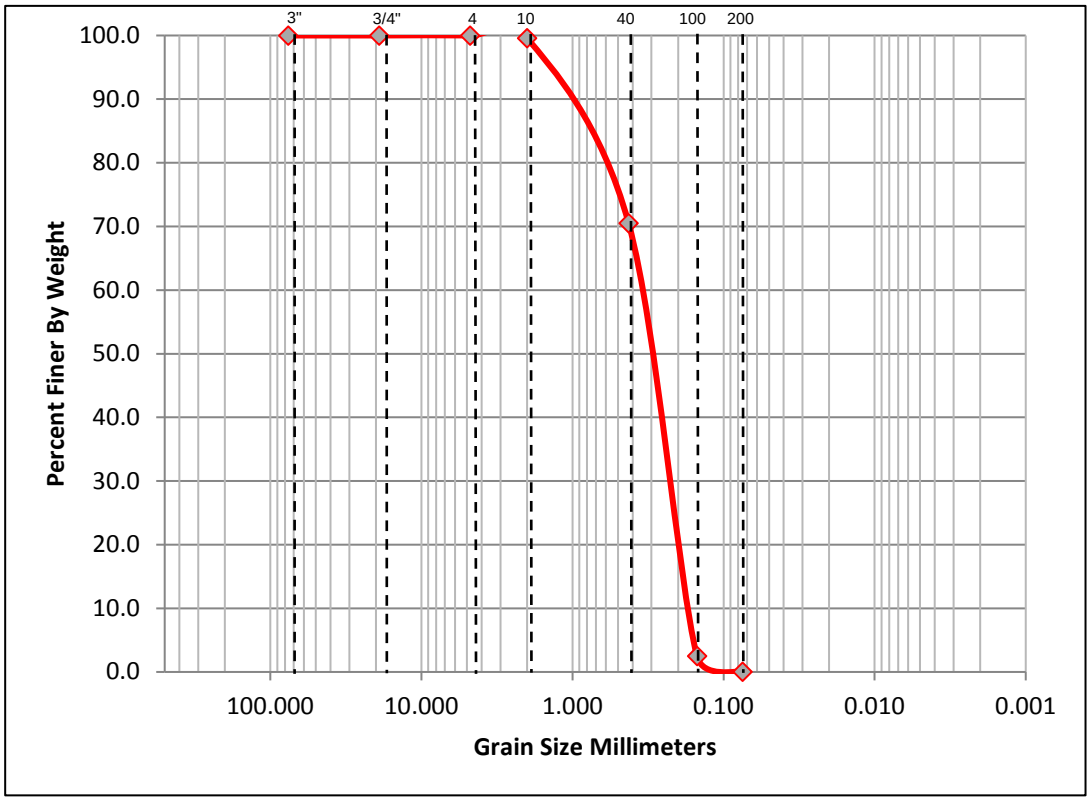
Original Sample Weight (g)			1170.3	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	488.8	493.2	4.4	0.4	0.4	99.6
#10	2.000	463.3	477.1	13.8	1.2	1.6	98.4
#40	0.425	354.8	655.0	300.2	25.7	27.2	72.8
#100	0.150	325.6	1150.5	824.9	70.5	97.7	2.3
#200	0.075	313.5	339.9	26.4	2.3	99.9	0.1
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T7-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	29.1	70.4	0.0	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1804	0.2007	0.2613	0.3422	0.3826	1.2104	7.57	2.12

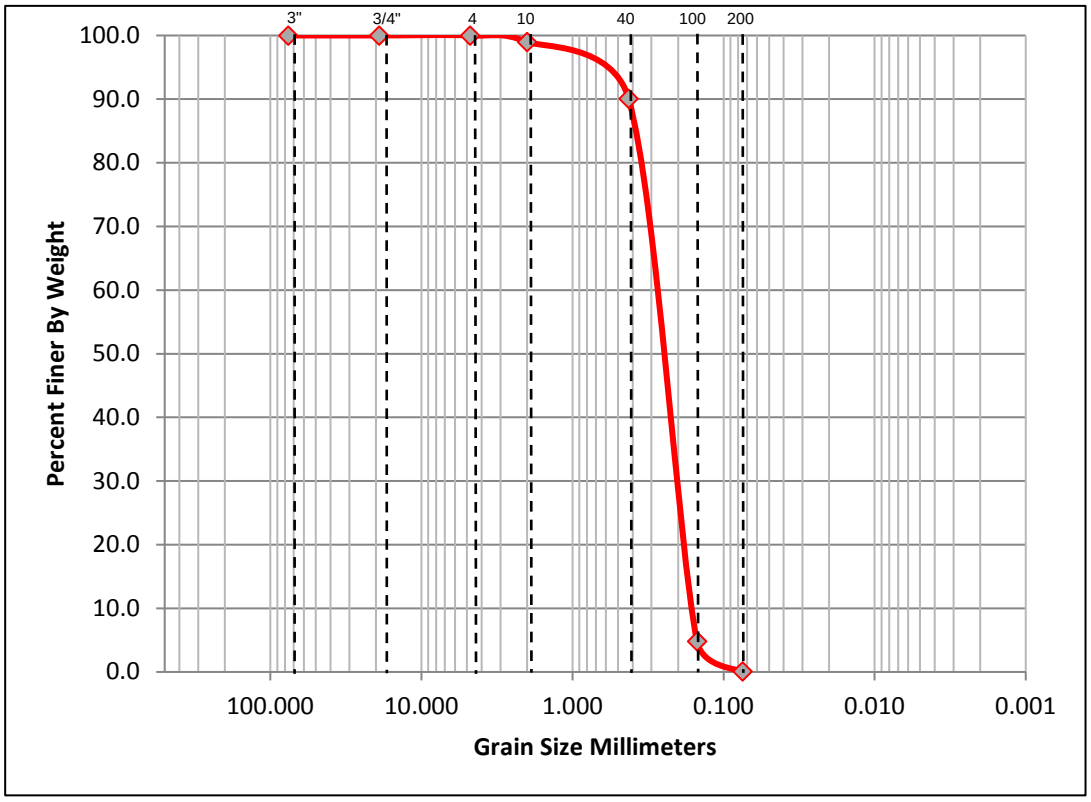
Original Sample Weight (g)			1003.3	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	506.7	506.7	0.0	0.0	0.0	100.0
3/4"	19.000	542.8	542.8	0.0	0.0	0.0	100.0
#4	4.750	493.6	493.6	0.0	0.0	0.0	100.0
#10	2.000	470.1	474.2	4.1	0.4	0.4	99.6
#40	0.425	352.9	644.9	292.0	29.1	29.5	70.5
#100	0.150	328.6	1011.0	682.4	68.0	97.5	2.5
#200	0.075	316.4	340.8	24.4	2.4	100.0	0.0
Sample Notes:							

US Army Corps of Engineers®
New England District

Project Name: Misquamicut Beach
Project Location: Westerly, RI
Sample ID: T8-L

Date: 11/30/15

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel		%Sand			%Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.0	8.9	90.0	0.1	

D10	D15	D30	D50	D60	D85	Cc	Cu
0.1667	0.1829	0.2312	0.2958	0.3280	0.4087	8.46	1.97

Original Sample Weight (g)			712.4	Post Wash Weight (g)			
Sieve	Sieve Size (mm)	Sieve Weight (g)	Shaken Weight (g)	Weight Retained (g)	Percent Retained	Cum. Percent Retained	Percent Finer
3"	76.200	0.0	0.0	0.0	0.0	0.0	100.0
3/4"	19.000	542.7	542.7	0.0	0.0	0.0	100.0
#4	4.750	488.8	488.8	0.0	0.0	0.0	100.0
#10	2.000	463.3	470.5	7.2	1.0	1.0	99.0
#40	0.425	354.8	418.4	63.6	8.9	9.9	90.1
#100	0.150	325.6	932.9	607.3	85.2	95.2	4.8
#200	0.075	313.5	347.3	33.8	4.7	99.9	0.1
Sample Notes:							

Pawcatuck River, Rhode Island
Coastal Storm Risk Management
Feasibility Study

Appendix A2: Coastal Zone Consistency Determination

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900
(401) 783-3370
Fax (401) 783-2069

October 31, 2017

Colonel William M. Conde
Department of the Army
New England District, Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751
Attn: Planning Division - Ms. Judith Johnson

Re: CRMC CZMA conditional consistency concurrence for Pawcatuck River, Rhode Island Coastal Storm Risk Management Feasibility Study (October 2016)
CRMC File # 2016-10-104

Dear Colonel Conde,

The Rhode Island Coastal Resources Management Council (CRMC) has been working in collaboration with Christopher Hatfield of your office and in coordination with the affected local communities to develop an acceptable locally preferred plan (LPP) as part of the Pawcatuck River, Rhode Island Coastal Storm Risk Management Feasibility Study (Study). The Study area encompasses the coastal areas of the Rhode Island communities of Westerly, Charlestown, South Kingstown and Narragansett, and the coastal watershed areas these communities are included as part of the CRMC's Salt Pond Region Special Area Management Plan. The current Study has undergone significant change in the project description with additional analyses having been performed by Corps staff at the request of the CRMC since the Study was issued by the Corps last October.

The LPP has been developed in collaboration with the affected communities and includes an identification of 247 residential structures that would be eligible for elevation above the current FEMA base flood elevation (BFE). Additionally, the LPP identifies 21 mainly commercial structures as eligible for flood proofing, removes 110 previously identified structures for consideration for elevation, and does not include any mandatory buyout of properties (7 properties were initially targeted for buyout).

The specific enforceable policies of the Rhode Island Coastal Resources Management Program (CRMP) at issue in this matter are Sections 210.2.C.6, 300.3.B.1 and Section 950.B.1(d) of the Salt Pond Region Special Area Management Plan (SAMP) as follows:

CRMP Section 210.2 Barrier Islands and Spits

> C.6. It is the Council's policy to assure <u>that all construction permitted on developed barriers is undertaken to provide for the greatest physical security of the inhabitants of the barrier and adjoining mainland</u> and to maintain, to as great an extent as possible, the qualities of the adjacent coastal pond and wetlands. (Emphasis added)

CRMP Section 300.3 Residential, Commercial, Industrial and Recreational Structures

> B.1. It shall be the policy of the Council to undertake all appropriate actions to prevent, minimize or mitigate the risks of storm damage to property and coastal resources, endangerment of lives and the public burden of post-storm disaster assistance consistent with policies of the State of Rhode Island as contained in the Hazard Mitigation Plan element of the State Guide Plan when considering applications for the construction of residential, commercial, industrial and recreational structures, including utilities such as gas, water and sewer lines, in high hazard areas. (Emphasis added)

Salt Pond Region SAMP Section 950.B.1(d)

> All construction within Federal Emergency Management Agency (FEMA) Flood Zones must follow the required construction standards for the flood zone in which the structure is located. Municipal officials need to certify that these standards are correct and present on any application for activity submitted before the CRMC.

Based on the current project description and anticipation of Corps approval for the LPP, the CRMC has determined that, at this stage, the proposed federal activities are conditionally consistent with Rhode Island's Coastal Resources Management Program pursuant to 15 CFR § 930.4. The State's continued concurrence will be based on ACOE Headquarters approval of the project to include the LPP. Please note that if the requirements of paragraphs (a)(1) through (3) of 15 CFR § 930.4 are not met, then all parties shall treat the CRMC's conditional concurrence as an objection. The State's final consistency concurrence of the federal action will be determined after the ACOE files a formal consistency determination with the CRMC in accordance with 15 CFR § 930 Subpart C following ACOE Headquarters approval of the project.

Thank you again for the ACOE's work on this Study, and the State looks forward to a productive partnership as we both move this important project forward to ensure public safety and make existing residences and businesses identified in the Study more resilient to coastal hazards. Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov with any questions regarding this determination.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/lat
cc Jennifer Cervenka, CRMC Chair
Jeffrey Willis, CRMC Deputy Director
James Boyd, CRMC Coastal Policy Analyst

Pawcatuck River, Rhode Island
Coastal Storm Risk Management
Feasibility Study

Appendix A3: Environmental Coordination

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

December 14, 2017

John R. Kennelly
Department of the Army
New England District, Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Dear Mr. Kennelly:

Re: Pawcatuck River Coastal Storm Risk Management Project
Westerly, Charlestown, South Kingstown and Narragansett, Rhode Island

This responds to your letter, dated November 8, 2017, requesting our concurrence with your determination that the above-referenced project may affect, but is not likely to adversely affect, the federally threatened northern long-eared bat (*Myotis septentrionalis*) or piping plover (*Charadrius melodus*). You also request that we provide comments under the Fish and Wildlife Coordination Act. Your request and our response are provided in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended: 16 U.S.C 1531, *et seq.*) and the Fish and Wildlife Coordination Act of 1956 (16 U.S.C. 742a, *et seq.*).

The proposed Pawcatuck River Coastal Storm Risk Management Project (Project) involves a range of nonstructural measures to reduce the risk of storm damage along 28 miles of moderately developed coast in the towns of Westerly, Charlestown, South Kingstown, and Narragansett, Rhode Island. Specifically, the Locally Preferred Plan (LPP) for the Project consists of elevating the first floors of 247 structures. Elevation of the structures will rely on conventional residential construction methods, which involves the demolition of the existing foundation, elevating of the structure, and construction of a new foundation. In addition, 21 primarily commercial structures are also included in the LPP for flood proofing.

Endangered Species Act Comments

Northern Long-Eared Bat

The northern long-eared bat (NLEB) is a forest-dependent species, and the forested uplands adjacent to the project area may support its summer roosting habitat. The footprint of the buildings

proposed for elevation will remain the same during the proposed project; therefore, we do not anticipate the removal of a large number of trees for construction purposes. However, in the event that individual trees need to be removed to enable access for construction vehicles, the U.S. Army Corps of Engineers (Corps) committed to the following conservation measure:

- no cutting of trees ≥3 inches diameter at breast height between 15 April and 30 September in any year to avoid direct effects to the NLEB.

Piping Plover

The coastline within the project area does have potential to support suitable nesting and foraging habitat for piping plover. The Project would not involve beach nourishment or flood wall construction, and while several structures are located in close proximity to Roger Wheeler State Park, none of the structures proposed for elevation are located within piping plover nesting areas. In addition, due to the nature of this project being contained within the footprints of existing structures, we do not anticipate any direct adverse effects to the piping plover. While some indirect impacts to this species may occur in the form of construction and traffic noise, we do not expect them to be significant, as similar human-related disturbances regularly occur in the vicinity of the project area.

Therefore, we concur with your determination that this Project may affect, but is not likely to adversely affect, the northern long-eared bat or piping plover.

Fish and Wildlife Coordination Act Comments

Based on our review of the information provided, we are not aware of any substantial or significant impacts the Project would have on fish and wildlife resources in the project area. This determination does not preclude future evaluation and recommendations by the U.S. Fish and Wildlife Service, should the project description change.

Further consultation with us under section 7 of the Endangered Species Act is not required at this time. Should project plans change, or if additional information on listed species becomes available, the Corps should contact us to determine if further consultation is necessary. Thank you for your cooperation, and please contact Ms. Maria Tur at (603) 227-6419 if you need further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

November 8, 2017

Planning Division
Evaluation Branch

Mr. Tom Chapman, Supervisor
Department of the Interior
U.S. Fish and Wildlife Service
Ecological Services
70 Commercial Street, Suite 300
Concord, Massachusetts 03301-5087

Dear Mr. Chapman:

The U.S. Army Corps of Engineers (USACE), New England District, is currently working on finalizing the Environmental Assessment (EA) for the Pawcatuck River Coastal Storm Risk Management (CSRM) study in Westerly, Charlestown, South Kingstown, and Narragansett, Rhode Island (see Figure 1). The floodplain completely encompasses the coastal barrier beaches and salt ponds in the area (see Figure 2). This study is authorized in a resolution approved by the Committee on Public Works of the United States Senate, dated September 12, 1969. Authorization and funding is also provided under investigations heading, Chapter 4, Title X, Division A of the Disaster Relief Appropriations Act of 2013, Public Law 113-2 (127 Stat. 23) enacted January 29, 2013. The Secretary of the Army is authorized to complete ongoing flood and storm damage reduction studies in areas that were impacted by Hurricane Sandy.

A review of our ongoing project related coordination pursuant to the Fish and Wildlife Coordination Act (FWCA), the Endangered Species Act (ESA) and the Coastal Barrier Resources Act (CBRA) is provided as follows. The USACE received a Planning Aid Letter from your office for the Pawcatuck River CSRM study dated August 12, 2015. Subsequently, we sent a letter to your office dated September 16, 2016 pursuant to the ESA and a separate letter, dated October 25, 2016, requesting a Section 2(b) Coordination Act Report (CAR) pursuant to the FWCA. We determined that some homes proposed for elevation were located within designated CBRA units or their buffer zones. We requested a CBRA determination in a letter dated January 9, 2017. The USFWS responded in a letter dated April 17, 2017 identifying fifteen homes that were located within CBRA units.

Since April 2017, an iterative process of review and coordination with multiple federal, state and local agencies and the public, resulted in project modifications (see the Revised Project Description section). The purpose of this letter is to provide you with the current project description, to request a Section 2(b) Coordination Act Report (CAR) from your office pursuant to the FWCA, and to request the U.S. Fish and Wildlife Service's concurrence with the attached "not likely to adversely affect" determination for the federally listed northern long-eared bat (*Myotis septentrionalis*) and piping plover (*Charadrius melodus*) pursuant to the ESA. There will be no work conducted within a CBRA unit.

Revised Project Description

The study area includes about 28 miles of moderately developed coast in the towns of Westerly, Charlestown, South Kingstown, and Narragansett, in Washington County, Rhode Island. The project description outlined in the September 16 and October 25, 2016 letters to your office was the Tentatively Selected Plan (TSP) which consisted of elevating the first floors of 341 structures in the four study area communities +1-foot above the FEMA designated base flood elevation. Following USACE and public review of the TSP and the USACE Agency Decision Milestone meeting, it was decided the study team would: conduct a performance based sea level change analysis (the 'intermediate' sea level rise rate was found to be the best performing rate over the economic and planning horizons), economically evaluate certain structures for potential flood proofing and acquisition, and optimize the analysis to determine the National Economic Development (NED) plan. The acquisition of structures determined to be economically justified within the CRBA units was also discussed with federal and state agencies. The NED plan consisted of elevating the first floors of 357 primarily residential structures, dry flood proofing 21 primarily commercial structures, and the acquisition of 7 properties located in CBRA units. Working with the communities, Rhode Island Coastal Resources Management Council (RICRMC) found 110 structures identified for elevation where the structure was not owned by the same entity who owns the land. These structures were eliminated from the NED plan as well as the 7 properties identified for acquisition within the CBRA units at the request of the RICRMC. The resulting Locally Preferred Plan (LPP) consists of elevating 247 structures and flood proofing of the 21 commercial structures.

The LPP consists of elevating the first floors of 247 structures in the four study area communities. The first floors will be elevated to a height corresponding to the FEMA designated Base Flood Elevation (BFE), ranging from +11 feet North Atlantic Vertical Datum of 1988 (NAVD88) to +17 feet NAVD88, plus 1 additional foot in accordance with Corps/NFIP standards, and another 0.8 feet to account for the

intermediate rate of sea level rise over the next 50 years. Properties eligible for elevation, by town, are as follows:

- Westerly: Elevate 49 Structures
- Charlestown: Elevate 5 Structures
- South Kingstown: Elevate 72 Structures
- Narragansett: Elevate 81 Structures

Twenty-one primarily commercial structures (6 in Westerly, 4 in South Kingstown, and 11 in Narragansett) are also included in the LPP for flood proofing. They consist of large multi-story hotels, sheet metal buildings, brick on concrete slab buildings, etc.

Construction Method: Elevation of individual structures will rely on conventional residential construction methods. First, existing structures will be elevated using lifting jacks and supported on temporary cribbing foundations. Temporary utility connections will be put into place to allow occupants to remain in the structure throughout construction. A new or extended foundation would then be constructed. Those structures located in the AE-zone of the floodplain will be provided with a new concrete wall foundation. Those in the VE-zone will be placed on new concrete piers. Once ready, the structures will then be lowered onto the new foundations and the permanent utility connections made.

Dry flood proofing consists of sealing all areas from the ground level up to approximately 3 feet of a structure to reduce the risk of damage from storm surge resulting from storms of a certain magnitude by making walls, doors, windows and other openings resistant to penetration by storm surge waters. Walls are coated with sealants, waterproofing compounds, or plastic sheeting is placed around the walls and covered, and back-flow from water and sewer lines prevention mechanisms such as drain plugs, standpipes, grinder pumps, and back-up valves are installed. Openings, such as doors, windows, sewer lines and vents, may also be closed temporarily, with sandbags or removable closures, or permanently. Critical utilities may be relocated to a less vulnerable elevation.

Species Listed in the Project Area

The following species were identified by the U.S. Fish and Wildlife Service Information, Planning and Conservations System (IPaC) website as threatened or endangered resources that may occur in the study area:

- Roseate Tern (*Sterna dougallii dougallii*) – Endangered
- Red Knot (*Calidris canutus rufa*) – Threatened
- Northern Long-Eared Bat (*Myotis septentrionalis*) – Threatened

As previously stated, we received a Planning Aid Letter, dated August 12, 2015, from the USFWS for this project. The piping plover (*Charadrius melodus*), listed as federally threatened, was also identified by the USFWS in the Planning Aid Letter as having potential to be in the project area.

Roseate terns generally nest on sandy, gravelly, or rocky islands and have fairly specialized feeding habits, consuming primarily sand lance. Roseate terns capture food mainly by plunge-diving but also by surface-dipping and contact-dipping (MA NHESP 2007[1], USFWS 2010[2]). The upland properties associated with individual houses proposed for elevation do not support suitable breeding or foraging habitat for roseate terns. Therefore, project activities should have no effect on the roseate tern and will not be discussed further.

The red knot makes one of the longest yearly migrations of any bird, traveling 9,300 miles from its Arctic breeding grounds to Tierra del Fuego in southern South America. During migration, red knots concentrate in huge numbers at traditional staging grounds. Delaware Bay is an important staging area during spring migration, where the knots feed on the eggs of spawning horseshoe crabs. Red knot breed in drier tundra areas, such as sparsely vegetated hillsides (USFWS 2017[3]). Outside of breeding season, it is found primarily in intertidal, marine habitats, especially near coastal inlets, estuaries, and bays. The upland properties associated with individual houses proposed for elevation or flood proofing do not provide suitable breeding or foraging habitat for red knot. Therefore, project activities should have no effect on the red knot and will not be discussed further.

[1] Massachusetts Natural Heritage and Endangered Species Program (MA NHESP). 2007. Roseate Tern (*Sterna dougallii*) fact sheet. Prepared by C. S. Mostello.

[2] U.S. Fish and Wildlife Service (USFWS). 2010. Caribbean Roseate Tern and North Atlantic Roseate Tern (*Sterna dougallii dougallii*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Southeast Region, Boquerón, Puerto Rico and Northeast Region, Concord, New Hampshire.

[3] U.S. Fish and Wildlife Service (USFWS). 2017. Species profile for Red Knot (*Calidris canutus rufa*). http://www.fws.gov/northeast/redknot/ [website accessed October 30, 2017].

As previously stated, the purpose of this letter is to request a Section 2(b) Coordination Act Report (CAR) from your office pursuant to the FWCA. The USACE New England District also requests your concurrence that the Pawcatuck River CSRM project "may affect but is not likely to adversely affect" the northern long-eared bat (*Myotis septentrionalis*) and the piping plover (*Charadrius melodus*) because the indirect effects to listed species, as described in the attached effects determination, are expected to be insignificant or discountable. We would greatly appreciate if your office would send a combined FWCA/ESA letter of response by the mid-December timeframe due to time-sensitive requirements for completion of the USACE's Pawcatuck River CSRM project Environmental Assessment.

Should you have additional questions, please contact Ms. Judith L. Johnson, of the Environmental Resources Section at (978) 318-8138, or by email at Judith.L.Johnson@usace.army.mil, or Christopher Hatfield, Study Manager at 978-318-8520, or by email at Christopher.L.Hatfield@usace.army.mil.

Sincerely,

John R. Kennelly
Chief, Planning Division

Enclosure

CC:

Susi vonOettingen – electronic copy susi_vonoettingen@fws.gov

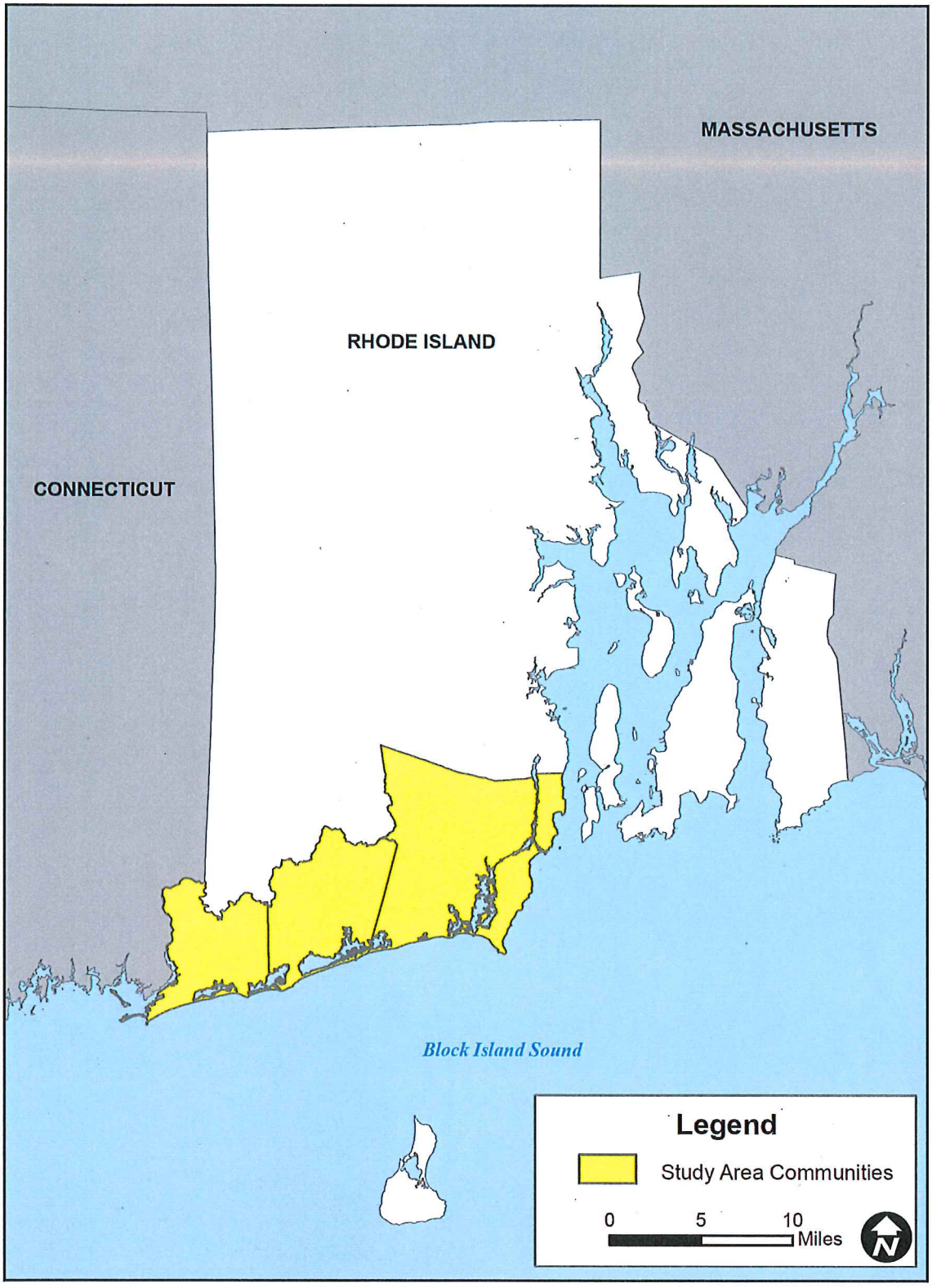


Figure 1 – Location Map

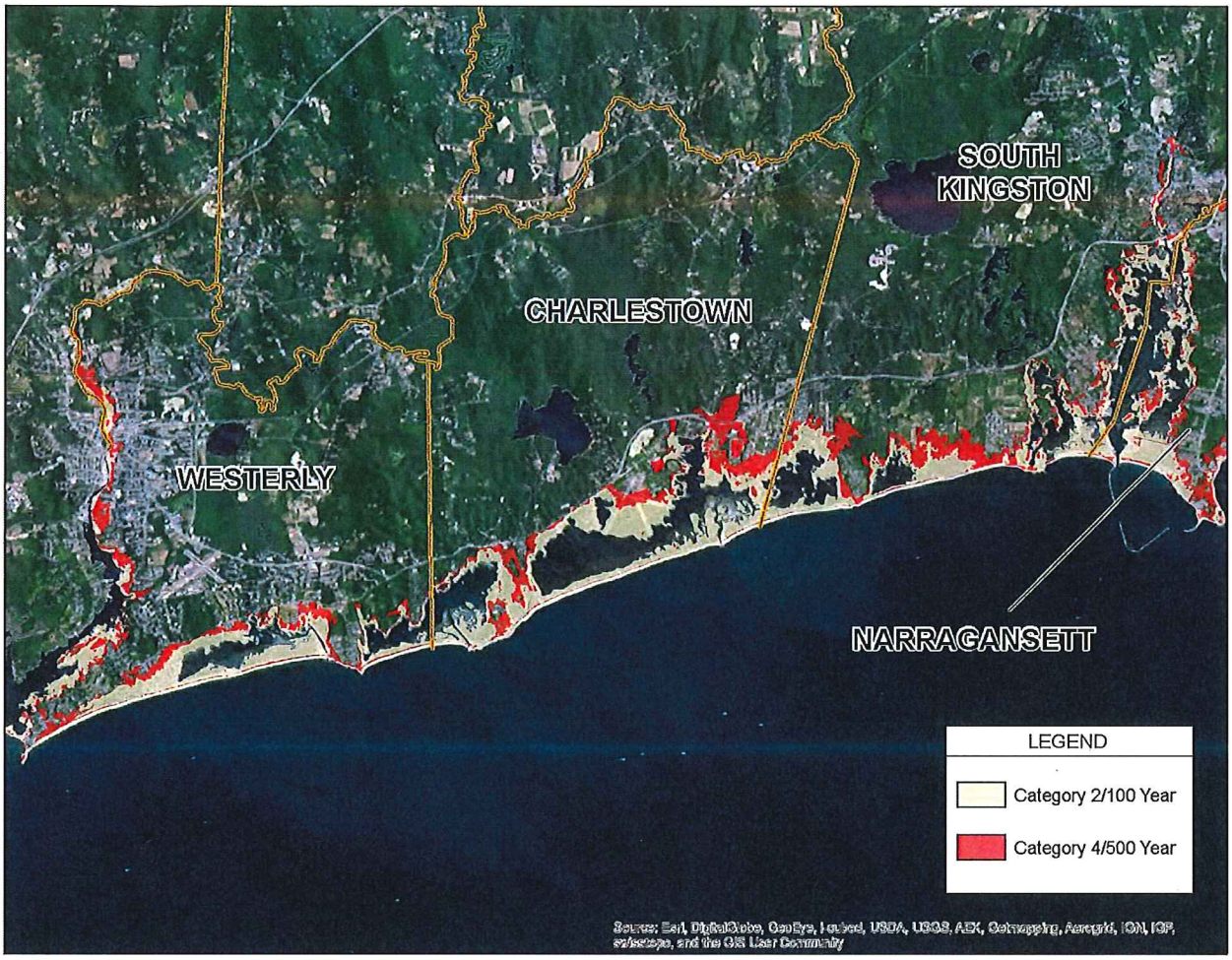


Figure 2. Pawcatuck River Study Area – Coastal Flood Plain

Pawcatuck River Coastal Storm Risk Management Project
Westerly, Charlestown, South Kingstown, and Narragansett, Rhode Island

"Not Likely to Adversely Affect" Determination

Northern Long-Eared Bat (*Myotis septentrionalis*)

The northern long-eared bat (NLEB), a federally threatened species, is a medium-sized bat found across much of the eastern and north central United States. White-nose syndrome is responsible for much of the species' recent population decline. NLEB typically winters in caves and abandoned mines. During the summer months, northern long-eared bats roost under loose bark, in cracks, crevices, and cavities within a variety of tree species. Other roosting habitat includes human made structures such as buildings, utility poles, and barns. The forested uplands adjacent to the project area may support summer roosting habitat for northern long-eared bat (USFWS 2016).

There have been no surveys conducted to determine the presence/absence of the NLEB in the project area and therefore, it is assumed that the NLEB is present and may utilize trees within the existing development and surrounding forest habitat for roosting. Since the footprint of the building proposed for elevation will remain the same, and homeowners generally do not have trees close to foundations for structural integrity, the USACE does not anticipate that a large number of trees would need to be cut for construction purposes. However, in the event that some individual trees may need to be removed to enable access for construction vehicles, the USACE has determined that the proposed project is not likely to adversely affect the threatened NLEB for the following reasons:

- No cutting of trees $\geq$ 3 inches diameter at breast height will occur from 15 April – 30 September, in any year, as outlined in the July 7, 2015 USFWS guidance for federal agencies to minimize potential negative effects to the northern long-eared bat.

- Scheduling tree cutting activities outside the Time-Of-Year (TOY) restriction will avoid impacts of greatest concern (e.g., direct roost disturbance).

The USACE will include the TOY restriction for tree cutting, as listed above, in the Plans and Specifications for the project; the work will be accomplished by a private contractor with USACE oversight. As per the project specifications, the contractor will be required to adhere to the TOY restriction for any trees identified as needing removal for construction access purposes.

Piping Plover (*Charadrius melodus*)

The piping plover, a federally threatened species, is a small species of shorebird which breeds in the northeastern Atlantic coast. Plovers nest above the high tide line on coastal beaches, sand flats at the ends of sands pits and barrier islands, gently sloping fore dunes, blowout areas behind primary dunes, sparsely vegetated dunes, and wash over areas cut into or between dunes. Feeding areas include intertidal portions of ocean beaches, wash over areas, mudflats, sandflats, wrack lines, and shorelines of coastal ponds, lagoons, or salt marshes (USFWS 1996). Plover broods prefer ephemeral pools and bay tidal flats over other habitat

types due to higher arthropod abundance and relatively increased availability of escape cover (Elias *et al.* 2000). Breeding plovers on the Atlantic Coast are generally found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets (USFWS 1996).

A Planning Aid Letter received from the USFWS, dated August 13, 2015, identified the coastline within the study area as having potential to support suitable nesting and foraging piping plover habitat. The Locally Preferred Plan (LPP) consists of elevating the first floors of 247 structures in the four study area communities. The first floors will be elevated to a height corresponding to the FEMA designated Base Flood Elevation (BFE), ranging from +11 feet North Atlantic Vertical Datum of 1988 (NAVD88) to +17 feet NAVD88, plus 1 additional foot in accordance with Corps/NFIP standards, and another 0.8 feet to account for the intermediate rate of sea level rise over the next 50 years. Twenty-one primarily commercial structures (6 in Westerly, 4 in South Kingstown, and 11 in Narragansett) are also included in the LPP for flood proofing. They consist of large multi-story hotels, sheet metal buildings, brick on concrete slab buildings, etc.

An analysis of the potential impacts to piping plover involved comparing the location of individual houses/structures proposed for elevation or flood proofing to the boundaries of designated piping plover habitat. (Note: The piping plover habitat locations were the most recent available pursuant to an email dated 3 August 2016 from Susi vonOettingen, Endangered Species Biologist, USFWS New England Field Office.) None of the individual houses/structures proposed for elevation or flood proofing are located within designated piping plover habitat in Westerly, Charlestown, South Kingstown or Narragansett. However, there are three houses proposed for elevation within the vicinity of Roger Wheeler State Park approximately 200, 500 and 900 feet west of the parking lot on the northern side of Sand Hill Cove Road in Narragansett. The beach seaward of the Roger Wheeler State Park parking lot is designated as piping plover habitat. In addition, there is one house located approximately 200 feet from East Beach in Westerly. A portion of this barrier beach in the Watch Hill area of Westerly is designated as piping plover habitat (see Figure 1).

Piping plovers form nests (shallow depressions) in the sand on the high beach close to the dunes on wide open beaches and shorelines and feed in the intertidal zone at low tide. Project activities will involve elevating houses within currently developed areas. None of the individual houses proposed for elevation are located within designated piping plover habitat and therefore, no direct impacts to piping plover breeding or foraging habitat are anticipated. However, four houses proposed for elevation are located in the vicinity of piping plover habitat as previously described. Indirect impacts to piping plover may occur due to construction activities (e.g., construction noise, truck traffic, etc.). These potential impacts are not expected to be significant in consideration of on-going human related disturbances in the area associated with the Roger Wheeler State Park and East Beach areas, especially during the summer months (e.g., traffic, beach goers, swimming, etc.). Therefore, the proposed project may affect but is not likely to adversely affect this species because the indirect effects to piping plover are expected to be insignificant or discountable.

References Cited:

Elias, S.P., Fraser, J.D., and P.A. Buckley. 2000. Piping Plover Brood Foraging Ecology on New York Barrier Islands. *The Journal of Wildlife Management* (2000): 346-354

U.S. Fish & Wildlife Service (USFWS). 1996. Piping Plover *(Charadrius melodus),* Atlantic Coast Population, and Revised Recovery Plan. Hadley, Massachusetts. 258 pp.

U.S. Fish and Wildlife Service (USFWS). 2016. Species Profile for Northern Long-Eared Bat (*Myotis septentrionalis*). Environmental Conservation Online System (ECOS). Website accessed September 6, 2016. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0JE

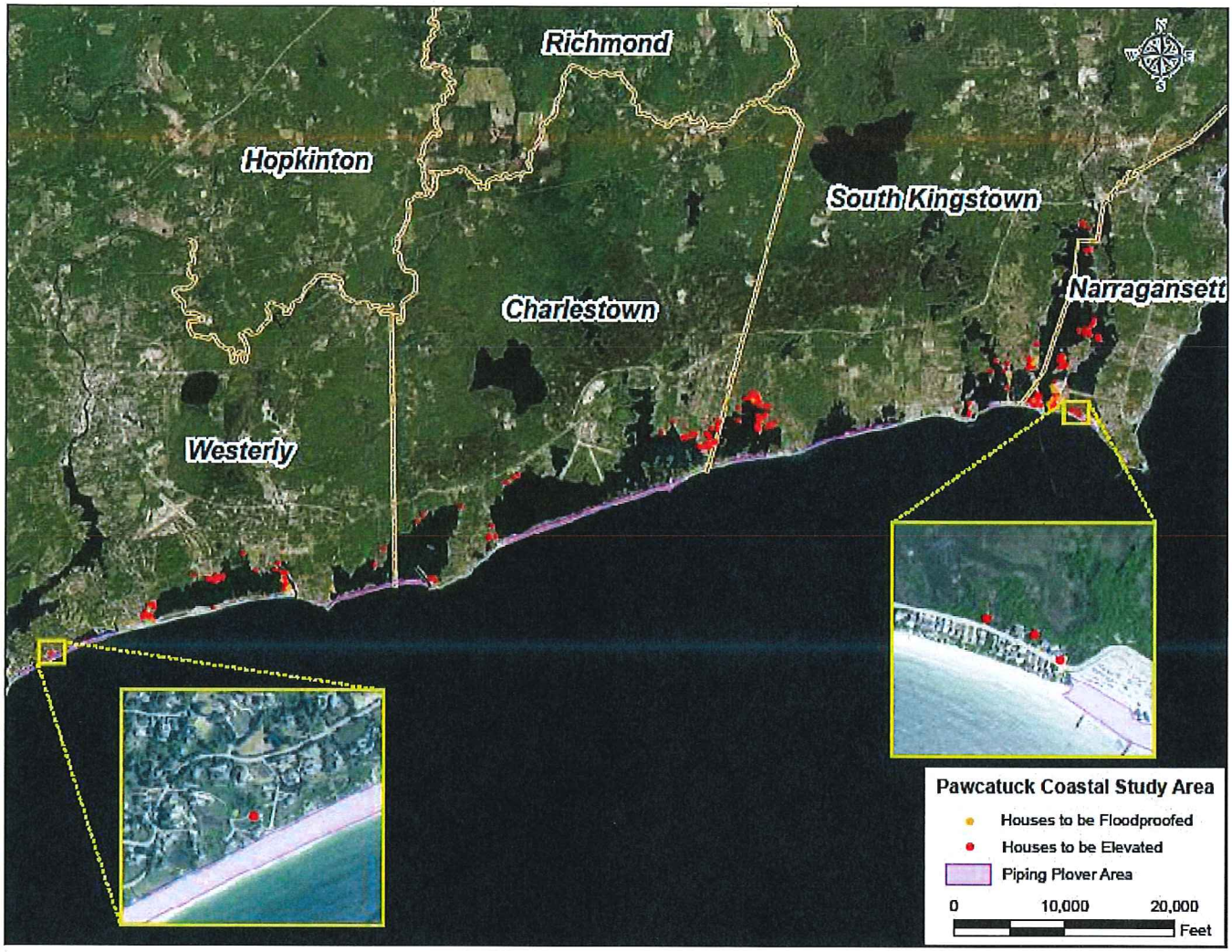


Figure 1. Project Activities in Proximity to Piping Plover Habitat

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

APR 17 2017

In Reply Refer To:
FWS/DBTS-BGMTS

Ms. Judith L. Johnson
Army Corps of Engineers
Evaluation Branch
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Ms. Johnson:

The U.S. Fish and Wildlife Service (Service) has reviewed the request dated January 9, 2017, for a determination as to whether certain structures on properties located in Charlestown, South Kingstown, Westerly, and Narragansett, Rhode Island, are within a System Unit or an Otherwise Protected Area (OPA) of the John H. Chafee Coastal Barrier Resources System (CBRS).

We compared the structures at the addresses listed on the attached table, as identified on the information that was provided, to the official CBRS maps for the area. Please see the attached table for the result of each determination.

We hope this information is helpful. Additional information concerning the CBRS can be found on our website at http://www.fws.gov/cbra. If you have any additional questions, please contact Ms. Dana Wright, Program Specialist, at (703) 358-2171.

Sincerely,

Jonathan Phinney, PhD
Chief, Branch of Geospatial Mapping and
Technical Support

cc: Maria Tur, FWS, Concord, NH
Percy Vasquez, NFIP, Landover, MD

Case No.	Address	StructureN	Town	CBRS Map #	CBRS Map Date	CBRA Determination	CBRS Unit	Prohibition Date
3196	298 Atlantic Avenue	Not provided	Westerly	079A	10/23/1992	In	RI-13P	11/16/1991
3197	187 West Beach Road	159	Charlestown	078A	10/15/1992	In	D06	11/16/1990
3198	28 South Bayberry Lane	388	Charlestown	078A	10/15/1992	Property mostly in/ Structure in	D06	11/16/1990
3199	Island in Green Hill Pond	709	Charlestown	077	10/24/1990	In	D04	10/1/1983
3200	523 Charlestown Beach Road	25808 25809	Charlestown	078A	10/15/1992	Property mostly in/ Structures in	D05	11/16/1990
3202	41 Nutmeg Lane	25811	Charlestown	078A	10/15/1992	Property mostly in/ Structure in	D05	11/16/1990
3205	392A Cards Pond Road	7489	South Kingstown	077	10/24/1990	In	D03	10/1/1983
3206	240 Cards Pond Road	275257	South Kingstown	077	10/24/1990	Property partially in/ Structure in	D03	10/1/1983
3207	16 Arbeth Avenue	143482	Narragansett	076A	10/15/1992	In	RI-12	10/15/1992

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
FWS/DBTS-BGMTS

MAR 2 0 2017

Judith L. Johnson
Army Corps of Engineers
Evaluation Branch
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Ms. Johnson:

The U.S. Fish and Wildlife Service (Service) has reviewed the request dated January 9, 2017, Case # 3172, for a determination as to whether the following property is within a System Unit or an Otherwise Protected Area (OPA) of the John H. Chafee Coastal Barrier Resources System (CBRS).

Address: 70 Cove Drive
Charlestown, Rhode Island

We compared the location of the property above, as depicted on the information that was provided, to the official CBRS map for the area, numbered 078A, dated October 15, 1992. This property is partially located within System Unit D05. The existing structure located on the property is within Unit D05. Most new Federal expenditures and financial assistance are restricted for areas designated within System Units of the CBRS. The prohibition date on Federal flood insurance for this property is November 16, 1991.

We hope this information is helpful. Additional information concerning the CBRS can be found on our website at http://www.fws.gov/cbra. If you have any additional questions, please contact Ms. Dana Wright, Program Specialist, at (703) 358-2171.

Sincerely,

Jonathan Phinney, PhD
Chief, Branch of Geospatial Mapping and
Technical Support

cc: Maria Tur, FWS, Concord, NH
Percy Vasquez, NFIP, Landover, MD

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
FWS/DBTS-BGMTS

MAR 2 0 2017

Ms. Judith L. Johnson
Army Corps of Engineers
Evaluation Branch
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Ms. Johnson,

The U.S. Fish and Wildlife Service (Service) has reviewed the request dated January 9, 2017, Case # 3193, for a determination as to whether the structures on the following property are within a System Unit or an Otherwise Protected Area (OPA) of the John H. Chafee Coastal Barrier Resources System (CBRS).

Address: 650 Succotash Road
South Kingstown, Rhode Island

We compared the location of three structures on the property above, identified as Structure Numbers 275813, 275814, and 276571 on the information that was provided, to the official CBRS map for the area, numbered 076A, dated October 15, 1992. This property is partially located within System Unit RI-12. All three of the identified structures located on the property are within Unit RI-12. Most new Federal expenditures and financial assistance are restricted for areas designated within System Units of the CBRS. The prohibition date on Federal flood insurance for this property is November 16, 1991.

We hope this information is helpful. Additional information concerning the CBRS can be found on our website at http://www.fws.gov/cbra. If you have any additional questions, please contact Ms. Dana Wright, Program Specialist, at (703) 358-2171.

Sincerely,

Jonathan Phinney, PhD
Chief, Branch of Geospatial Mapping and
Technical Support

cc: Maria Tur, FWS, Concord, NH
Percy Vasquez, NFIP, Landover, MD

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
FWS/DBTS-BGMTS

MAR 2 0 2017

Judith L. Johnson
Army Corps of Engineers
Evaluation Branch
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Ms. Johnson,

The U.S. Fish and Wildlife Service (Service) has reviewed the request dated January 9, 2017, Case # 3194, for a determination as to whether the following property is within a System Unit or an Otherwise Protected Area (OPA) of the John H. Chafee Coastal Barrier Resources System (CBRS).

Address: 801H Succotash Road
South Kingstown, Rhode Island

We compared the location of the property above, as depicted on the information that was provided, to the official CBRS map for the area, numbered 076A, dated October 15, 1992. This property is partially located within System Unit RI-12. The existing structure located on the property is within Unit RI-12. Most new Federal expenditures and financial assistance are restricted for areas designated within System Units of the CBRS. The prohibition date on Federal flood insurance for this structure is November 16, 1991.

We hope this information is helpful. Additional information concerning the CBRS can be found on our website at http://www.fws.gov/cbra. If you have any additional questions, please contact Ms. Dana Wright, Program Specialist, at (703) 358-2171.

Sincerely,

Jonathan Phinney, PhD
Chief, Branch of Geospatial Mapping and
Technical Support

cc: Maria Tur, FWS, Concord, NH
Percy Vasquez, NFIP, Landover, MD

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

October 31, 2016

Planning Division
Evaluation Branch

Mr. Tom Chapman, Supervisor
Department of the Interior
U.S. Fish and Wildlife Service
Ecological Services
70 Commercial Street, Suite 300
Concord, Massachusetts 03301-5087

Dear Mr. Chapman:

The U.S. Army Corps of Engineers (USACE), New England District, has continued to evaluate project alternatives for the Pawcatuck River Coastal Storm Risk Management (CSRM) Project. The project area is located along the southern coast of Rhode Island in the towns of Westerly, Charlestown, South Kingstown, and Narragansett (see Figure 1). We received a Planning Aid Letter from your office for the Pawcatuck River project dated August 12, 2015. The purpose of this letter is to provide you with the most recent project information regarding the selection of the Tentatively Selected Plan (TSP) and to request a Section 2(b) Coordination Act Report (CAR) from your office pursuant to the Fish and Wildlife Coordination Act (FWCA). The USACE New England District also sent a letter to your office dated September 16, 2016 pursuant to the Endangered Species Act (ESA). Please feel free to provide a combined FWCA/ESA response should that be more convenient.

Project Description

The study area includes about 28 miles of moderately developed coast in the towns of Westerly, Charlestown, South Kingstown, and Narragansett, in Washington County, Rhode Island. The floodplain completely encompasses the coastal barrier beaches and salt ponds in the area (see Figure 2). The CSRM project plan formulation considered a range of structural and nonstructural measures to reduce the risk of storm damage in the project area. Through an iterative planning process, potential coastal storm risk management measures were identified, evaluated, and compared. The Tentatively Selected Plan (TSP) for the Pawcatuck River CSRM project consists of elevating the first floors of 341 structures in the four study area communities (see Figures 3 through 6). The first floors will be elevated to a height corresponding to the Federal Emergency Management Agency (FEMA) designated Base Flood Elevation (BFE), ranging from +11 feet North Atlantic Vertical Datum of 1988 (NAVD88) to +17 feet NAVD88, plus 1

foot in accordance with state building code and another 0.37 feet to account for historic sea level rise over the next 50 years. Properties eligible for elevation, by town, are as follows:

- Westerly: Elevate 45 Structures
- Charlestown: Elevate 44 Structures
- South Kingstown: Elevate 172 Structures
- Narragansett: Elevate 80 Structures

Forty six other mainly commercial structures throughout the study area, though found to be highly susceptible to coastal flooding damage, do not lend themselves to elevation (concrete, brick, or metal structures). Instead, other flood proofing measures may be able to be applied in these situations by others.

Elevation of individual structures will rely on conventional residential construction methods. First, the participating homes will be elevated using lifting jacks and supported on temporary cribbing while a new foundation is constructed. Temporary utility connections will be put into place to allow occupants to remain in the structure throughout construction. Those structures located in the AE-zone of the floodplain will be provided with a new concrete wall foundation and those in the VE-zone will be placed on new concrete piers. Once ready, the structures will then be lowered onto the new foundations and the permanent utility connections made.

The project report was released for public review on October 19, 2016 and may be accessed in its entirety on the following website: http://www.nae.usace.army.mil/Missions/Projects-Topics/. Should you have additional questions, please contact Ms. Judith L. Johnson, of the Environmental Resources Section at (978) 318-8138, or by email at Judith.L.Johnson@usace.army.mil, or Christopher Hatfield, Study Manager at 978-318-8520, or by email at Christopher.L.Hatfield@usace.army.mil.

Sincerely,

John R. Kennelly
Chief, Planning Division

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
HISTORICAL PRESERVATION & HERITAGE COMMISSION
Old State House • 150 Benefit Street • Providence, R.I. 02903-1209
TEL (401) 222-2678 FAX (401) 222-2968
TTY / Relay 711 Website www.preservation.ri.gov

RIHPHC No. 11886
161004.01

4 October 2016

Via email: Kathleen.a.atwood@usace.army.mil

Kathleen Atwood, Staff Archaeologist
Department of the Army
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742

Re: Coastal Storm Damage Reduction
Charlestown, Narragansett, South Kingstown and Westerly, Rhode Island

Dear Ms. Atwood:

The Rhode Island Historical Preservation and Heritage Commission (RIHPHC) staff has reviewed the documentation submitted for the above-referenced project. The U.S. Army Corps of Engineers (Army Corps) is addressing the vulnerability of buildings in Rhode Island's coastal communities to storm damage and is proposing to elevate the first floor of approximately 350 buildings in four coastal towns: Charlestown, Narragansett, South Kingstown and Westerly.

The Army Corps provided the RIHPHC with spreadsheets listing all properties that would be affected. The RIHPHC has enclosed annotated spreadsheets, noting if there would be "no historic properties affected" or if an individual project would have an effect on a resource listed in or potentially eligible for listing in the National Register of Historic Places. A summary of the RIHPHC's comments for each town follows below.

Charlestown
No historic properties will be affected.

Narragansett
While none of the identified buildings are presently listed in the National Register, 29 buildings in the former fishing community of Jerusalem will be affected. These buildings are located on Arbeth Avenue, Champlin Avenue, MacAlder Street, and Succotash Road. Preliminary background research indicates that Jerusalem was initially settled at the turn of the twentieth century possibly by fishermen from Nova Scotia. The community's growth was spurred by several large-scale projects, including construction of the breachway and stone breakwater, and the establishment of state piers in both Jerusalem and Galilee.

Due to Jerusalem's potential significance, an architectural survey should be conducted to evaluate its National Register eligibility. The architectural survey should consist of the following:

- completion of RIHPHC survey forms for each building more than 50 years of age in the potential historic district
- an architectural overview of the potential district that summarizes the era, style, materials and methods of construction of buildings in the potential historic district

- development of a historic context that traces the social, ethnic and physical development of the community
- background research of primary and secondary sources that includes, but is not limited to, review of state and federal census records, town directories, land evidence records, plat maps, and the *Narragansett Times*
- consultation with the Narragansett Historical Society to identify relevant historical material
- inclusion of historic maps and images, as appropriate
- discussion of how the hurricanes of 1938 and 1954 affected the potential historic district
- National Register of Historic Places evaluation with a cogent justification for eligibility/ineligibility

South Kingstown

No. 392A Card's Pond Road is located in the Browning's Beach Historic District, which is listed in the National Register of Historic Places. Known as Mares Nest, 392A Card's Pond Road was built *circa* 1905 as a stable for the other houses at Browning's Beach. According to the National Register nomination prepared in 1997, the stable was "recently" converted to a residence. The building consists of a frame, single-story, gable-roof wing connected to a frame, 2-1/2 story saltbox wing. The alterations undertaken that converted the stable to a residence have diminished the building's integrity of design, materials, workmanship, feeling and association. It is the RIHPHC's conclusion that 392A Card's Pond Road should be considered a non-contributing resource of the Browning's Beach Historic District. Elevating 392A Card's Pond Road will have no adverse effect on historic properties.

Westerly

The Weekapuag Inn (25 Spray Rock Rd) is individually listed in the National Register. It is the RIHPHC's understanding that, due to the building's large size, no coastal damage reduction alternatives are being pursued. The RIHPHC should be notified if plans change at a later date.

The RIHPHC looks forward to continuing Section 106 consultation on this project. If you have any questions, please contact Glenn Modica, Senior Project Review Coordinator of this office at glenn.modica@preservation.ri.gov or 401-222-2671.

Very truly yours,

for Edward F. Sanderson
Executive Director
State Historic Preservation Officer

enclosure

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

September 16, 2016

Planning Division
Evaluation Branch

Mr. Tom Chapman, Supervisor
Department of the Interior
U.S. Fish and Wildlife Service
Ecological Services
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

Dear Mr. Chapman:

The U.S. Army Corps of Engineers (USACE), New England District, is currently working on the Pawcatuck River Coastal Storm Risk Management (CSRM) study in Westerly, Charlestown, South Kingstown, and Narragansett, Rhode Island (see Figure 1). This study is authorized in a resolution approved by the Committee on Public Works of the United States Senate, dated September 12, 1969. Authorization and funding is also provided under investigations heading, Chapter 4, Title X, Division A of the Disaster Relief Appropriations Act of 2013, Public Law 113-2 (127 Stat. 23) enacted January 29, 2013. The Secretary of the Army is authorized to complete ongoing flood and storm damage reduction studies in areas that were impacted by Hurricane Sandy. The purpose of this letter is to provide your office with information about the project and request the U.S. Fish and Wildlife Service's concurrence with the attached "not likely to adversely affect" determination for the federally listed northern long-eared bat (*Myotis septentrionalis*) and piping plover (*Charadrius melodus*).

Project Description

The study area includes about 28 miles of moderately developed coast in the towns of Westerly, Charlestown, South Kingstown, and Narragansett, in Washington County, Rhode Island. The floodplain completely encompasses the coastal barrier beaches and salt ponds in the area (see Figure 2). The CSRM project plan formulation considered a range of structural and nonstructural measures to reduce the risk of storm damage in the project area. Through an iterative planning process, potential coastal storm risk management measures were identified, evaluated, and compared. The Tentatively Selected Plan (TSP) for the Pawcatuck River CSRM project consists of elevating the first floors of 341 structures in the four study area communities. The first

floors will be elevated to a height corresponding to the Federal Emergency Management Agency (FEMA) designated Base Flood Elevation (BFE), ranging from +11' North Atlantic Vertical Datum of 1988 (NAVD88) to +17' NAVD88, plus 1' in accordance with state building code. Properties eligible for elevation, by town, are as follows:

- Westerly: Elevate 45 Structures
- Charlestown: Elevate 44 Structures
- South Kingstown: Elevate 172 Structures
- Narragansett: Elevate 80 Structures

Forty six other mainly commercial structures throughout the study area, though found to be highly susceptible to coastal flooding damage, do not lend themselves to elevation (concrete, brick, or metal structures). Instead, others may be able to apply other flood proofing measures in these situations.

Elevation of individual structures will rely on conventional residential construction methods. First, existing foundations for the participating homes will be demolished and temporary utility connections put into place to allow occupants to remain in the structure throughout construction. The structures will then be elevated using lifting jacks and supported on temporary cribbing while a new foundation is constructed. Those structures located in the AE-zone of the floodplain will be provided with a new concrete wall foundation. Those in the VE-zone will be placed on new concrete piers. Once ready, the structures will then be lowered onto the new foundations and the permanent utility connections made.

Species Listed in the Project Area

The following species were identified by the U.S. Fish and Wildlife Service Information, Planning and Conservations System (IPaC) website as threatened or endangered resources that may occur in the study area (USFWS 2016a):

- Roseate Tern (*Sterna dougallii dougallii*) – Endangered
- Red Knot (*Calidris canutus rufa*) – Threatened
- Northern Long-Eared Bat (*Myotis septentrionalis*) – Threatened

In addition, we received a Planning Aid Letter, dated August 12, 2015, from the USFWS for this project. It was anticipated in the early planning phase that the proposed project would involve beach nourishment along the Misquamicut State Park shoreline and possibly flood walls at Misquamicut Village. As such, the piping plover (*Charadrius melodus*), listed as federally threatened, was also identified by the USFWS

as having potential to be in the project area. An effects determination for the northern long-eared bat and piping plover is attached for your review.

Roseate terns generally nest on sandy, gravelly, or rocky islands and have fairly specialized feeding habits, consuming primarily sand lance. Roseate terns capture food mainly by plunge-diving but also by surface-dipping and contact-dipping (MA NHESP 2007, USFWS 2010). The upland properties associated with individual houses proposed for elevation do not support suitable breeding or foraging habitat for roseate terns. Therefore, project activities should have no effect on the roseate tern and will not be discussed further.

The red knot makes one of the longest yearly migrations of any bird, traveling 9,300 miles from its Arctic breeding grounds to Tierra del Fuego in southern South America. During migration, red knots concentrate in huge numbers at traditional staging grounds. Delaware Bay is an important staging area during spring migration, where the knots feed on the eggs of spawning horseshoe crabs. Red knot breed in drier tundra areas, such as sparsely vegetated hillsides (USFWS 2016c). Outside of breeding season, it is found primarily in intertidal, marine habitats, especially near coastal inlets, estuaries, and bays. The upland properties associated with individual houses proposed for elevation do not support suitable breeding or foraging habitat for red knot. Therefore, project activities should have no effect on the red knot and will not be discussed further.

The USACE New England District requests your concurrence that the Pawcatuck River Coastal project "may affect but is not likely to adversely affect" the northern long-eared bat (*Myotis septentrionalis*) and the piping plover (*Charadrius melodus*) because the effects to listed species, as described in this letter, are expected to be insignificant or discountable. Should you have additional questions, please contact Ms. Judith L. Johnson, of the Environmental Resources Section at (978) 318-8138, or by email at Judith.L.Johnson@usace.army.mil, or Christopher Hatfield, Study Manager at 978-318-8520, or by email at Christopher.L.Hatfield@usace.army.mil.

Sincerely,

John R. Kennelly
Chief, Planning Division

Enclosure

CC:
Susi vonOettingen – electronic copy susi_vonoettingen@fws.gov

Pawcatuck River Coastal Storm Risk Management Project
Westerly, Charlestown, South Kingstown, and Narragansett, Rhode Island

"Not Likely to Adversely Affect" Determination

Northern Long-Eared Bat (*Myotis septentrionalis*)

The northern long-eared bat (NLEB), a federally threatened species, is a medium-sized bat found across much of the eastern and northcentral United States. White-nose syndrome is responsible for much of the species' recent population decline. NLEB typically winters in caves and abandoned mines. During the summer months, northern long-eared bats roost under loose bark, in cracks, crevices, and cavities within a variety of tree species. Other roosting habitat includes human made structures such as buildings, utility poles, and barns. The forested uplands adjacent to the project area may support summer roosting habitat for northern long-eared bat (USFWS 2016b).

There have been no surveys conducted to determine the presence/absence of the NLEB in the project area and therefore, it is assumed that the NLEB is present and may utilize mature trees within the existing development and surrounding forest habitat for roosting. Since the footprint of the building proposed for elevation will remain the same, and homeowners generally do not have trees close to foundations for structural integrity, the USACE does not anticipate that a large number of trees would need to be cut for construction purposes. However, in the event that some individual trees may need to be removed to enable access for construction vehicles, the USACE has determined that the proposed project is not likely to adversely affect the threatened NLEB for the following reasons:

- No cutting of trees $\geq$ 3 inches diameter at breast height will occur from 15 April – 30 September, in any year, as outlined in the July 7, 2015 USFWS guidance for federal agencies to minimize potential negative effects to the northern long-eared bat.

- Scheduling tree cutting activities outside the Time-Of-Year (TOY) restriction will avoid impacts of greatest concern (e.g., direct roost disturbance).

The USACE will include the TOY restriction for tree cutting, as listed above, in the Plans and Specifications for the project; the work will be accomplished by a private contractor with USACE oversight. As per the project specifications, the contractor will be required to adhere to the TOY restriction for any trees identified as needing removal for construction access purposes.

Piping Plover (*Charadrius melodus*)

The piping plover, a federally threatened species, is a small species of shorebird which breeds in the northeastern Atlantic coast. Plovers nest above the high tide line on coastal beaches, sand flats at the ends of sandspits and barrier islands, gently sloping fore dunes, blowout areas behind primary dunes, sparsely vegetated dunes, and wash over areas cut into or between dunes. Feeding areas include intertidal portions of ocean beaches, wash over areas, mudflats, sandflats, wrack lines, and shorelines of coastal ponds, lagoons, or salt marshes (USFWS 1996). Plover broods prefer ephemeral pools and bay tidal flats over other habitat

types due to higher arthropod abundance and relatively increased availability of escape cover (Elias *et al.* 2000). Breeding plovers on the Atlantic Coast are generally found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets (USFWS 1996).

A Planning Aid Letter received from the USFWS, dated August 13, 2015, identified the coastline within the study area as having potential to support suitable nesting and foraging piping plover habitat. The project alternatives involving beach nourishment and flood wall construction were determined to be non-viable; the TSP involves elevating 341 houses in four coastal communities. An analysis of the potential impacts to piping plover from the individual house elevation project involved comparing the location of individual house lots proposed for elevation to the boundaries of designated piping plover habitat. (Note: The piping plover habitat locations were the most recent available pursuant to an email dated 3 August 2016 from Susi vonOettingen, Endangered Species Biologist, USFWS New England Field Office.) None of the individual houses proposed for elevation are located within designated piping plover habitat in Westerly, Charlestown, South Kingstown or Narragansett. However, there are three houses proposed for elevation within the vicinity of Roger Wheeler State Park. The beach seaward of the Roger Wheeler State Park parking lot is designated as piping plover habitat. These houses are located approximately 200, 500 and 900 feet west of the parking lot on the northern side of Sand Hill Cove Road in Narragansett as depicted on Figure 3.

Piping plovers form nests (shallow depressions) in the sand on the high beach close to the dunes on wide open beaches and shorelines and feed in the intertidal zone at low tide. Project activities will involve elevating houses within currently developed areas. None of the individual houses proposed for elevation are located within designated piping plover habitat and therefore, no direct impacts to piping plover breeding or foraging habitat are anticipated. However, three houses proposed for elevation are located within 200, 500 and 900 feet of designated piping plover habitat in the Roger Wheeler State Park area as depicted on Figure 3. Indirect impacts to piping plover may occur due to construction activities (e.g., construction noise, truck traffic, etc.). These potential impacts are not expected to be significant in consideration of on-going human related disturbances in the area associated with the Roger Wheeler State Park, especially during the summer months (e.g., traffic, beach goers, swimming, etc.). Therefore, the proposed project may affect but is not likely to adversely affect this species because the indirect effects to piping plover are expected to be insignificant or discountable.

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U.S. Fish and Wildlife Service (USFWS). 2016c. Species profile for Red Knot (*Calidris canutus rufa*). http://www.fws.gov/northeast/redknot/ [website accessed September 6, 2016].

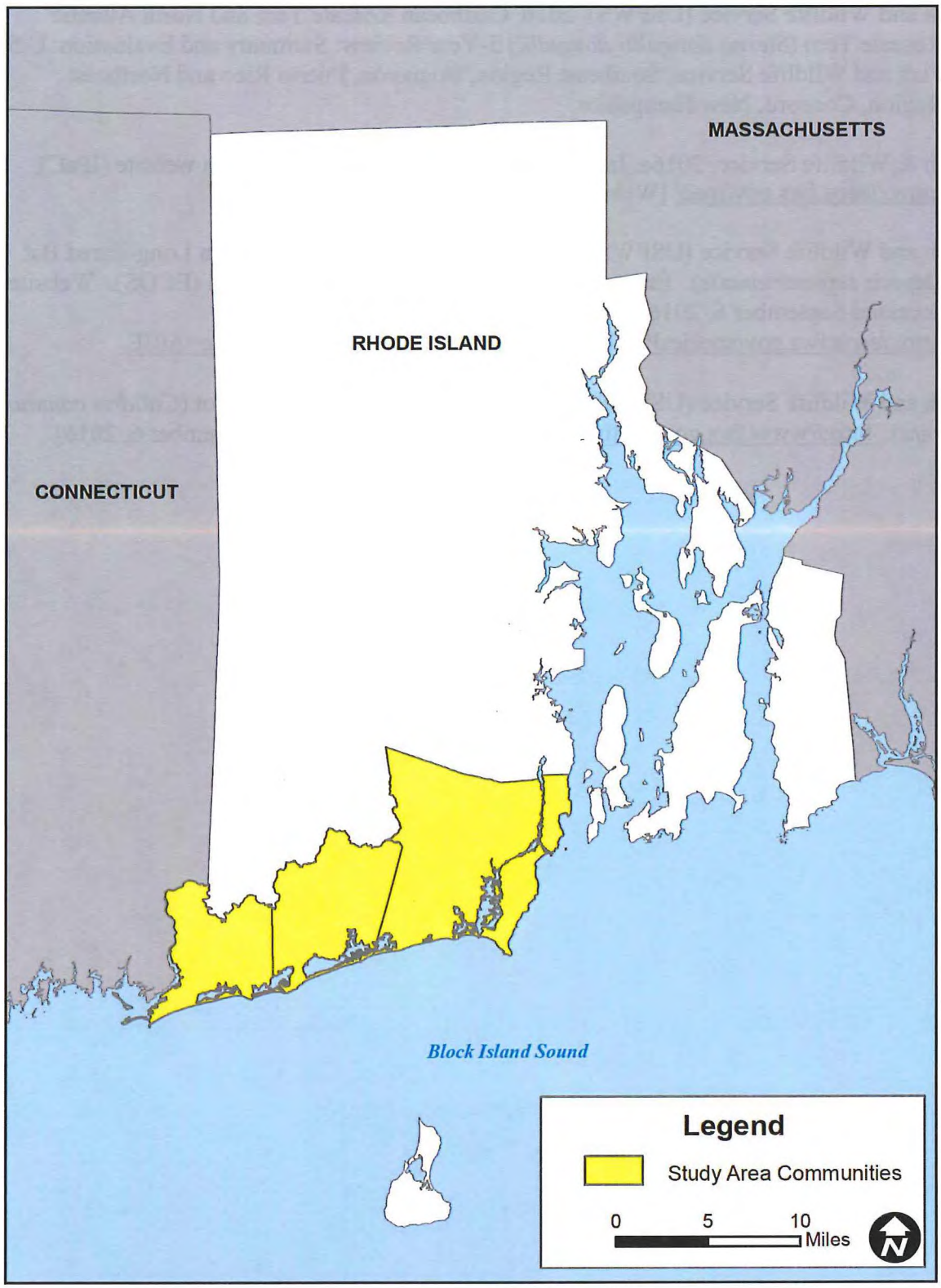

Figure 1 – Location Map

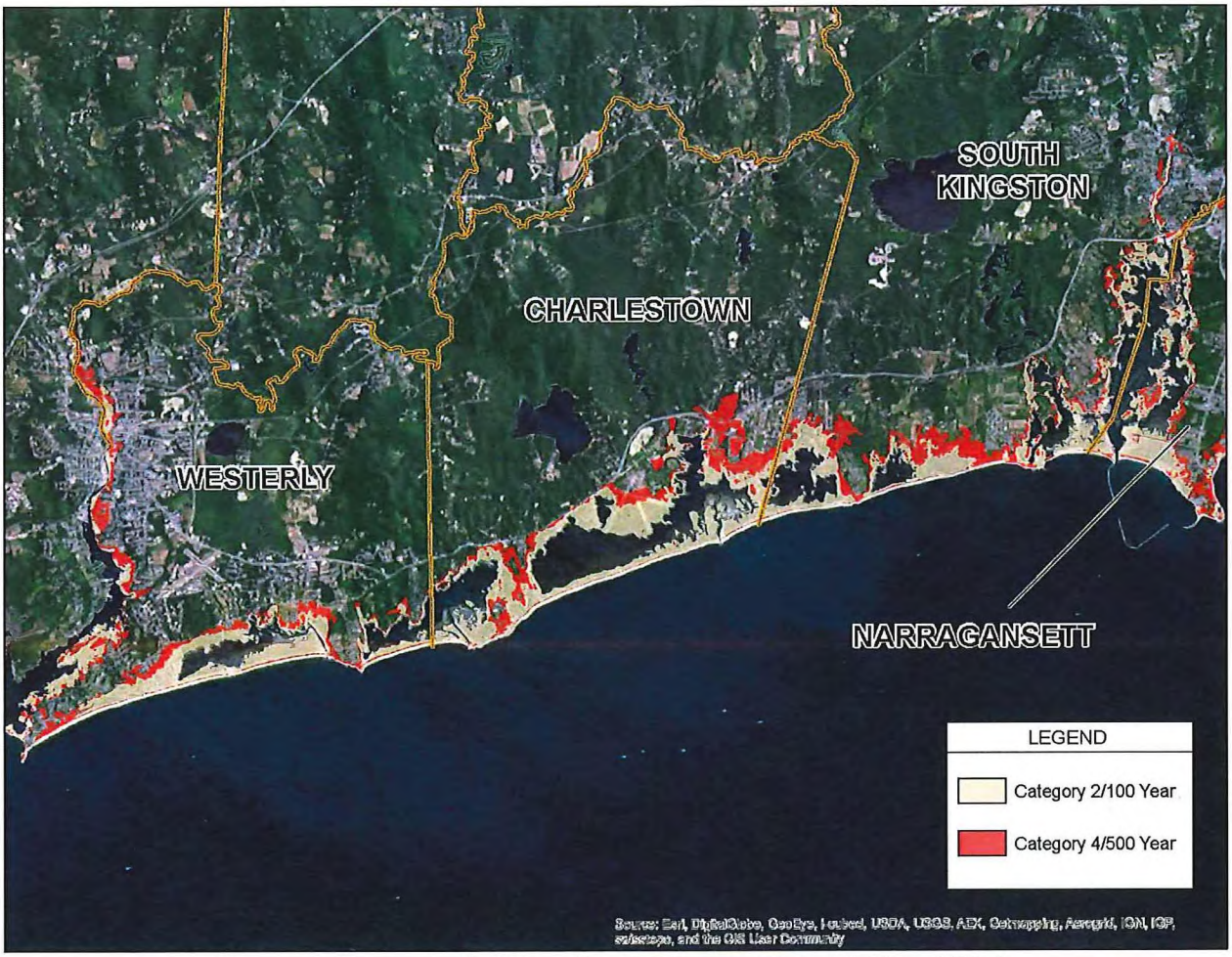

Figure 2. Pawcatuck River Study Area – Coastal Flood Plain

Figure 3. Project Activities in Proximity to Piping Plover Habitat

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

July 23, 2014

Evaluation/Planning Division
Evaluation Branch

Mr. Tom Chapman, Supervisor
Department of the Interior
U.S. Fish and Wildlife Service
Ecological Services
70 Commercial Street, Suite 300
Concord, Massachusetts 03301-5087

Dear Mr. Chapman:

The US Army Corps of Engineers (USACE), New England District, would like to invite you and/or a member(s) of your staff to participate in a coordinated site visit for the Pawcatuck River Coastal Storm Damage Reduction (CSDR) Feasibility Study. This study is authorized in a resolution approved by the Committee on Public Works of the United States Senate, dated September 12, 1969 (also known as the Southeastern New England (SENE) resolution). Authorization and funding is also provided under investigations heading, Chapter 4, Title X, Division A of the Disaster Relief Appropriations Act of 2013, Public Law 113-2 (127 Stat. 23) enacted January 29, 2013 (hereinafter "DRAA 13"). The Secretary of the Army is authorized, at full Federal expense using funds provided in DRAA 13, to complete ongoing flood and storm damage reduction studies in areas that were impacted by Hurricane Sandy.

The New England District will prepare the Pawcatuck River CSDR decision document, including National Environmental Policy Act (NEPA) information for Public and USACE review.

In October 2012, Hurricane Sandy was preceded by coastal flood warnings and mandatory evacuations for coastal towns, low lying areas and mobile homes in Rhode Island. Major evacuations from towns along Narragansett Bay and the southern Atlantic Coast included: Charlestown, Narragansett, South Kingstown, and Westerly. The storm surge destroyed houses and businesses, damaged pilings and deck supports, blew out walls on lower levels, and moved significant amounts of sand and debris into homes, businesses, streets, and adjacent coastal ponds.

In 2013, the USACE New England District conducted a focus area analysis for the coastal portion of the Pawcatuck River watershed. This analysis was part of the larger North Atlantic Coastal Comprehensive Study. The analysis concluded that there is a

Federal interest in continuing with a feasibility study to examine coastal storm damage reduction along the south coast of the state. The southern edge of the state faces the Atlantic Ocean for approximately 28 miles as shown in the enclosed figure. The study area includes the towns of Westerly, Charlestown, South Kingstown, and Narragansett.

The general water resource problem to be addressed is the vulnerability of coastal Rhode Island to storm damage from wave attack, storm surge and erosion. Potential fixes include structural and non-structural solutions.

A coordinated site visit for interested state and federal agencies, town officials, and non-governmental organizations will occur on Thursday, August 21, 2014. The purpose of the site visit is to view the project area (as time allows), discuss alternatives, and elicit concerns and suggestions from your office under the Fish and Wildlife Coordination Act and the Endangered Species Act.

If you have any comments pursuant to the coordinated site visit, please submit a letter within 30 days of the visit.

Site visit participants will meet at 11:00 a.m. at the Town Planner's Office, Westerly Town Hall, 45 Broad Street, Westerly. Please RSVP with Ms. Judith L. Johnson, of the Environmental Resources Section at (978) 318-8138. If any additional information is required please contact Ms. Johnson or Mr. Christopher Hatfield, the study manager, at (978) 318-8520.

Sincerely,

Christopher Hatfield
Study Manager

Enclosure

Similar letter sent:

Ms. Ruth Platner, Chair
Planning Commission
59 Maize Drive
Charlestown, Rhode Island 02813

Mr. Jeffry Ceasrine, P.E.
Engineering Department
25 Fifth Avenue
Narragansett, Rhode Island 02882

Ms. Lillian B. Arnold, Chair
Charlestown Conservation Commission
24 Hunter's Harbor Road
Charlestown, Rhode Island 02813

Mr. Thomas B. Gentz, President, Town Council
Town of Charlestown
152 Sea Breeze Avenue
Charlestown, Rhode Island 02813

Mr. Mark S. Stankiewicz, Town Administrator
4540 South County Trail
Charlestown, Rhode Island 02813

Mr. Terence Fleming, Chair
Narragansett Planning Board
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Mr. Dennis Lynch, Chair
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Coastal Resources Management Council
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Environmental Protection Agency, Region 1
Office of Ecosystem Protection
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Boston, Massachusetts 02109-3912

Mr. Tom Chapman, Supervisor
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U.S. Fish and Wildlife Service
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Rhode Island Department of Environment Management
Marine Fisheries Section
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John Brown, Tribal Historic Preservation Officer
Narragansett Indian Tribe
Tribal Historic Preservation Office
215 Fenner Hill Road
Hope Valley, RI 02832

Mr. Lou Chiarella, Acting Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
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Gloucester, Massachusetts 01930-2276

Ms. Mary Colligan, Assistant Regional Administrator
Protected Resources Division
National Marine Fisheries Service
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Gloucester, Massachusetts 01930-2276

Mr. Edward Sanderson, Executive Director,
Deputy State Historic Preservation Officer
Rhode Island Historical Preservation and Heritage Commission
Old State House
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Providence, Rhode Island 02903

Mr. John O'Brien
Rhode Island Chapter, The Nature Conservancy
159 Waterman Street
Providence, Rhode Island 02906

Mr. Dave Prescott
Save the Bay
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Ms. Dorian Boardman, Chair
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Mr. Joe MacAndrew, Commissioner
Westerly Conservation Commission
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Director of Planning, Code Enforcement and Grant Administration
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United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

REF: Pawcatuck River Coastal Storm Damage Reduction Feasibility Study

August 12, 2015

Mr. John Kennelly
Engineering/Planning Division
U.S. Army Corps of Engineers
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Mr. Kennelly:

This responds to your letter dated June 18, 2015, requesting that we review the proposed Pawcatuck River Coastal Storm Damage Reduction Feasibility Study alternatives for potential effects to the federally threatened piping plover (*Charadrius melodus*). Misquamicut Beach State Park and Misquamicut Village in Westerly, Rhode Island are located within the scope of the feasibility study. Our comments are provided in accordance with the Endangered Species Act (87 Stat. 884, as amended: 16 U.S.C. 1531, *et seq.*) and the Fish and Wildlife Coordination Act (16.U.S.C. 662, *et seq.*).

Piping plovers occur in the vicinity of Misquamicut Beach State Park and Misquamicut Village, although they have not been documented to nest in this area in over a decade. Foraging and roosting adult piping plovers have been periodically documented at Misquamicut Beach State Park. In 2014, the Army Corps of Engineers (ACOE) undertook a beach nourishment project at Misquamicut Beach in order to restore the Beach to its authorized profile, and included a number of conservation measures to avoid adverse effects to piping plovers. These conservation measures included incorporating a 10 horizontal to 1 vertical slope beach profile, post-construction monitoring for piping plovers, and implementation of the U.S. Fish and Wildlife Service's (USFWS) guidelines for managing piping plovers on recreational beaches (USFWS 1994),[1] if breeding piping plovers returned to Misquamicut State Park.

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[1] U.S. Fish and Wildlife Service (USFWS). 1994. Guidelines for managing recreational activities in piping plover breeding habitat on the U.S. Atlantic coast to avoid take under section 9 of the Endangered Species Act. Northeast Region, Hadley, Massachusetts.

The proposed feasibility study includes additional beach nourishment on Misquamicut State Park and possibly flood walls and beach fill at Misquamicut Village. In order to avoid adverse effects to piping plovers and their roosting, foraging and potential nesting habitat on Misquamicut Beach State Park, we recommend the following conservation measures be included in the project design:

- beach fill will maintain a 10 horizontal to 1 vertical slope beach profile;
- implementation of post-construction monitoring for piping plover presence beginning April 1 (in accordance with the USFWS management guidelines);
- implementation of the USFWS guidelines for managing piping plovers if they nest at Misquamicut Beach State Park; and
- time-of-year restriction for construction activity of April 1 to August 31 if breeding piping plovers are documented within the vicinity of the project.

Most likely, piping plovers have not nested on the beach at Misquamicut Village because of the very narrow beach at this location. At this time, we cannot provide additional comments on proposed construction activities for Misquamicut Village because of the lack of specifics relative to a preferred alternative, and lack of information about the current status of the beach (e.g., is it piping plover habitat?). Once the ACOE has a preferred alternative and site-specific information relative to the current status of the beach profile and width for Misquamicut Village, we may be able to provide additional comments on potential effects to piping plovers.

Thank you for your cooperation, and please contact Ms. Susi von Oettingen of this office at (603) 227-6418 if you need any further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

June 18, 2015

Engineering/Planning Division
Evaluation Branch

Mr. John Warner
Department of the Interior
U.S. Fish and Wildlife Service
Ecological Services
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

Dear Mr. Warner,

This letter is a follow up to several emails and phone conversations that you had in April with members of my staff concerning the Pawcatuck River Coastal Storm Damage Reduction (CSDR) Feasibility Study. The U.S. Army Corps of Engineers, New England District (Corps), is performing this study under the authorization in a resolution approved by the Committee on Public Works of the United States Senate, dated September 12, 1969 (also known as the Southeastern New England (SENE) resolution). Authorization and funding is also provided under investigations heading, Chapter 4, Title X, Division A of the Disaster Relief Appropriations Act of 2013, Public Law 113-2 (127 Stat. 23) enacted January 29, 2013 (hereinafter) DRAA 13. The Secretary of the Army is authorized, at full Federal expense using funds provided in DRAA 13, to complete ongoing flood and storm damage reduction studies in areas that were impacted by Hurricane Sandy.

As noted in our earlier letter, as part of this study, the Corps conducted a focus area analysis for the coastal portion of the Pawcatuck River watershed in Rhode Island. This analysis was part of the larger North Atlantic Coastal Comprehensive Study. The analysis concluded that there is a Federal interest in continuing with a feasibility study to examine coastal storm damage reduction along the south coast of the state. The study area includes the towns of Westerly, Charlestown, South Kingstown, and Narragansett. To assist in your review, the following information is enclosed: Original letter from the Corps to your office dated July 23, 2014, Report Synopsis for the Pawcatuck River CSDR Feasibility Study, Figure illustrating the various structural alternatives at Misquamicut Beach, 2014 Environmental Assessment, Misquamicut Beach, Beach Erosion Control Project Westerly, Rhode Island and Letter from your office to the Corps dated December 24, 2013 with regard to the Misquamicut Beach Erosion Control Project

The general water resource problem to be addressed in the Pawcatuck River CSDR Feasibility Study is the vulnerability of coastal Rhode Island to storm damage from wave attack, storm surge and erosion. Potential fixes include structural and non-structural solutions. Currently, as a result of the project team's early economic analysis there is only one of the five damage areas evaluated in the study area that propose the use of structural alternatives: at Misquamicut Beach in Westerly (see enclosed figure). The alternatives being further evaluated at Misquamicut Beach include a combination of beach fill and flood walls for Misquamicut Village, beach fill alone (two reaches; 4,000 and 9,200 linear feet), beach fill, flood wall and a tide gate at the breachway to Winnapaug Pond. The study team is also evaluating non-structural alternatives (elevation and/or acquisition of homes and businesses) in areas in Westerly, Charlestown, South Kingstown, and Narragansett.

Misquamicut Beach was initially constructed in the early 1960s by the Corps as a beach erosion control project. The project was authorized by the River and Harbor Act of July 14, 1960 (PL 86-645), as amended. The beach erosion control project was designed and constructed to provide protection to the bathhouse, public parking lot, roadway (part of the evacuation route system), and utilities, and reduce backshore flooding during coastal storms. This project involved the placement of approximately 80,000 cubic yards of sand fill along 3,250 feet of shoreline. The beach was roughly 150 feet wide shoreward of the mean high water line with a top elevation of +7.5 feet mean low water.

Hurricane Sandy caused significant erosion along the Rhode Island shoreline. This included Misquamicut Beach. In 2014, the Corps placed 84,000 cubic yards of sand fill at the beach in order to restore the beach to its authorized design profile. The 2014 Environmental Assessment (EA) for this Beach Erosion Control Project noted that the project was not anticipated to have any significant impact on any state or federally listed, threatened or endangered species. The enclosed letter from your office dated December 24, 2013 concerning piping plovers (*Charadrius melodus*), concurred that the project was unlikely to have adverse effects on the federally threatened piping plover. As noted in the EA, the re-engineered beach could provide suitable piping plover nesting habitat once the beach was widened and as such, recommended a monitoring program be conducted after the work was completed.

The U.S. Fish and Wildlife Service began a piping plover monitoring and management plan in cooperation with the Rhode Island Department of Environmental Management at Misquamicut Beach once the Beach Erosion Control Project was complete. According to Nick Ernst, former piping plover coordinator at the Rhode Island National Wildlife Refuge Complex, monitoring was completed at Misquamicut Beach in 2014 and 2015 and no nesting piping plovers were identified (as per telephone conversation on June 12, 2015 with Kathleen Atwood, a member of my staff). The

Pawcatuck River, Rhode Island
Coastal Storm Risk Management
Feasibility Study

Appendix A4: Record of Non-Applicability

RECORD OF NON-APPLICABILITY (RONA)

GENERAL CONFORMITY - RECORD OF NON-APPLICABILITY

Project/Action Name: *Pawcatuck River Coastal Storm Risk Management Home Elevation Project*

Project/Action Point of Contact: *Christopher Hatfield, USACE Project Manager*

Phone: 978-318-8520

Begin Date: *TBD* End Date: *TBD*

The Pawcatuck River Coastal Storm Risk Management Project is located in Washington County, Rhode Island which is in attainment with the National Ambient Air Quality Standards (NAAQS) for all six criteria pollutants. As such, a General Conformity review under the Clean Air Act, Section 176 is not required.

Supporting documentation appears in the NEPA documentation (Clean Air Act Section)

Date: _____ Signed:_____

Joseph B. Mackay, Chief
Environmental Resources Section

Pawcatuck River, Rhode Island
Coastal Storm Risk Management
Feasibility Study

Appendix A5: Draft Finding of No Significant Impact (FONSI)

Pawcatuck River Coastal Storm Risk Management Feasibility Study
Westerly, Charlestown, South Kingstown and Narragansett, Rhode Island
Finding of No Significant Impact (FONSI)

The U.S. Army Corps of Engineers (USACE) New England District (NAE) prepared an Integrated Feasibility Report and Environmental Assessment for the Pawcatuck River Coastal Storm Risk Management Feasibility Study (CSRMFS). The study area includes about 28 miles of moderately developed coast in the towns of Westerly, Charlestown, South Kingstown, and Narragansett located in Washington County, Rhode Island. The area includes a series of coastal barrier beaches that front several coastal ponds. The floodplain completely encompasses the barriers and ponds.

The study was authorized in a resolution approved by the Committee on Public Works of the United States Senate, dated September 12, 1969 (also known as the Southeastern New England [SENE] resolution). The SENE resolution authorized the Army Corps of Engineers to investigate solutions for "flood control, navigation, and related purposes in Southeastern New England …" Authorization and funding was also provided under investigations heading, Title X, Chapter 4, Division A of the Disaster Relief Appropriations Act of 2013, Public Law 113-2 (127 Stat. 23) enacted January 29, 2013.

The Pawcatuck River CSRMFS project plan formulation considered a range of structural and nonstructural measures to reduce the risk of storm damage in the study area. Through an iterative planning process, potential coastal storm risk management measures were identified, evaluated, and compared. Initial screening of alternatives determined that detailed study of structural (sheet pile floodwalls and tide gates), soft structural (beach fill/nourishment), and nonstructural (elevation and buyout of properties) should be conducted in Westerly due to the amount of denser development there. Conversely, only non-structural alternatives were warranted for full evaluation in the towns of Charlestown, South Kingstown, and Narragansett.

The Tentatively Selected Plan (TSP) for coastal storm risk management in the Pawcatuck River coastal watershed was to elevate the first floors of 341 residential structures in the four communities +1-foot above the FEMA designated base flood elevation. Following USACE and public review of the TSP and the Agency Decision Milestone meeting, it was decided the study team would: conduct a performance based sea level change analysis (the 'intermediate' rate was found to be the best performing rate over the economic and planning horizons), economically evaluate certain structures for potential flood proofing and acquisition, and optimize the analysis to determine the National Economic Development (NED) plan. The NED plan consists of elevating the first floors of 357 primarily residential structures, dry flood proofing 21 primarily commercial structures, and the acquisition of 7 properties located in Coastal Barrier Resource Act units. Working with the communities, Rhode Island Coastal Resources Management Council (RI CRMC) found 110 structures identified for elevation where the structure was not owned by the same entity who owns the land. These structures were eliminated from the NED

plan as well as the 7 properties identified for acquisition. The resulting Locally Preferred Plan (LPP) consists of elevating 247 structures and flood proofing of the 21 commercial structures.

The LPP consists of elevating the first floors of 247 structures in the four study area communities. The first floors will be elevated to a height corresponding to the FEMA designated Base Flood Elevation (BFE), ranging from +11 feet North Atlantic Vertical Datum of 1988 (NAVD88) to +17 feet NAVD88, plus 1 additional foot in accordance with Corps/NFIP standards, and another 0.8 feet to account for intermediate sea level rise over the next 50 years. Twenty-one primarily commercial structures are also included in the LPP for flood proofing. They consist of large multi-story hotels, sheet metal buildings, brick on concrete slab buildings, etc.

Elevation of individual structures will rely on conventional residential construction methods. First, existing structures will be elevated using lifting jacks and supported on temporary cribbing foundations. Temporary utility connections will be put into place to allow occupants to remain in the structure throughout construction. A new or extended foundation would then be constructed. Those structures located in the AE-zone of the floodplain will be provided with a new concrete wall foundation. Those in the VE-zone will be placed on new concrete piers. Once ready, the structures will then be lowered onto the new foundations and the permanent utility connections made.

Dry flood proofing consists of sealing all areas from the ground level up to approximately 3 feet of a structure to reduce the risk of damage from storm surge resulting from storms of a certain magnitude by making walls, doors, windows and other openings resistant to penetration by storm surge waters. Walls are coated with sealants, waterproofing compounds, or plastic sheeting is placed around the walls and covered, and back-flow from water and sewer lines prevention mechanisms such as drain plugs, standpipes, grinder pumps, and back-up valves are installed. Openings, such as doors, windows, sewer lines and vents, may also be closed temporarily, with sandbags or removable closures, or permanently. Critical utilities may be relocated to a less vulnerable elevation.

I find that based on the evaluation of environmental effects discussed in this document, the proposed action is not a major federal action significantly affecting the quality of the human environment. Under the Council on Environmental Quality ("CEQ") NEPA regulations, "NEPA significance" is a concept dependent upon context and intensity (40 C.F.R. § 1508.27.) The CEQ regulations identify a number of factors to measure the intensity of impact. These factors are discussed below, and none are implicated here to warrant a finding of NEPA significance. A review of these NEPA "intensity" factors reveals that the proposed action will not result in a significant impact, neither beneficial nor detrimental, to the human environment.

Impacts on public health or safety: The project is expected to have no significant adverse effect on public health and safety.

Unique characteristics: The unique characteristics of coastal Rhode Island are multifaceted involving highly valued coastal habitat, aesthetic and recreational resources. The project involves elevating individual houses within the same footprint in residential neighborhoods. No significant impacts will occur to unique characteristics of the project area as a result of the proposed project.

Controversy: The project was coordinated with federal, state, local agencies, and stakeholders with jurisdiction or interest in the project. All comments were addressed.

Impacts on cultural, environmental and recreational resources: A neighborhood comprised of 29 buildings in the former fishing community of Jerusalem in Narragansett will be affected by elevating structures. These properties could be eligible for the National Register of Historic Places. An architectural survey must be conducted to evaluate the neighborhood's eligibility.

Cumulative impact: The proposed house elevations will be accomplished within the footprint of existing structures and as such, no additional permanent cumulative impacts to the coastal community are anticipated as a result of the proposed project. There are no anticipated cumulative impacts to fish and wildlife, or federal and/or state threatened and endangered species.

Historic resources: An architectural survey must be completed of 29 buildings in the Jerusalem neighborhood of Narragansett. Due to the amount of property already elevated in the village, 29 additional altered properties will not significantly impact the area beyond what it already is. RISHPO has requested we conduct an architectural survey during PED to document the changing conditions.

Endangered species: None of the individual houses proposed for elevation are located within designated piping plover (*Charadrius melodus*) habitat. Therefore, no direct short or long term impacts to piping plover breeding or foraging habitat are anticipated. There are four houses proposed for elevation located between 200 and 900 feet from designated piping plover habitat which may result in indirect impacts to piping plover due to construction activities. These potential impacts are not expected to be significant in consideration of on-going recreational activities in the area. Therefore, the proposed project may affect but is not likely to adversely affect this species because the effects to piping plover are expected to be insignificant or discountable. The U.S. Fish and Wildlife Service concurred with this determination in a letter dated December 14, 2017. There is no in-water work and therefore, no federally protected animal species under the jurisdiction of the National Marine Fisheries Service will be impacted. There are thirteen state-listed species identified in the vicinity of protect activities. However, none of the state-listed species will be directly or indirectly impacted by project related activities.

Potential violation of state or federal law: This action will not violate federal law. The local sponsor will be responsible for obtaining necessary state and local permits.

Based on my review and evaluation of the environmental effects as presented in the December 2017 Integrated Feasibility Report and Environmental Assessment, I have determined that the for the Pawcatuck River Coastal Storm Risk Management Feasibility Study, located in Westerly, Charlestown, South Kingstown and Narragansett, Rhode Island, is not a major federal action significantly affecting the quality of the human environment. Therefore, I have determined that this project is exempt from the requirement to prepare an Environmental Impact Statement.

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Date

William M. Conde
Colonel, Corps of Engineers
District Engineer