APPENDIX B2

BORROW AREA - ENVIRONMENTAL

Biological and Environmental Services Related to Marine and Navigable Waterways Civil Works Activities in the Philadelphia District

Contract: W912BU-12-D-0021, Task Order 0019

Draft Report

January 15, 2015

Borrow Area Study for the Atlantic Coast of Long Island, East Rockaway New York, Storm Damage Reduction Project

Prepared for:
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FOREWORD

This report entitled "Borrow Area Study for the Atlantic Coast of Long Island, East Rockaway New York, Storm Damage Reduction Project" was prepared by Tetra Tech, Inc., for Mr. Robert Smith, Environmental Branch, U.S. Army Corps of Engineers, New York District, under Contract No. W912BU-12-D-0021; Task Order: 0019.

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LIST OF ABBREVIATIONS

°C	degrees Celsius
cm	centimeter
DO	dissolved oxygen
ECO	Ecological Consulting Organization
EFH	Essential Fish Habitat
ft	feet
GPS	global positioning system
HDPE	high-density polyethylene
in	inch
m^2	squared meter
mg/L	milligrams per liter
mS/cm	milliSeimens per centimeter
NAVD	North American Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
NOAA	National Oceanic and Atmospheric Administration
NTU	nephelometric turbidity units
oz	ounce
psu	practical salinity unit
QC	quality control
sp.	species
USACE	United States Army Corps of Engineers

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), New York District is conducting a comprehensive feasibility-level reformulation of shore protection and storm damage reduction for the East Rockaway, New York Storm Damage Reduction Project (the Project). The habitats within the borrow area of the project must be assessed in order to monitor conditions before and after dredge activities. Tetra Tech, Inc. (Tetra Tech) conducted the benthic and fisheries assessment surveys as part of this program. Field work conducted between April and September 2014 included the collection of water quality data, benthic grab sampling, sediment characterization, and fish trawling at the East Rockaway Borrow Area.

New York waters support a diversity of valuable fisheries. Twelve species generated over $1 million of revenue individually in 2013 (Table 1; NOAA 2014a). Of these, six were finfish; the other half were shellfish. Northern quahogs (*Mercenaria mercenaria*) were the most valuable fishery, worth over $13 million. The most abundant species landed by weight was longfin squid (*Doryteuthis pealeii*), which brought in almost $6 million. In total, 127 different species were landed in New York State, grossing over $56 million.

Table 1. Commercial Fisheries Landings from 2013 in New York that Generated Over $1 Million in Revenue

Species	Pounds	Value
Northern quahog	1,932,373	$13,474,804
Longfin squid	4,828,205	$5,975,821
Golden tilefish	1,466,281	$4,672,505
Eastern oyster	204,132	$4,148,769
Striped bass	823,804	$3,393,905
Summer flounder	1,051,773	$3,231,889
Scup	4,577,932	$2,970,263
Sea scallop	255,540	$2,601,571
Atlantic surf clam	3,452,496	$2,410,205
Silver hake	2,380,120	$1,908,938
Goosefish	1,425,514	$1,624,779
Snails (conchs)	2,073,001	$1,303,017

Source: NOAA 2014a

There are potential impacts to fish from the dredging of sand for beach nourishment along the New York coast. Dredge activities affect the top portion of the seabed, creating a shallow depression in the borrow area. Impacts are generally localized and restricted to the dredge project footprint and the immediately surrounding area. Larger and more mobile organisms, such as crustaceans, finfish, and marine mammals, are not similarly confined to one area and will largely be able to avoid most of the dredging activity, though this is not universal, especially for bottom-dwelling animals and early life history stages. Additionally, many of these fisheries resources depend on benthos as a prey resource. Since benthic invertebrates are expected to experience 100% mortality if residing within dredged material removed from the borrow area, finfish abundance within the borrow area following dredging may be influenced by recovery of benthic resources within the borrow area.

1.1 Project Description and Location

The USACE identified the East Rockaway Borrow Area for this benthic and finfish survey (Figure 1). The borrow area surveyed for this study is about 2 miles south of Long Island, NY and about 6 miles east of the Rockaway Inlet. It is about 2.6 miles long, and 1.1 miles wide, with depths of 36 to 58 feet. The coordinates of the borrow areas are defined according to the World Geodetic System version 84 (WGS 84) coordinate system in Table 2.

Table 2: Coordinates of the East Rockaway Borrow Area

World Geodetic System 84	
Latitude	**Longitude**
40.548900 N	73.832319 W
40.560008 N	73.783346 W
40.544140 N	73.777461 W
40.533244 N	73.825703 W

Tetra Tech completed the benthic and finfish survey of this site as described below. Sampling sites were targeted and identified using the vessel's onboard global positioning system (GPS) navigation system. Positioning data were recorded manually or electronically in a Trimble® Juno SB handheld GPS system with differential capability at each of the sites identified for sampling. GPS points followed the WGS 84 coordinate system. Sampling locations were mapped using ESRI ArcGIS® Release 10.

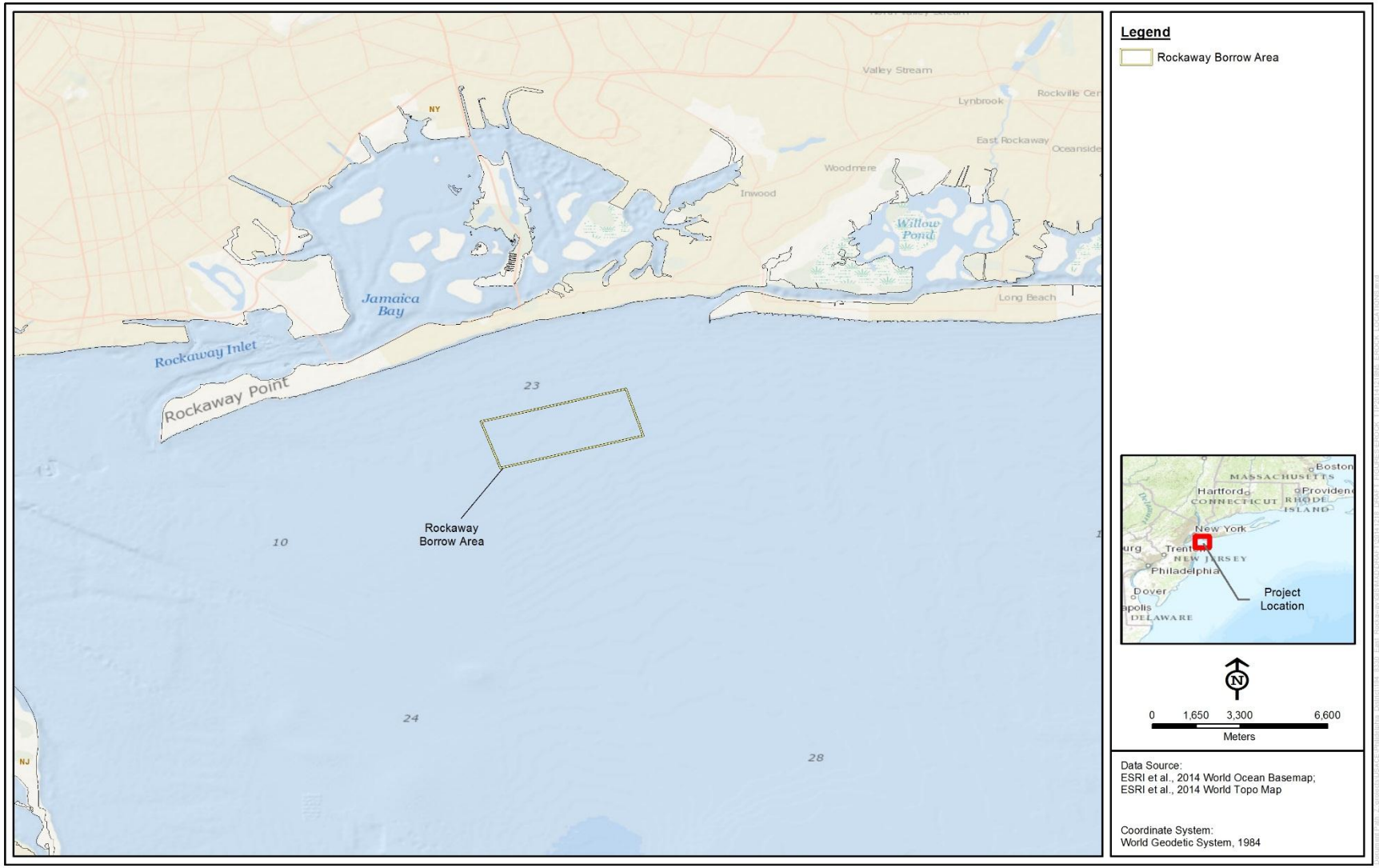


Figure 1: East Rockaway Borrow Area for Long Island, New York Storm Damage Reduction Projects

1.2 Objectives

The objectives of this study were to characterize and compare seasonal demersal fishes and benthic community structures, and to assess Project impacts on these communities and their related marine habitats, based on the Project Scope of Work. This report describes field and laboratory methodologies that were used for the collection of benthic grab samples, the analysis of vertical stratification, and the characterization of offshore fish populations. Results are presented in graphs and tables, and are discussed in the context of other relevant studies. The benthic sample collection and bottom trawl methods are described in Section 2.0. Benthic grabs were collected in the spring and fall of 2014. From these, infauna identification, biomass, sediment size, and organic carbon content were determined. Monthly trawl data was analyzed for species composition, abundance, and size data to characterize the finfish community of the East Rockaway Borrow Area.

1.3 Summary of Findings

Based on the 50 benthic grabs collected both in the spring and fall, the average dominant sediment type was fine sand for both seasons. Spring samples displayed greater homogeneity, however, with 96% of samples dominated by fine sand. In fall samples, 64% of samples were dominated by fine sand, with 34% dominated by medium sand. The most abundant benthic infauna phylum was Annelida, in both the spring and fall. By species, a polychaete worm (phylum Annelida) was the most abundant in the spring, and an amphipod (phylum Arthropoda) was the most abundant in the fall. Species richness, diversity, and evenness were all significantly greater in the fall relative to the spring. During monthly fish sampling both within the borrow area (on-site) and at reference sites, 36 distinct species were captured. Of these, 28 support a commercial industry and 12 have Essential Fish Habitat (EFH) in the study area. Overall, the most abundant species was longfin squid; little skate (*Leucoraja erinacea*) had the greatest biomass. Based on catch per unit effort (CPUE), which is a standardized unit of abundance, there was greater variation month-to-month than between on-site and reference trawls within a given month.

2.0 METHODS

Sample collection in the field is summarized in Table 3. The benthic survey was conducted aboard the *R/V Hudson*, a USACE vessel. Finfish trawls were conducted aboard the *F/V Tiny Giant*, as well as the *R/V Hudson*. Sampling details are provided in each subsection below. Blank data sheets used in the field are provided in Appendix A.

Table 3: Summary of Sample Collection Methods in the East Rockaway Borrow Area

Type of sampling	Gear	Number of sites	Frequency of sampling	Samples collected
In situ water quality	YSI 6920 sonde	Surface, middle, and bottom readings at each site	Every site	Readings of pH, water temperature, turbidity, dissolved oxygen, and specific conductance
Benthic grab	0.1 m^2 Smith-McIntyre grab	50 randomly selected sites	Seasonally, spring and fall	Stratification assessment of subsample, macroinvertebrates, and sediment size
Finfish trawl	30-ft. headrope bottom otter trawl with 1-in. mesh and ¼-in. codend liner	10-15 trawls	Monthly, May through October	Species identification, length, and weight; all animals released

Notes: m^2 = square meters; ft. = foot; in. = inch

2.1 PHYSICAL DATA AND WATER QUALITY

Physical data and water parameters were taken at all sampling sites. In the field, date and time of collection, and latitude/longitude coordinates (by dual-range global positioning system) for all samples were recorded. Weather was also recorded for each sampling day.

Water quality data were collected at each of the benthic and finfish sample sites, at the end of each grab or tow. The following parameters were measured at the surface, middle, and bottom: pH, water temperature (degrees Celsius [°C]), turbidity (nephelometric turbidity units [NTU]), dissolved oxygen (DO) (milligrams per liter [mg/L] and percent [%]), and conductivity (milliSiemens per centimeter [mS/cm]), using a YSI 6920. Salinity (practical salinity units [psu]) was calculated from the conductivity values and water temperature. Depth was also reported relative to tide state. The time of the latest high and low tide at the nearest tide station is included in Appendix B.

2.2 BENTHIC GRABS

To characterize the benthic environment, a total of 100 benthic grabs were completed. Benthic grabs were collected from pre-selected sites in the East Rockaway Borrow Area in the spring and fall of 2014 aboard the *R/V Hudson*, which is summarized in Table 4 and depicted in Figure 2 and Figure 2. Coordinates of each grab location are provided in Appendix C. Sites within the borrow area were labeled as “ER,” while reference sites were labeled “RS.” Since site numbers were assigned chronologically, the number of the site does not necessarily correspond between spring and fall sampling events. At each

site, the 0.1 m^2 stainless steel Smith-McIntyre grab sampler was thoroughly rinsed prior to each grab. Each grab was at least 50% full and showed no evidence of surface washout. A marine geologist made a qualitative assessment of vertical stratification in 15 of the 50 grabs (30%) for each season using a clear plastic tube. Each sample was given a general qualitative description, which was supplemented by the laboratory results of the grain size assessment. Every sample was then analyzed in a laboratory for macroinvertebrate composition and grain size.

Table 4: Benthic Sampling Effort within the East Rockaway Borrow Area

Collection date (2014)	Weather conditions	Number of samples in borrow area	Number of reference samples	Vertical stratification assessment	Benthic infauna and grain size samples
Spring 2014					
18 June	Sunny/hazy, 90°F, 15-20 knot winds	27	0	15	27
19 June	Overcast, 75°F, 10 knot winds	17	6	0	23
Fall 2014					
09 October	Clear, 63°F, 5-10 knot winds	28	0	15	28
10 October	Clear, 58°F, 5 knot winds	16	6	0	22

Figure 2: Benthic Grab Sampling Sites in the East Rockaway Borrow Area Collected in the Spring

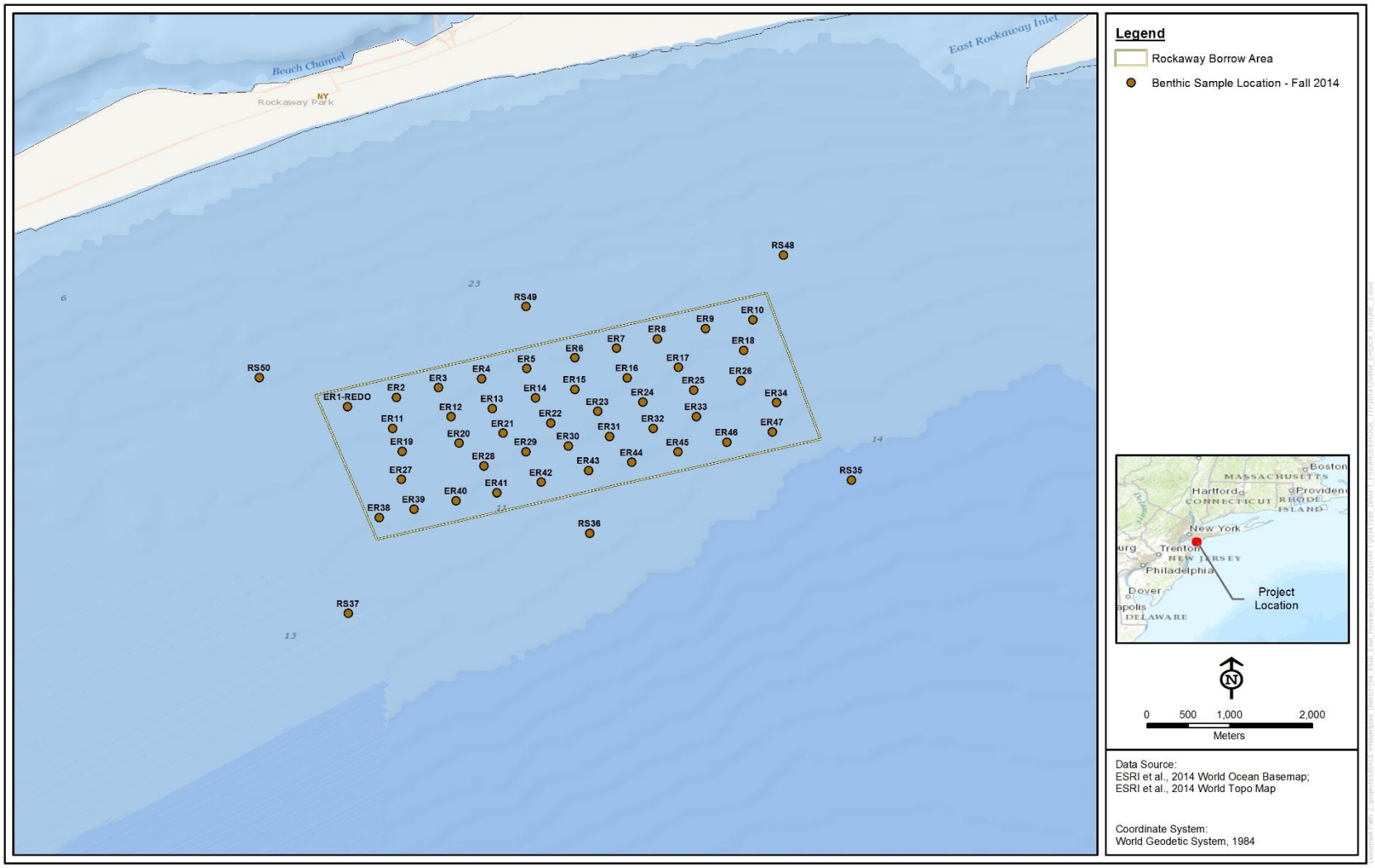


Figure 3: Benthic Grab Sampling Sites in the East Rockaway Borrow Area Collected in the Fall

All sampling containers were pre-labeled for sieved benthic organisms and grain size. No samples were composited; all 100 samples were handled individually. For the grain size sample, surface sediments were removed from the top 0.8 in (2 cm) of each sediment grab and placed in a screw-top container (16 ounce [oz] plastic jar), and kept in a cooler until transfer for laboratory processing (Appendix D). Within 1-2 days of collection, the samples were picked up by or delivered to Cashin Associates, located in Hauppauge, NY (Appendix F). In the field, grab samples were then processed for benthic infauna identification (Figure 4; see Appendix E for details). After sieving and preserving, the benthic organism samples were packed securely in sealed 5-gallon buckets and shrink-wrapped for pick-up by Ecological Consulting Organization (ECO), located in Lake Ronkonkoma, NY (Appendix F).

Figure 4: Benthic Sample Processing Aboard the *R/V Hudson*

2.3 Laboratory Analysis

2.3.1 Grain Size

Grain size analysis was performed in a laboratory by Cashin Associates using the ASTM Standard D422-63, Particle-Size Analysis of Soils (ASTM 2007). In this method, sediment is sifted through progressively smaller, nested sieves. After the sample is dried, the weight retained in each sieve is then divided by the total sample weight. Cobble gravel is greater than 2.5000 inches (in.). Pebble gravel is retained in US sieve Number (No.) 5 (0.1570-inch). Granule gravel is retained in the No. 10 sieve (0.0787-inch). Very coarse and coarse sand passes through the No. 10 sieve and is retained in the No. 35 sieve (0.0197-inch). Medium sand is retained in the No. 60 sieve (0.0098-inch). Very fine and fine sand passes through the No. 60 sieve and is retained in the No. 230 sieve (0.0025-inch). Silt and clay pass through all sieves and are collected in the bottom tray, with no further differentiation.

2.3.2 Invertebrate Analysis

Benthic invertebrates, preserved in the field, remained in 10% buffered formalin until laboratory sorting by ECO taxonomists. To remove preservative and any sediment, samples were gently rinsed over a 0.020 in (0.5 mm) mesh sieve. If not processed immediately, samples were kept in alcohol for longer-term storage. All species were identified on a sorting tray using a stereoscope. Each individual was identified to the lowest practical taxonomic level and counted.

2.4 FISH TRAWLS

Fish trawls were conducted within the East Rockaway Borrow Area and at nearby reference sites between May and October of 2014 (Figure 5, Appendix C). The conditions and effort of each monthly sampling event are summarized in Table 5. All fish sampling from May to August were conducted aboard the *F/V Tiny Giant*; those in September and October were conducted aboard the *R/V Hudson*. Each tow was processed for the identification, enumeration, length, and weight of each species collected. All common and scientific names of fishes are based on Page et al. 2013.

Table 5: Fish Sampling Effort within the East Rockaway Borrow Area

Collection date (2014)	Weather conditions	Number of borrow area trawls	Number of reference trawls
14 May	Overcast, 50°F, light winds	11	1
17 June	Sunny/hazy, 85°F, southwest winds	11	1
15 July	Overcast, 80°F, moderate winds	10	0
16 July	Overcast, 77°F, 10 knot winds	4	1
05 August	Sunny, 85°F, 5 knot winds	9	1
16 September	Overcast/showers, 64°F, light winds	6	0
17 September	Clear, 64°F, calm	5	1
20 October	Clear, 63°F, 10 knot winds	10	0

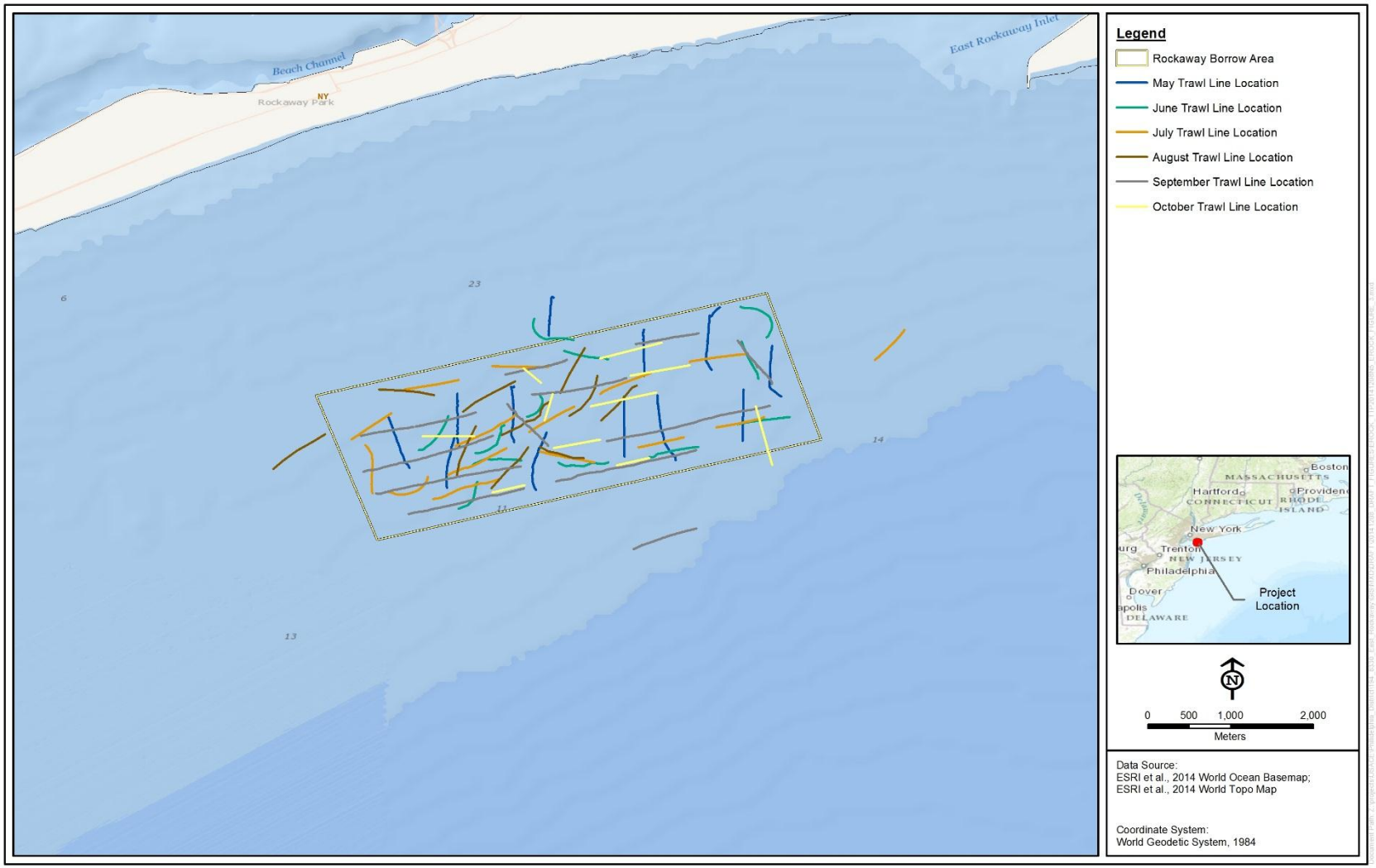


Figure 5: Trawls Conducted for Monthly Fish Sampling in the East Rockaway Borrow Area

A 30-ft. headrope bottom otter trawl with a ¼-in. codend liner was towed for approximately 0.25 nautical miles at a speed of 2 to 3 knots, which equates to 8 to 10 minutes. Contents of the trawl net were processed on board the vessel (Figure 6). Each species of teleost, elasmobranch, and squid was identified to the lowest taxonomic level. The standard length (SL), the distance from the snout to the hypural bone, was measured to the nearest millimeter (mm) for each individual. For elasmobranchs, the total length (TL) from the nose to the tail was measured. Weight was collected to the nearest gram (g). For species with high abundance (i.e., >30 individuals), a bulk composite weight was measured for the additional individuals. With the exception of squid (due to their commercial importance), all mollusks were noted for presence but were otherwise not enumerated, weighed, or measured. Mantle length and weight were collected for squid.

Although abundance, length, and weight was collected for all fish species, in this report, attention is given to species of interest, which are identified as organisms that support a fishery valued at over $1 million.

Figure 6: Fish Sample Processing Aboard the *F/V Tiny Giant*

2.5 Data Analysis

To analyze characteristics and patterns within the benthic data, several different parameters were investigated. Species richness (R) is the overall number of species. To measure diversity, the Shannon Diversity Index (H') was calculated as:

$$H' = -\sum_{i=1}^{R} p_i \ln p_i$$

For taxon *i*, p_i is the proportion of individuals from the particular taxon relative to the total number of individuals. Greater values of H' correspond to higher diversity. This diversity index can then be used to look at relative abundances of different species, or evenness. Pielou's evenness index, calculated as:

$$J' = \frac{H'}{H'_{max}}$$

estimates the evenness of different species. H'_{max} is the maximum value of H', equivalent to the natural log (ln) of R (where R = total number of species). J' ranges from 0 to 1, with low values representing greater variation between species and high values indicative of more even abundances.

Species dominance was measured using Simpson's Dominance Index calculated as:

$$\lambda = \sum_{i=1}^{R} p_i^2$$

λ ranges from 0 to 1; a community not dominated by just a few species would have a value below 0.5 while a community dominated by one or a few species would have a value greater than 0.5. A comparison of these infauna community measures between spring and fall was conducted using a two-tailed student's t-test. To focus on spatial changes in the benthic community, these statistics were run separately for grabs conducted on-site and reference site grabs. However, the disproportionate number of grabs collected within the Borrow Area and at nearby reference areas are not suitable for parametric statistics between the two types of areas.

Finfish abundance is reported as percent composition, as well as catch per unit effort (CPUE). CPUE is a way to standardize abundance and is calculated as number of fishes captured per tow. During quality control (QC) of trawl data, the length-weight relationship of each individual organism, if available, was used to identify possible outliers. An assumption was made that if an inconsistency in the length-weight relationship was apparent, the error was in the weight measurement, rather than the length measurement. The movement of a vessel, an inescapable and common challenge working at sea, may impact a weight measurement, especially for smaller individuals. Therefore, based on the fish's length, an expected weight was calculated (Lange and Johnson 1978, NOAA 2003, Robinette 1983). If an in-field weight was more than 50% different than the expected weight of an individual, the expected weight was substituted in further calculations. Of the original weights obtained, 25% did not agree with the expected weights and were therefore replaced with calculated weights. All statistical tests were conducted in Microsoft Excel 2013 or the statistical software R (R Core Team 2013), and used an alpha level of $\alpha = 0.05$ to determine statistical significance.

3.0 RESULTS

3.1 WATER QUALITY

Water quality measurements were taken at the surface, middle, and bottom of the water column at each benthic grab and trawl site from May to October 2014 (Table 6). In May, the turbidity meter was not providing reliable readings, so these are omitted. Though more parameters were measured (Appendix B), temperature, salinity, and dissolved oxygen are highlighted here (Figure 7; Figure 8; Figure 9), due to the biological relevance of these measurements, as well as the seasonal patterns evidenced. In May, the water column is well-mixed, with no vertical stratification or pycnocline (i.e., density gradient). Since the solubility of oxygen is greater in colder water, this could partially account for the high DO observed from the surface to the bottom. In addition to this, wave action and photosynthetic organisms may have also contributed to the supersaturation of oxygen (Millero 2006). This pattern was also apparent in June, July, and August, but only in the surface layer. As is common at temperate latitudes, a pycnocline formed during the summer months. Although the densest water (which is also the coldest and saltiest) is in the bottom layer for all six months, it is only during June, July, and August that the surface temperature is warm enough to become less dense, thus creating a pycnocline. In these same summer months, oxygen levels in bottom water were depleted due to respiration of organisms and lack of mixing with oxygen-rich surface waters (Millero 2006). In September and October, however, surface waters began to cool, breaking down the pycnocline. Increased wind and storms facilitated the mixing of the water column. Without the contribution of photosynthetic organisms (as witnessed in the spring), DO levels remained low. These values would be expected to increase as winter storms replenished atmospheric oxygen into the water.

Table 6: Average Water Quality Parameters by Month at the East Rockaway Borrow Area

Sampling month	Average depth (ft)	Reading depth	Temperature (°C)	Salinity (psu)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH
May	38.9	Surface	11.9	27.6	12.21	134.7	--	8.23
		Middle	11.7	29.3	11.97	132.4	--	8.17
		Bottom	11.8	30.1	10.86	123.8	--	8.09
June	44.7	Surface	18.7	30.1	9.15	119.3	5.9	8.15
		Middle	17.4	30.5	9.27	119.9	5.6	8.11
		Bottom	14.8	30.9	6.42	75.1	5.5	8.02
July	43.1	Surface	20.3	30.4	9.76	122.7	1.3	8.16
		Middle	16.1	31.3	6.73	84.1	0.9	7.95
		Bottom	13.4	31.8	5.39	63.5	2.0	7.78
August	42.3	Surface	23.2	30.4	9.05	126.2	0.5	8.32
		Middle	22.6	31.1	7.85	107.1	0.2	8.19
		Bottom	18.5	31.9	5.02	66.1	2.6	7.95
September	44.2	Surface	21.4	30.5	6.65	89.9	0.4	7.99
		Middle	21.4	30.5	6.53	88.5	0.3	8.01
		Bottom	21.4	30.7	6.33	86.0	0.7	7.99
October	44.9	Surface	17.8	31.0	6.02	76.3	0.8	8.11
		Middle	17.9	31.3	5.82	73.8	0.7	8.09
		Bottom	17.3	32.4	5.80	72.8	0.7	8.06

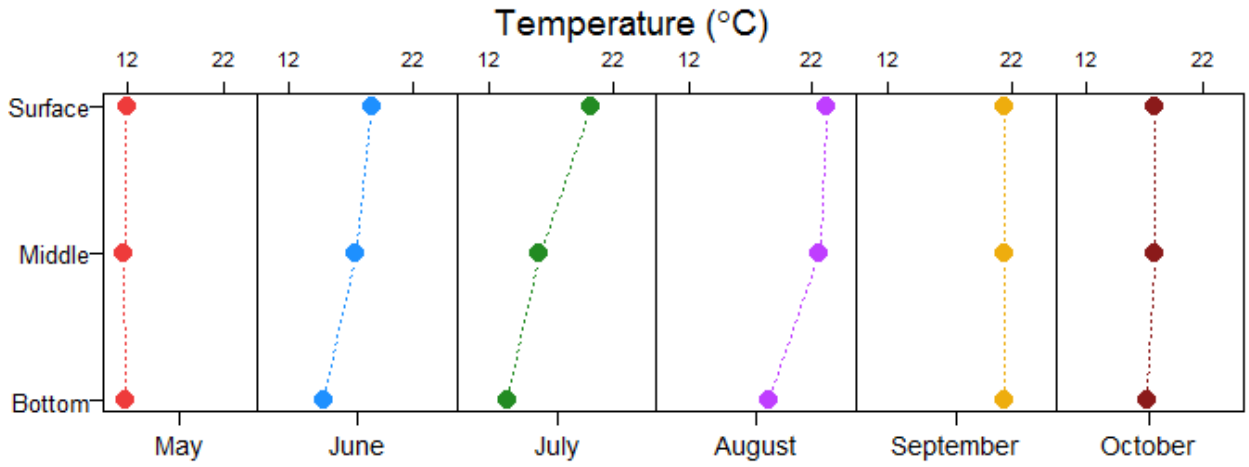


Figure 7: Vertical Profile of Average Water Temperature by Month

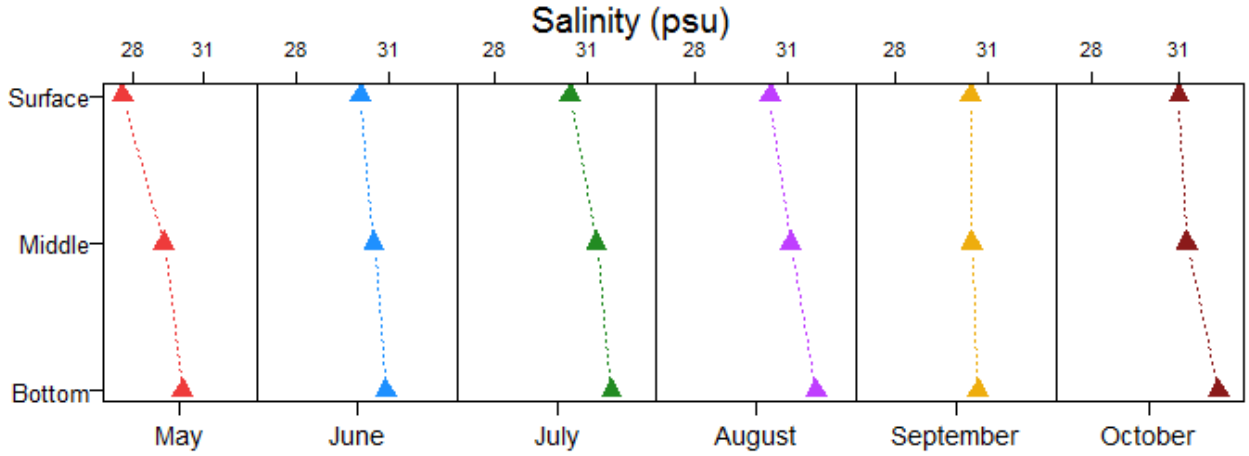


Figure 8: Vertical Profile of Average Water Salinity by Month

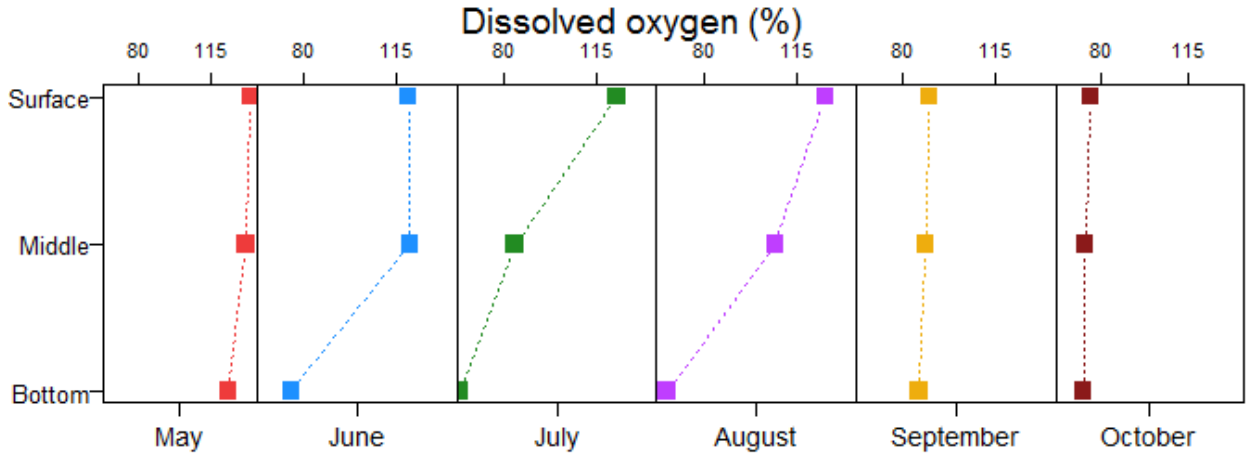


Figure 9: Vertical Profile of Average Dissolved Oxygen by Month

3.2 Benthic Grabs

Benthic sample collection occurred in June and October 2014. Physical attributes, such as sediment type, presented separately for the spring and fall seasons. Collectively, they provide a characterization of the East Rockaway Borrow Area benthic habitat. Benthic organisms and communities displayed temporal differences, which are explored in the following section based on the month of collection.

3.2.1 Benthic Habitat and Sediment Types

Each benthic sample collected in the spring and fall of 2014 was qualitatively described in the field in addition to the quantitative laboratory analysis of grain size. Field data sheets of benthic sample collection and in-field descriptions are included in Appendix A; detailed laboratory results are provided in Appendix D and Appendix E. On average, samples collected in both the spring and fall were dominated by fine sand (Table 7). Spring samples had a higher proportion of fine-sized particles than fall samples. In this section, reference sites are distinguished as "RS" and by light purple shading.

Table 7: Average Particle-size Distribution of Spring and Fall Benthic Grabs

Sampling period	Particle-size distribution						
	Gravel-size (%)			Sand-size (%)			Silt- & clay-size (%)
	Cobble	Pebble	Granule	Coarse	Medium	Fine	
June 2014	0.00	0.12	1.65	3.16	11.40	72.30	11.37
October 2014	0.07	1.24	2.36	5.98	34.19	55.90	0.25

In the field, the most common descriptor of samples collected in June was "medium brown sand" (Table 8). Traces of organic matter and pieces of shell were apparent in several samples. Only one sample was not described as sand; RS06, was composed of "organic muck," which is very small particles. Other than this one site, reference sites were similar overall. A geologist inspected a subsample of the grab from 15 of the 50 grabs for vertical stratification (Table 8). In these cases, the qualitative description was based on the geologist's description, rather than the whole sample. None of the inspected subsamples showed signs of stratification in the sediment. The dominant sediment types, determined by quantitative laboratory analysis, were in agreement with the qualitative descriptions, since nearly every sample was described as a type of sand.

Table 8: Qualitative Descriptions and Dominant Sediment Type of Spring Benthic Grabs

Site	Time	Depth (ft)	Stratification sample	Qualitative description (in-field)	Dominant sediment type (lab analysis)
18 June 2014					
ER01	1000	43	✓	Fine brown sand and crushed shells	Fine sand
ER02	1009	44	✓	Brown medium sand	Fine sand
ER03	1016	45	✓	Brown medium sand with organics	Fine sand
ER04	1022	46	✓	Brown fine sand	Fine sand
ER05	1028	46	✓	Fine dark brown sand with organics	Fine sand
ER06	1035	48	✓	Medium brown sand	Fine sand

Site	Time	Depth (ft)	Stratification sample	Qualitative description (in-field)	Dominant sediment type (lab analysis)
ER07	1042	47	✓	Medium brown sand and crushed shells	Fine sand
ER08	1049	48	✓	Medium brown sand and crushed shells	Granule gravel
ER09	1055	48	✓	Medium brown sand and shell bits	Fine sand
ER10	1101	50	✓	Medium brown sand and crushed shells and organics	Fine sand
ER11	1110	52	✓	Medium brown sand	Fine sand
ER12	1119	51	✓	Medium brown sand	Fine sand
ER13	1128	52	✓	Medium brown sand, shell bits	Fine sand
ER14	1159	40	✓	Medium brown sand, shell hash	Medium sand
ER15	1208	41	✓	Medium brown sand	Fine sand
ER16	1214	42		Medium brown sand	Fine sand
ER17	1221	42		Medium brown sand	Fine sand
ER18	1229	42		Dark brown, medium sand	Fine sand
ER19	1235	43		Medium brown sand	Fine sand
ER20	1243	44		Medium brown sand with organics	Fine sand
ER21	1250	44		Medium brown sand	Fine sand
ER22	1257	44		Medium brown sand	Fine sand
ER23	1302	45		Medium dark brown sand	Fine sand
ER24	1308	45		Medium brown sand	Fine sand
ER25	1316	47		Medium brown sand	Fine sand
ER26	1323	48		Medium brown sand	Fine sand
ER27	1328	50		Medium brown sand, shell hash	Fine sand
19 June 2014					
ER28	844	39		Dark brown sand, shell bits	Fine sand
ER29	853	40		Dark brown sand	Fine sand
ER30	859	40		Dark brown sand	Fine sand
ER31	906	40		Dark brown sand	Fine sand
ER32	913	40		Dark brown sand	Fine sand
ER33	920	42		Dark brown sand	Fine sand
ER34	926	31		Dark brown sand, some organics	Fine sand
ER35	933	44		Dark brown sand	Fine sand
ER36	939	43		Dark brown sand	Fine sand
ER37	1028	42		Medium brown sand	Fine sand
ER38	1035	43		Medium brown sand	Fine sand
ER39	1043	44		Medium brown sand	Fine sand
ER40	1049	44		Medium brown sand, some organics	Fine sand
ER41	1056	44		Medium brown sand	Fine sand
ER42	1103	46		Medium brown sand	Fine sand
ER43	1110	47		Medium brown sand	Fine sand

Site	Time	Depth (ft)	Stratification sample	Qualitative description (in-field)	Dominant sediment type (lab analysis)
ER44	1116	48		Medium brown sand, some organics	Fine sand
RS01	1157	37		Medium brown sand	Fine sand
RS02	955	38		Medium brown sand, some organics	Fine sand
RS03	1127	56		Medium brown sand	Fine sand
RS04	936	47		Medium fine sand and crushed shells	Fine sand
RS05	1139	52		Medium brown sand	Fine sand
RS06	1009	44		Organic muck	Fine sand

The quantitative analysis of sediment size confirmed most of the in-field observations (Figure 10; Figure 11). For sediment collected in June, 48 of the 50 samples were dominated by fine to very fine-sized sand (0.0025-0.0098 in). On average, a sample contained 72.3% of fines. Silt and clay (<0.0025 in) were present in about the same quantities as medium-sized sand (0.0098-0.0197 in); both averaged just over 11% per sample. Coarse-sized sand (0.0197-0.0787 in) and gravel (>0.0787 in) combined to make up less than 5% on average. Many samples contained just fractions of a percent of gravel. Only two samples were not dominated by fine-sized sand. Sample ER08 was dominated by granule gravel, but at 32.6%, the gravel was about as abundant as both medium and fine-sized sand. Sample ER14 was dominated by medium-sized sand. Cobble gravel, the largest sediment size, was not present in any sample. All six of the reference sites were dominated by fine sand, which is similar to sites in the Borrow Area.

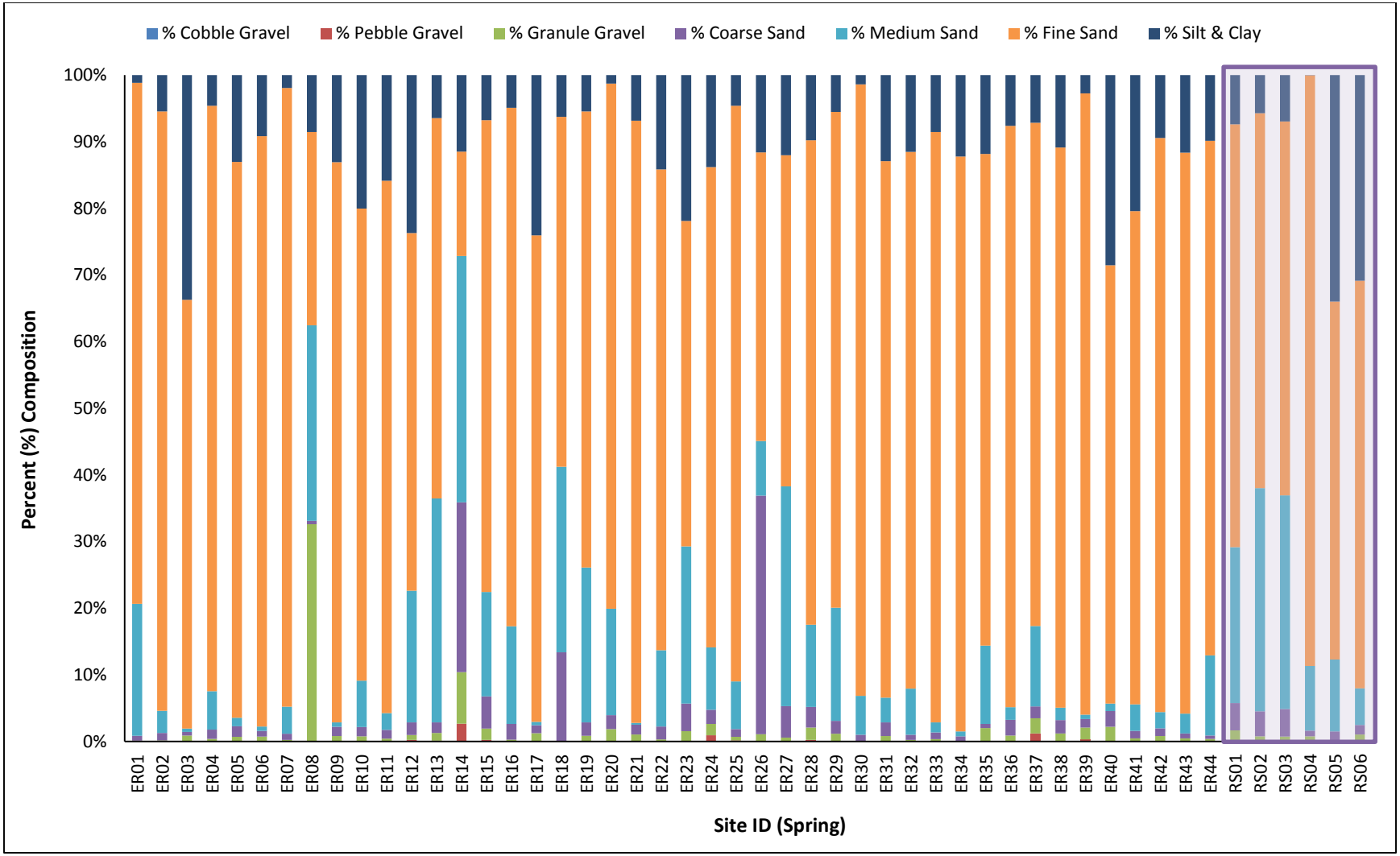


Figure 10: Sediment Composition of Spring Benthic Grabs by Site

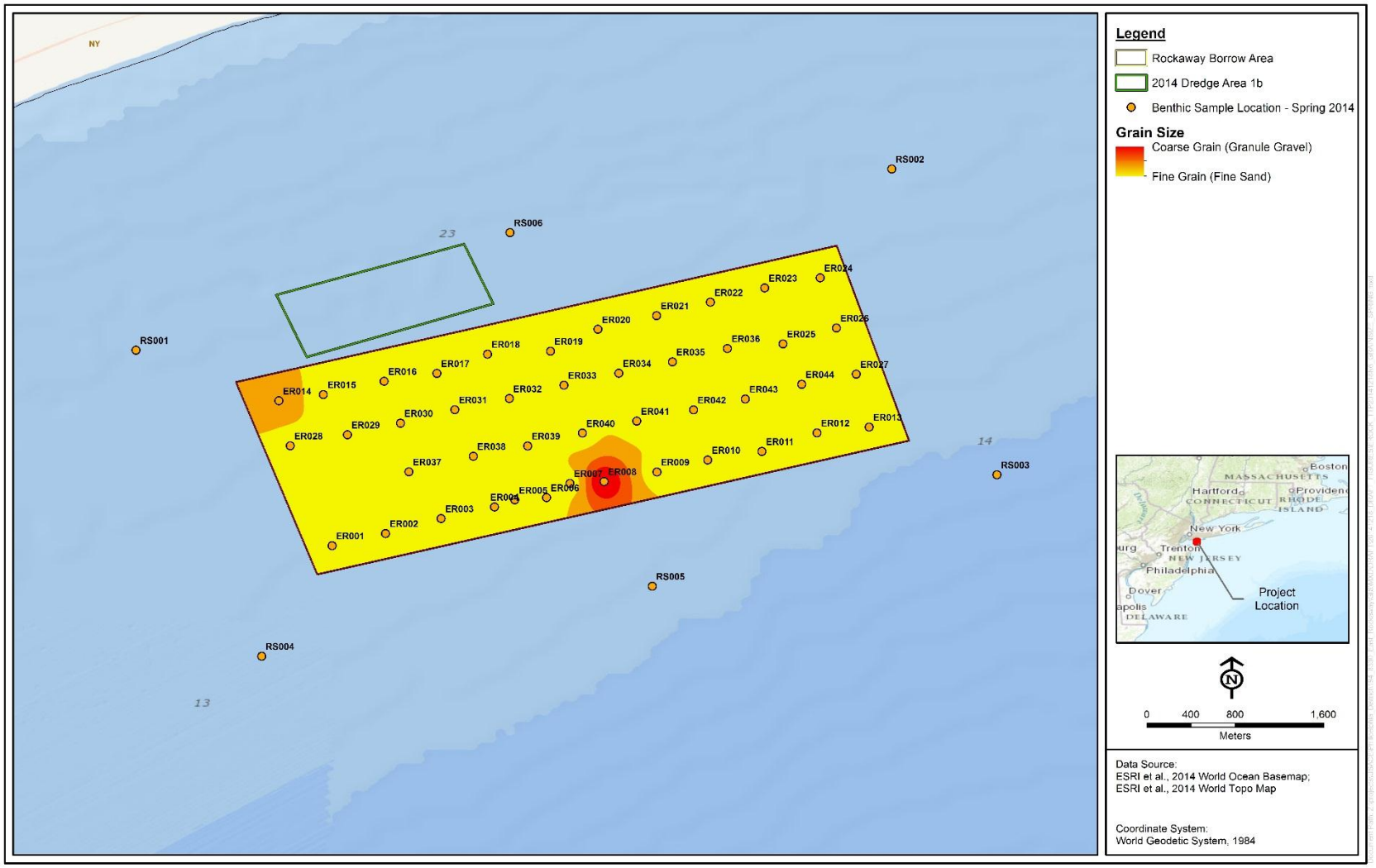


Figure 11: Dominant Grain Size of the East Rockaway Borrow Area in Spring 2014. Also shown is the area dredged during 2014.

In looking at benthic characteristics of the samples collected in the fall, a slightly different pattern emerged (Table 9) within the borrow area. The qualitative descriptions were similar to those made in June. Most of the fall samples were described as "sand," either brown or gray. Pieces of shell were again present, as well as bits of organic matter. Additionally, only one sample was described as something other than sand. One reference site, site RS49, contained "black muck," which is usually smaller sediment particles. In general, however, the in-field descriptions of mostly sand agree with the laboratory analysis that concluded the dominant sediment type for all of the samples was sand. Similar to the June sampling event, 15 subsamples were taken and analyzed by a geologist to determine the level of sediment stratification (Table 9). The geologist's analysis was used as the qualitative description. No samples showed evidence of vertical stratification. Five of the six reference grabs were fine sand; one was dominated by coarse sand.

Table 9: Qualitative Descriptions and Dominant Sediment Type of Fall Benthic Grabs

Site	Time	Depth (ft)	Stratification sample	Qualitative description (in-field)	Dominant sediment type (lab analysis)
09 October 2014					
ER01	900	41	✓	Light brown/gray sand with clay	Fine sand
ER02	910	43	✓	Light brown/gray sand no clay	Medium sand
ER03	920	42	✓	Light brown/gray sand no clay, shell hash	Medium sand
ER04	930	43	✓	Light brown/gray sand no clay, shell hash	Medium sand
ER05	935	43	✓	Light brown/gray sand no clay, shell hash	Medium sand
ER06	943	43	✓	Light brown/gray sand no clay, shell hash	Medium sand
ER07	950	43	✓	Light brown/gray sand no clay, shell hash	Medium sand
ER08	958	44	✓	Light brown/gray sand no clay, shell hash	Medium sand
ER09	1004	44	✓	Light brown/gray sand no clay, shell hash, with some organics	Medium sand
ER10	1013	45	✓	Light brown/gray sand, shell hash	Medium sand
ER11	1037	41	✓	Light brown/gray sand, shell hash	Medium sand
ER12	1045	41	✓	Light brown/gray sand, shell hash	Medium sand
ER13	1051	42	✓	Light brown/gray sand, shell hash	Medium sand
ER14	1058	43	✓	Light brown/gray sand, shell hash	Medium sand
ER15	1106	43	✓	Light brown/gray sand, shell hash	Fine sand
ER16	1114	44		Light brown/gray sand, shell hash	Medium sand
ER17	1118	43		Light brown/gray sand, shell hash	Medium sand
ER18	1127	45		Light brown/gray sand, shell hash	Medium sand
ER19	1151	41		Light brown/gray sand, shell hash	Medium sand
ER20	1200	41		Light brown/gray sand, shell hash	Fine sand
ER21	1204	41		Light brown/gray sand, shell hash	Fine sand
ER22	1211	42		Light brown/gray sand, shell hash	Fine sand
ER23	1217	42		Gray sand with organics	Fine sand
ER24	1225	43		Gray sand	Fine sand
ER25	1233	44		Gray sand with organics	Fine sand
ER26	1239	44		Gray sand with organics	Fine sand

Site	Time	Depth (ft)	Stratification sample	Qualitative description (in-field)	Dominant sediment type (lab analysis)
09 October 2014					
ER27	1258	40		Gray sand with organics	Fine sand
ER28	1305	41		Gray sand with organics	Fine sand
10 October 2014					
ER29	900	47		Brown sand	Fine sand
ER30	908	48		Brown sand	Fine sand
ER31	914	49		Brown sand	Fine sand
ER32	923	49		Brown sand	Fine sand
ER33	929	50		Brown sand	Fine sand
ER34	937	52		Brown sand	Fine sand
RS35	950	58		Brown sand	Fine sand
RS36	1004	51		Brown sand	Fine sand
RS37	1020	49		Gray sand	Fine sand
ER38	1031	47		Brown sand	Fine sand
ER39	1037	46		Brown sand with organics	Fine sand
ER40	1043	46		Brown sand with organics	Fine sand
ER41	1049	48		Brown and gray sand	Fine sand
ER42	1056	47		Brown sand	Fine sand
ER43	1103	48		Brown sand	Fine sand
ER44	1109	49		Brown sand with organics	Fine sand
ER45	1115	49		Brown sand with organics	Fine sand
ER46	1122	50		Brown and gray sand	Fine sand
ER47	1128	57		Brown and gray sand	Fine sand
RS48	1145	41		Brown sand large grains	Coarse sand
RS49	1203	50		Black muck, all organic	Fine sand
RS50	1219	36		Brown sand	Fine sand

The quantitative analysis of sediment size of samples collected in October revealed a higher incidence of coarse-sized particles than in June samples (Figure 12; Figure 13), particularly within the northern half of the borrow area. On average, fall samples contained 55.9% of fine-sized sand per sample (0.0025-0.0098 in). Medium-sized sand (0.0098-0.0197 in) was the next most common grain size, accounting for an average of over 34% per sample. Coarse-sized sand (0.0197-0.0787 in), gravel (>0.0787 in), and silt and clay (<0.0025 in) made up the remaining approximately 10%. Although fine-sized sand dominated on average, as was the case for spring samples, individual samples displayed more variety in their composition during fall samples. Of the 50 samples, 32 were dominated by fine-sized sand, 17 by medium-sized sand, and one by coarse-sized sand. Silt and clay were much less prevalent than in spring samples. Cobble gravel, the largest sediment size, was only present in one sample. Dredging occurred just to the north, but outside, of this borrow area (Figure 13) during 2014.

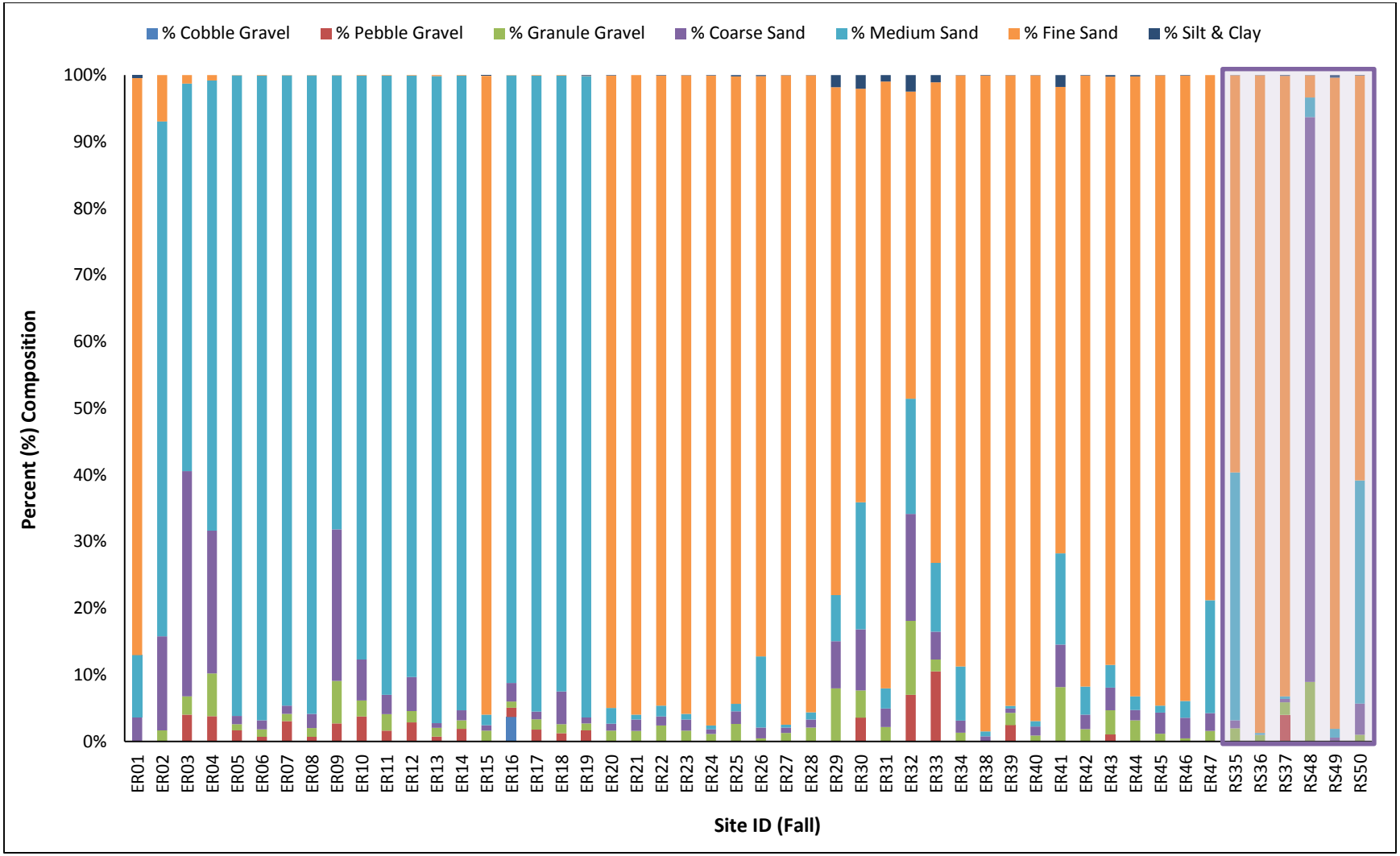


Figure 12: Sediment Composition of Fall Benthic Grabs by Site

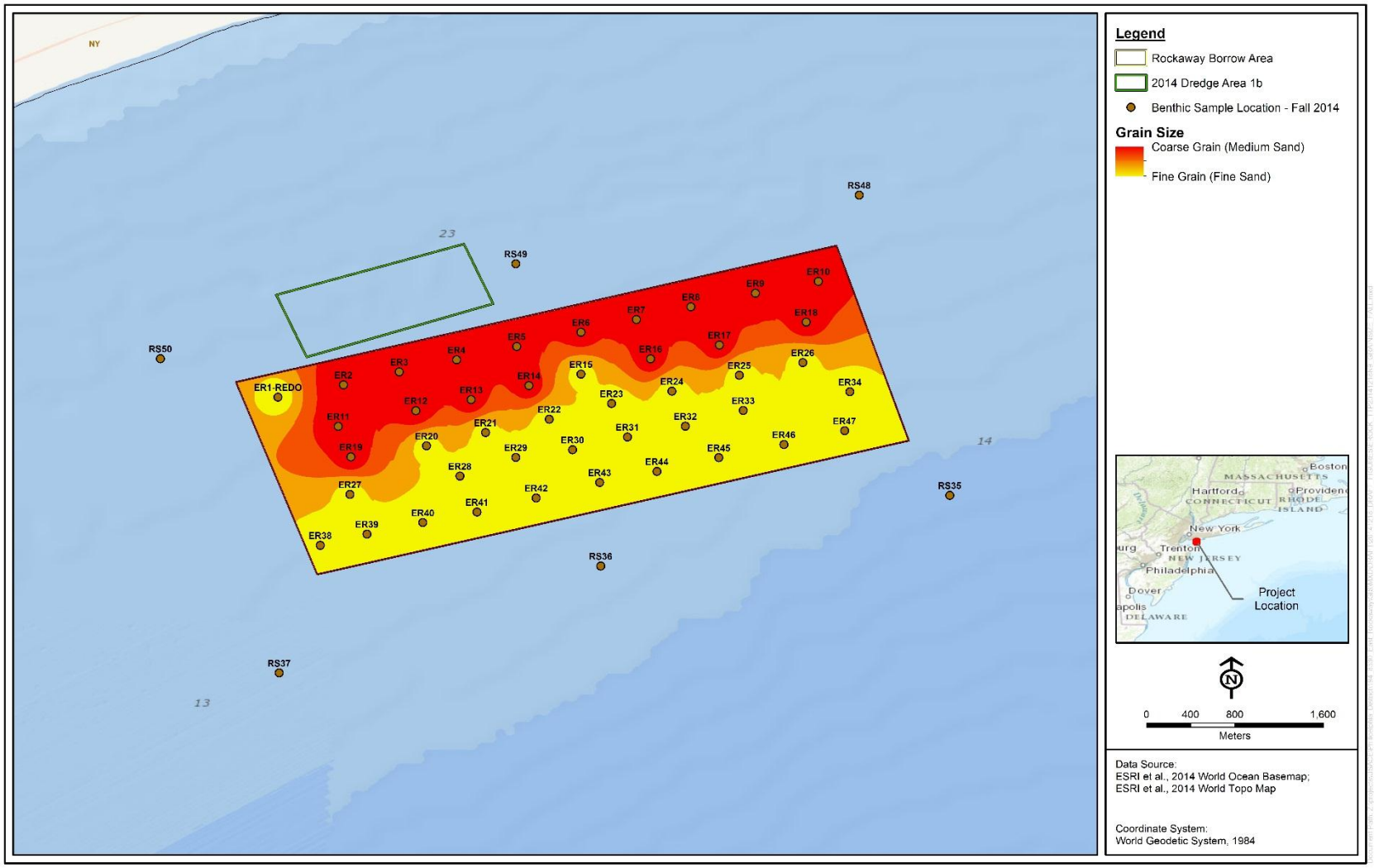


Figure 13: Dominant Grain Size of the East Rockaway Borrow Area in Fall 2014. Also shown is the area dredged during 2014.

3.2.2 BENTHIC INFAUNA

Although the benthic community in the East Rockaway Borrow Area showed species overlap in the spring and fall, there were significant differences in many of the calculated community parameters. In order to focus on the benthic environment of the Borrow Area, the following comparisons separate grabs conducted within the Borrow Area (on-site) and those conducted at nearby reference sites. In both Table 10 and Figure 14, an asterisk indicates a significantly greater value at the $\alpha = 0.05$ level. Species richness, or the number of species, was significantly greater in samples collected in the fall relative to those collected in the spring ($P = 0.029$). The number of individuals per grab was not different between fall and spring. Fall benthic samples had significantly greater diversity than spring samples ($p < 0.001$). Spring samples had a significantly higher dominance index ($p < 0.001$), indicating fewer taxa made up most of the individuals. Accordingly, fall samples displayed greater evenness ($p < 0.001$).

Off-site reference areas did not differ between spring and fall sampling events for any of the calculated community parameters (Figure 15).

Table 10: Comparison of Average Benthic Parameters of the East Rockaway Borrow Area

	Average species richness (R)	Individuals per grab	Shannon diversity index (H')	Simpson's dominance index (λ)	Pielou's evenness index (J')
On-site (n = 88)					
Spring	19	142	1.983	0.344*	0.677
Fall	21*	197	2.240*	0.191	0.741*
P-value	0.019	0.432	<0.001	<0.001	<0.001
Reference (n = 12)					
Spring	22	289	2.022	0.232	0.668
Fall	20	427	1.485	0.444	0.492
P-value	0.558	0.404	0.183	0.134	0.145

Note: an asterisk (*) indicates a significantly greater value.

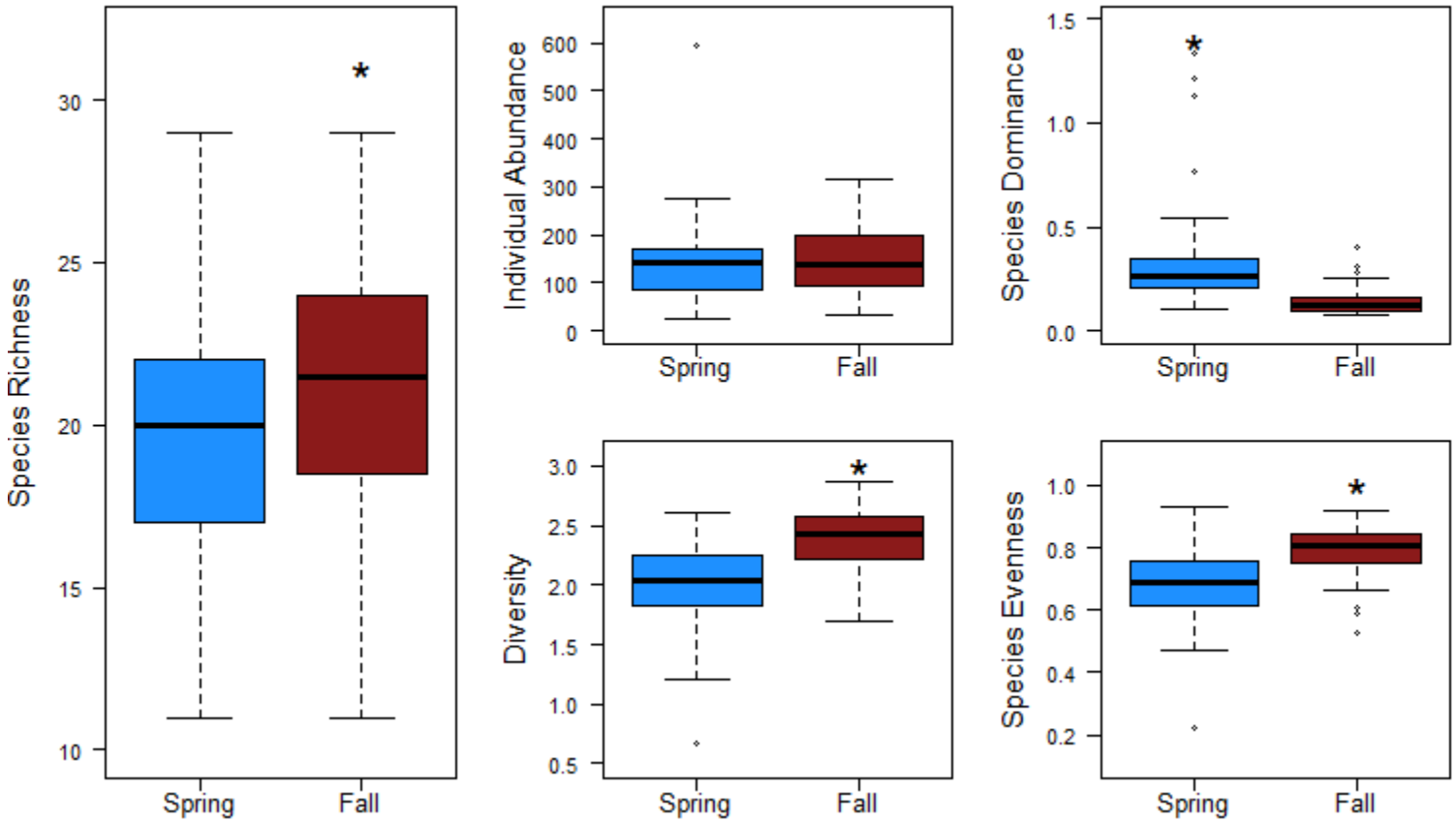


Figure 14: Benthic Infauna Parameters of On-site Grabs for Spring and Fall in East Rockaway Borrow Area

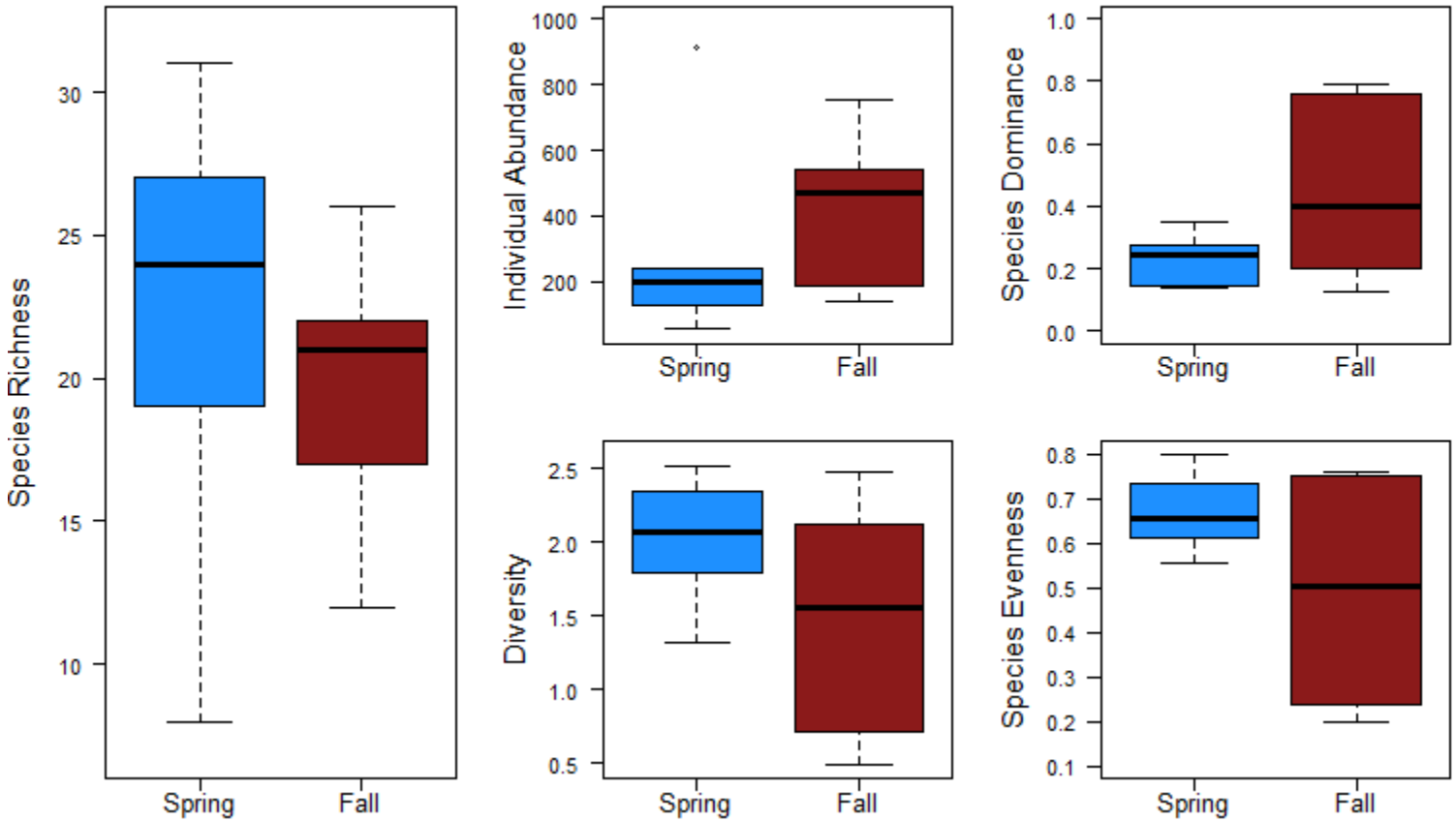


Figure 15: Benthic Infauna Parameters of Reference Grabs for Spring and Fall in East Rockaway Borrow Area

A total of 17,380 individual organisms were collected in the spring and fall benthic grabs for a total of 94 different species (Table 11; Appendix E). Of these, 7,966 (45.8%) were collected in the spring, and 9,414 (54.2%) were collected in the fall. As was indicated by the community parameters, the fall had greater species richness, with 78 distinct taxa identified, while the spring had 66 taxa. On-site and reference sites combined, both seasons were dominated by the Annelida phylum, specifically the Polychaeta class. On-site spring samples were 84.8% polychaetes, followed by an almost equal occurrence of arthropods, mollusks, and nematodes. At reference sites, spring samples were primarily (72.3%) composed of polychaetes, followed by mollusks (18.7%). Fall samples showed less dominance by polychaetes. On-site, samples were 54.5% polychaetes and 23.0% arthropods. Mollusks, nematodes, and nemertea worms composed 5-10% of samples. At reference sites, however, the most abundant phylum was Arthropoda, composing 38.7% of all organisms. Polychaetes and nematodes were also relatively abundant in fall reference samples, composing 23.1% and 20.7%, respectively. Fall samples contained almost 46% polychaetes, followed by 27.3% arthropods, and about 10% each of mollusks and nematodes.

Table 11: Benthic Community Composition in the East Rockaway Borrow Area

	June 2014				October 2014			
	On-site		Reference		On-site		Reference	
Phylum	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**	**Individ**	**%**
Annelida - Polychaeta	5287	84.8%	1253	72.3%	3732	54.5%	593	23.1%
Arthropoda	275	4.4%	107	6.2%	1574	23.0%	992	38.7%
Molluska	250	4.0%	324	18.7%	642	9.4%	343	13.4%
Nematoda	267	4.3%	23	1.3%	489	7.1%	532	20.7%
Nemertea	65	1.0%	4	0.2%	382	5.6%	71	2.8%
Annelida - Oligochaeta	52	0.8%	10	0.6%	16	0.2%	16	0.6%
Platyhelminthes	29	0.5%	9	0.5%	6	0.1%	1	<0.1%
Cnidaria	0	0.0%	0	0.0%	4	0.1%	14	0.5%
Echinodermata	7	0.1%	4	0.2%	5	0.1%	1	<0.1%
Chordata	0	0.0%	0	0.0%	0	0.0%	1	<0.1%
Total	6232	99.9%	1734	100.0%	6850	100.1%	2564	99.8%

Note: due to rounding, total percentages may not equal 100.0%; Individ = number of individuals

At the species level, spring and fall samples were dominated by different organisms (Table 12). Capitellidae, a polychaete worm, was the most dominant species in both on-site and reference spring samples. This species made up 52.5% of on-site samples; all other species made up less than 5% of the total abundance of organisms. Reference sites contained 39.5% of the Capitellidae species. *Tellina agilis*, a bivalve, and an oligochaete worm each made up another 10%. In the fall, an arthropod, *Ampelisca verrilli*, dominated abundance in both on-site and reference samples. On-site, samples contained 20.7% of the arthropod, as well as several polychaete worm species at moderate abundances. In fall reference samples, the dominant amphipod *Ampelisca verrilli* composed 38.2% of samples. A nematode species made up over 20% of the total species abundance. A bivalve, *Nucula* sp, made up 11.1% of fall reference samples. The composition of the fall samples was more even than the spring samples. Spring and fall samples had 47.9% of species in common. This is in part due to the higher diversity seen in fall samples, which was not reflected in spring samples.

Table 12: Twenty Most Abundant Benthic Infauna Present in the East Rockaway Borrow Area

June 2014						October 2014					
Taxon	Species	On-site		Reference		Taxon	Species	On-site		Reference	
		Total	%	Total	%			Total	%	Total	%
Annelida - polychaeta	Capitellidae sp.	3272	52.5%	685	39.5%	Arthropoda - amphipoda	*Ampelisca verrilli*	1415	20.7 %	979	38.2%
Annelida - polychaeta	*Aricidea* sp.	298	4.8%	55	3.2%	Annelida - polychaeta	*Prionospio pygmaea*	960	14.0 %	59	2.3%
Annelida - polychaeta	*Tharyx* sp.	297	4.8%	47	2.7%	Annelida - polychaeta	*Polygordius* sp	630	9.2%	106	4.1%
Annelida - polychaeta	*Clymenella* sp.	273	4.4%	82	4.7%	Annelida - polychaeta	Capitellidae sp	572	8.4%	130	5.1%
Nematoda	Nematoda sp.	267	4.3%	23	1.3%	Annelida - polychaeta	*Aricidea* sp	508	7.4%	48	1.9%
Annelida - polychaeta	*Prionospio pygmaea*	255	4.1%	48	2.8%	Nematoda	*Nematoda* sp	489	7.1%	532	20.7%
Molluska - bivalvia	*Tellina agilis*	155	2.5%	183	10.6%	Molluska - bivalvia	*Tellina agilis*	392	5.7%	24	0.9%
Annelida - polychaeta	*Polygordius* sp.	152	2.4%	28	1.6%	Nemertea	Nemertea sp	382	5.6%	71	2.8%
Annelida - polychaeta	*Nepthys picta*	141	2.3%	30	1.7%	Annelida - polychaeta	*Nepthys picta*	244	3.6%	46	1.8%

June 2014						October 2014					
Taxon	Species	On-site		Reference		Taxon	Species	On-site		Reference	
		Total	%	Total	%			Total	%	Total	%
Annelida - polychaeta	*Asabellides oculata*	139	2.2%	17	1.0%	Annelida - polychaeta	*Tharyx* sp	194	2.8%	39	1.5%
Arthropoda - amphipoda	*Ampelisca verrilli*	133	2.1%	68	3.9%	Annelida - polychaeta	*Magelona* sp	132	1.9%	23	0.9%
Annelida - polychaeta	*Spiophanes bombyx*	128	2.1%	24	1.4%	Annelida - polychaeta	*Spiophanes bombyx*	103	1.5%	6	0.2%
Annelida - polychaeta	*Scoloplos robustus*	85	1.4%	11	0.6%	Molluska - bivalvia	*Nucula* sp	86	1.3%	284	11.1%
Annelida - polychaeta	*Megalona* sp.	73	1.2%	4	0.2%	Arthropoda - amphipoda	*Unciola irrorata*	84	1.2%	5	0.2%
Nemertea	Nemertea sp.	65	1.0%	4	0.2%	Molluska - bivalvia	*Spisula solidissima*	78	1.1%	17	0.7%
Annelida - oligochaeta	Oligochaeta sp.	52	0.8%	10	0.6%	Annelida - polychaeta	*Scoloplos robustus*	75	1.1%	4	0.2%
Arthropoda - cumacea	*Diastylis sculpta*	47	0.8%	8	0.5%	Annelida - polychaeta	*Spiochaetopterus oculatus*	57	0.8%	7	0.3%
Arthropoda - amphipoda	*Unciola irrorata*	41	0.7%	13	0.7%	Annelida - polychaeta	*Onuphis opalina*	49	0.7%	4	0.2%
Annelida - oligochaeta	*Polydora* sp.	40	0.6%	170	9.8%	Annelida - polychaeta	*Asabellides oculata*	40	0.6%	41	1.6%
Molluska - bivalvia	*Spisula solidissima*	38	0.6%	15	0.9%	Annelida - polychaeta	*Sigalion arenicola*	40	0.6%	4	0.2%

3.4 FISH TRAWLS

Between May and October 2014, 71 trawls were conducted within and adjacent to the East Rockaway Borrow Area. In total, 34 fish and 12 macroinvertebrate species were identified. A total of 6,055 individual fishes were captured. This equated to 419,903 g of biomass (Table 13). Overall, the most numerically abundant species was the longfin squid, followed by anchovy (*Anchoa* sp.), and scup (*Stenotomus chrysops*). Little skate had the greatest biomass, followed by winter skate (*Leucoraja ocellata*) and longfin squid. The fish trawl results are presented in more detail in the following sections, first by temporal trends, then by spatial patterns.

3.4.1 MONTHLY COMPARISONS

Although longfin squid were the most abundant species by number, little skate had the highest overall biomass, followed by winter skate and longfin squid (Table 13). By month, little skate had the greatest weight in May, June, July, and October. In August, clearnose skate (*Raja eglanteria*) had the greatest biomass. Two Atlantic stingray (*Dasyatis sabina*) combined to comprise the greatest biomass in September. Scup had the next greatest biomass in September.

Table 13: Monthly Biomass (g) and Length (mm) of Each Fish Species

Species	Scientific name	May	June	July	August	September	October	Total	
		Total weight	Total weight	Total weight	Total weight	Total weight	Total weight	Total weight	Average length
Little skate	*Leucoraja erinacea*	46930	19272	59252	530		102840	228825	439
Winter skate	*Leucoraja ocellata*	41636	3486	4559			5459	55140	464
Longfin squid	*Doryteuthis pealeii*	510	4707	14543	658	1199	15468	37086	67
Clearnose skate	*Raja eglanteria*	10200	8649	1100	2580	500	4100	27129	583
Atlantic stingray	*Dasyatis sabina*					12418		12418	555
Smooth dogfish	*Mustelus canis*		97	6998			4300	11395	561
Summer flounder	*Paralichthys dentatus*	5569	1324	530	70	1746	1888	11127	211
Scup	*Stenotomus chrysops*	135	253	1537	137	4350	2442	8854	71
Spiny dogfish	*Squalus acanthias*			4760				4760	422
Windowpane	*Scophthalmus aquosus*	3087	633	272	40		188	4220	173
Anchovy	*Anchoa* sp.	3913					2	3915	68
Striped searobin	*Prionotus evolans*	876	688	1441	786	5	33	3829	214
Spotted hake	*Urophycis regia*	665	74	1418			500	2656	100
Northern searobin	*Prionotus carolinus*	176	818	653	140	55	26	1867	90
Smallmouth flounder	*Etropus microstomus*		176	553	145	104	131	1109	59
Winter flounder	*Pseudopleuronectes americanus*	1050	6					1056	218
Butterfish	*Peprilus triacanthus*	760	1	141	11		11	923	70
Northern puffer	*Sphoeroides maculatus*				754	81	27	862	70
Fourspot flounder	*Hippoglossina oblonga*		632				13	645	216
Juvenile skate	*Raja* sp.		150	440				590	324
Silver hake	*Merluccius bilinearis*	26		3			363	393	90

Species	Scientific name	May	June	July	August	September	October	Total	
		Total weight	Total weight	Total weight	Total weight	Total weight	Total weight	Total weight	Average length
Black sea bass	*Centropristis striata*	3		120	70	80	29	302	45
Hickory shad	*Alosa mediocris*	220						220	260
Tautog	*Tautoga onitis*			180				180	175
Atlantic herring	*Clupea harengus*	110						110	235
Kingfish sp.	*Menticirrhus* sp.						93	93	219
Lizardfish sp.	*Synodus* sp.						60	60	205
Shortfin squid	*Illex illecebrosus*		59					59	60
Rough scad	*Trachurus lathami*		2	22		6		30	62
Red hake	*Urophycis chuss*	27						27	104
Pompano	*Trachinotus* sp.			16				16	92
Red goatfish	*Mullus auratus*				4			4	65
Juvenile hake	*Merluccius* sp.	1						1	38
Flying gurnard	*Dactylopterus volitans*				1			1	42
Grand Total		**115896**	**41026**	**98537**	**5926**	**20545**	**137973**	**419903**	**141**

Note: weight is total weight of each species in grams; length is average standard length of measured individuals in mm

Although many species showed overlap from month to month, the overall catch composition showed variation depending on the time of year (Table 14). Longfin squid were the most abundant species in June, July, and October. In May, anchovy were the most abundant. The catch in August was numerically dominated by northern puffer (*Sphoeroides maculatus*), while scup were the most abundant in September. Six of the 36 species collected (or 16.7% of total species captured) were present in each of the six months of sampling: longfin squid, scup, northern searobin (*Prionotus carolinus*), summer flounder (*Paralichthys dentatus*), striped searobin (*Prionotus evolans*), and clearnose skate. Even though anchovy were the most abundant species in May, they were only observed once more in October, at extremely low abundances. Thirteen additional species were only captured in one month. Therefore, 14 species had moderate overlap, occurring in between two and five of the sampling months.

Catch per unit effort (CPUE) is a standardization of abundance based on the number of trawls (i.e., effort). Since there was similar effort among months, with between 10 and 15 total trawls, CPUE displays the same patterns as abundance. For example, the same species that dominated each month numerically also had the highest CPUE (Figure 16). Of the 36 species collected, four are among the commercially landed species that generate over $1 million in New York (Table 1): longfin squid, summer flounder, scup, and silver hake (*Merluccius bilinearis*). All four of these fishes had relatively low abundance, and CPUE, in May. Longfin squid numbers increased in the next two months, peaking in July. August was again a time of low to no abundance for all species. A shift occurred in September, with scup dominating the total catch. Longfin squid were again the most dominant species in October, but scup were still present in high numbers, with moderate numbers of silver hake. Summer flounder were present in all months and abundances remained relatively consistent throughout the study period.

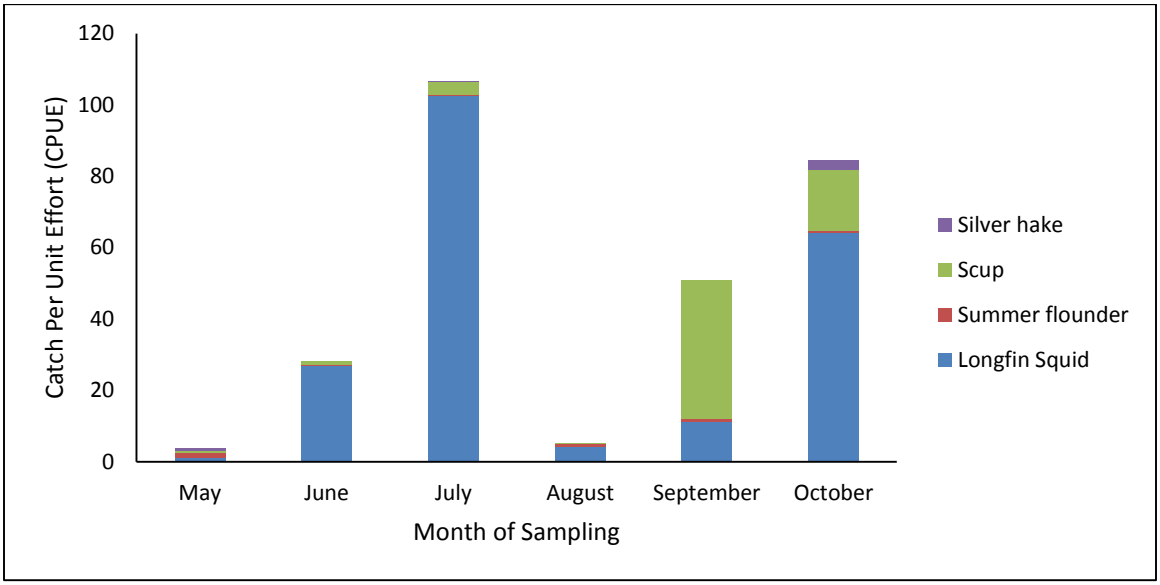
Table 14: Abundance and Composition of Monthly Trawls

Species	May		June		July		August		September		October		Total	
	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%
Longfin squid	13	0.8%	323	70.1%	1540	83.4%	42	23.9%	135	17.3%	640	53.9%	2693	44.5%
Anchovy	1179	73.5%									2	0.2%	1181	19.4%
Scup	5	0.3%	13	2.8%	56	3.0%	3	1.7%	466	59.7%	170	14.3%	713	11.8%
Little skate	83	5.2%	37	8.0%	109	5.9%	1	0.6%			195	16.4%	425	7.0%
Smallmouth flounder			12	2.6%	30	1.6%	12	6.8%	75	9.6%	68	5.7%	197	3.3%
Spotted hake	118	7.4%	5	1.1%	20	1.1%					5	0.4%	148	2.4%
Northern searobin	67	4.2%	22	4.8%	10	0.5%	7	4.0%	9	1.2%	22	1.9%	137	2.3%
Northern puffer							78	44.3%	3	0.4%	17	1.4%	98	1.6%
Black sea bass	1	0.1%			1	0.1%	1	0.6%	76	9.7%	8	0.7%	87	1.4%
Winter skate	43	2.7%	6	1.3%	11	0.6%					5	0.4%	65	1.1%
Butterfish	16	1.0%	1	0.2%	21	1.1%	12	6.8%			3	0.3%	53	0.9%
Summer flounder	19	1.2%	4	0.9%	3	0.2%	8	4.5%	9	1.2%	8	0.7%	51	0.8%
Windowpane flounder	31	1.9%	5	1.1%	5	0.3%	1	0.6%			2	0.2%	44	0.7%
Silver hake	8	0.5%			1	0.1%					27	2.3%	36	0.6%
Striped searobin	3	0.2%	5	1.1%	8	0.4%	6	3.4%	2	0.3%	2	0.2%	26	0.4%
Clearnose skate	6	0.4%	8	1.7%	1	0.1%	3	1.7%	1	0.1%	3	0.3%	22	0.4%
Spiny dogfish					16	0.9%							16	0.3%
Smooth dogfish			1	0.2%	7	0.4%					7	0.6%	15	0.2%
Shortfin squid			11	2.4%									11	0.2%
Fourspot flounder			5	1.1%							1	0.1%	6	0.1%
Rough scad			1	0.2%	3	0.2%			2	0.3%			6	0.1%

Species	May		June		July		August		September		October		Total	
	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%	Individ	%
Juvenile hake	5	0.3%											5	0.1%
Red hake	4	0.2%											4	0.1%
Juvenile skate			1	0.2%	2	0.1%							3	<0.1%
Winter flounder	2	0.1%	1	0.2%									3	<0.1%
Atlantic stingray									2	0.3%			2	<0.1%
Atlantic herring	1	0.1%											1	<0.1%
Hickory shad	1	0.1%											1	<0.1%
Flying gurnard							1	0.1%					1	<0.1%
Kingfish sp.											1	0.1%	1	<0.1%
Lizardfish sp.											1	0.1%	1	<0.1%
Pompano					1	0.1%							1	<0.1%
Red goatfish							1	0.1%					1	<0.1%
Tautog					1	0.1%							1	<0.1%
Grand Total	**1605**	**100.2%**	**461**	**100.0%**	**1846**	**100.0%**	**176**	**98.9%**	**780**	**100.1%**	**1187**	**100.2%**	**6055**	**100.0%**

Note: due to rounding, total percentages may not equal 100.0%

Figure 16: Monthly Catch Per Unit Effort (CPUE) of the Most Commercially Important Species



With the exception of squid species, invertebrates were not enumerated, measured, and weighed. However, the presence of other organisms in the catch was noted (Table 15). A total of 12 organisms were observed: five arthropods, four mollusks, two egg cases, and one cnidarian. The spider crab was the most commonly encountered organism, occurring in trawls conducted from May through August. The rock crab was also common, present in May, June, and September. Seven of the species occurred in two months. The invasive green crab, blue mussel, and periwinkle were only observed in one of the six months.

Table 15: Presence of Macroinvertebrates Collected in Monthly Fish Trawls

Species	May	June	July	August	September	October
Rock crab	X	X			X	
Spider crab	X	X	X	X		
Horseshoe crab	X		X			
Green crab	X					
Jonah crab		X	X			
Squid eggs			X	X		
Northern moonsnail			X		X	
Blue mussel			X			
Skate egg case			X		X	
Hermit crab			X		X	
Jellyfish			X		X	
Periwinkle					X	

3.4.2 REFERENCE SITE COMPARISONS

To provide a local comparison, as well as a baseline for future projects, reference tows were conducted adjacent to the East Rockaway Borrow Area during each monthly sampling event from May to September (Table 16). A reference tow was not conducted in October, so this month is excluded from this section's results. Likewise, the three species that were only captured in October (kingfish sp. [*Menticirrhus* sp.] and lizardfish sp. [*Synodus* sp.]) are not presented here. Since more tows were conducted within the East Rockaway Borrow Area, though, it was expected that greater diversity (i.e., more species) would be observed on-site when compared to a single reference site. Therefore, rather than comparing the number of species collected, the overlap of species in the reference tow relative to the on-site tow is presented.

In May, anchovies were the most abundant species caught in both on-site and reference trawls. Only two of the 12 species collected in reference tows were unique to the catch and not also collected in the Borrow Area. In June, both the on-site and reference area catches were dominated by longfin squid. The four species collected in the reference tows were also observed in the Borrow Area. The July catch was again dominated by longfin squid, however, the reference area had a higher incidence of little skate relative to the on-site trawls. Each of the nine species collected in reference trawls were also collected on-site. In August, the northern puffer was the most abundant species collected in on-site trawls, followed by longfin squid. In reference trawls, butterfish was the most abundant species collected, followed by the northern puffer and longfin squid, which were collected in equal amounts. One of the six fish species collected in the reference site was not found in the Borrow Area. In September, the on-site trawls were dominated by scup. At the reference site, black sea bass dominated the catch, followed by longfin squid. All of the six species collected at the reference site were also collected on-site.

The CPUE of the total catch from month to month followed the same pattern both within the Borrow Area and at the reference sites (Figure 17). Both areas experienced peak CPUE in May. The high number of anchovies drove this pattern. July and September also had relatively higher CPUE than other months. Longfin squid were collected in high numbers in July. In September, scup abundances contributed to the high CPUE. The smaller total catches in June and August resulted in lower CPUE. These monthly variations were reflected in both the Borrow Area and at the reference site, with less variation among sites in any given month.

Table 16: Monthly Comparisons of Catch Composition of On-site and Reference Trawls at the East Rockaway Borrow Area

Species	May		June		July		August		September	
	On-site	Ref.	On-site	Ref.	On-site	Ref.	On-site	Ref.	On-site	Ref.
Longfin squid	0.7%	2.0%	74.2%	84.0%	84.8%	50.0%	23.6%	26.3%	16.7%	33.3%
Scup	0.3%	1.0%	2.3%	4.0%	3.2%		1.9%		61.7%	10.0%
Anchovy	74.5%	58.2%								
Northern puffer							46.5%	26.3%	0.4%	
Butterfish	0.5%	9.2%	0.2%		1.1%	1.4%	3.8%	31.6%		
Black seabass	0.1%				0.1%		0.6%		8.7%	36.7%
Smallmouth flounder			2.3%		1.4%	6.9%	7.0%	5.3%	9.5%	13.3%
Little skate	5.4%	2.0%	7.1%		5.2%	23.6%	0.6%			
Spotted hake	7.2%	10.2%	1.0%		1.0%	4.2%				
Northern searobin	4.0%	7.1%	4.2%		0.6%		4.5%		1.2%	
Winter skate	2.5%	6.1%	1.2%		0.3%	6.9%				
Clearnose skate	0.4%		1.3%	4.0%	0.1%		1.3%	5.3%	0.1%	
Summer flounder	1.3%		0.8%		0.2%		5.1%		1.1%	3.3%
Windowpane flounder	2.0%	1.0%	1.0%		0.3%			5.3%		
Fourspot flounder			0.6%	8.0%						
Striped searobin	0.2%		1.0%		0.3%	2.8%	3.8%		0.3%	
Atlantic stingray									0.1%	3.3%
Smooth dogfish			0.2%		0.3%	2.8%				
Shortfin squid			2.1%							
Juvenile skate			0.2%		0.1%	1.4%				
Juvenile hake	0.3%	1.0%								
Atlantic herring		1.0%								
Hickory shad		1.0%								
Spiny dogfish					0.9%					
Flying gurnard							0.6%			
Red goatfish							0.6%			

Species	May		June		July		August		September	
	On-site	Ref.	On-site	Ref.	On-site	Ref.	On-site	Ref.	On-site	Ref.
Rough scad			0.2%		0.2%				0.3%	
Silver hake	0.5%				0.1%					
Winter flounder	0.1%		0.2%							
Red hake	0.3%									
Pompano					0.1%					
Tautog					0.1%					

Note: Ref. represents reference sites adjacent to the Borrow Area. Also, no reference tows were conducted in October.

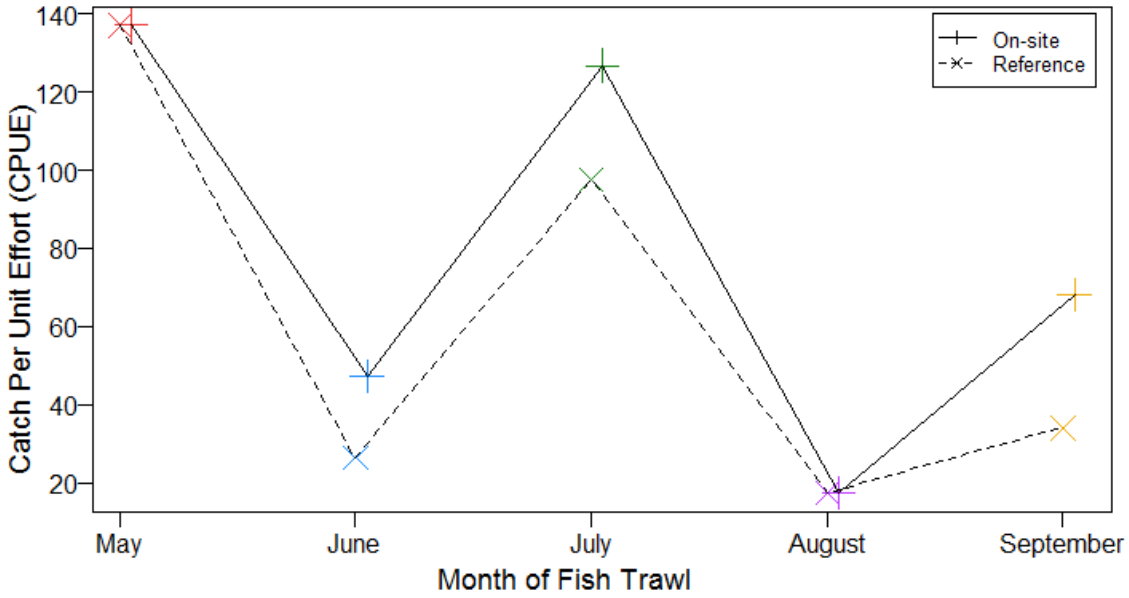


Figure 17: Average Catch Per Unit Effort (CPUE) of Monthly Fish Trawls

3.4.3 LENGTH-FREQUENCY DISTRIBUTIONS

Lengths of all fish species were collected (Appendix A), but the results here focus on the most important commercial species (longfin squid, summer flounder, scup, and silver hake; Figure 18). Longfin squid ranged in mantle length from a minimum of 10 mm to a maximum of 273 mm. The average length was 67 mm. The most common length was around 50 mm. Summer flounder ranged from 50 to 475 mm in standard length, with an average of 211 mm. A peak in length frequency was apparent at lengths less than 100 mm. The standard length of scup ranged from 35 to 137 mm and averaged 71 mm. The most common length was around 45 mm, but another peak in lengths occurred around 85 mm. Silver hake standard lengths were between 35 and 225 mm, averaging 90 mm. The most common lengths were around 50 mm, with only a few measurements above 150 mm.

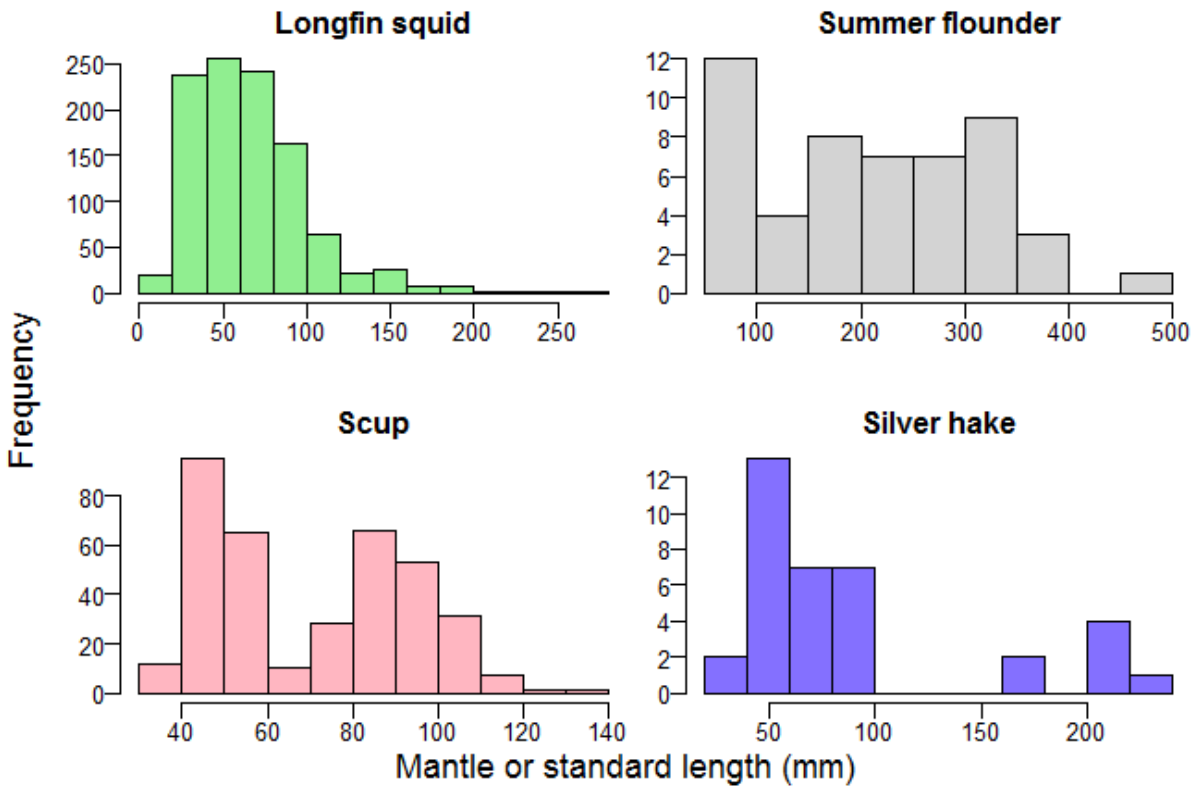


Figure 18: Length Frequency Distributions of Commercially Important Fish Species

4.0 DISCUSSION

The structure and mixing of the water column impacts both benthic invertebrates and fish species. For biological organisms, summer is usually a time of increased growth, due to abundant food and prey resources (e.g., Malloy and Targett 1994). Abiotic factors affect habitat utilization, though. A behavioral response to temperature changes varies greatly by species; however, most fishes strive to remain in their thermal niche (i.e., ±2 or 5°C of the preferred temperature; Magnuson and Destasio 1997). Bottom-dwelling species, such as flatfish, often experience less temperature variation and therefore, less movement, while more mobile fishes, like bluefish (*Pomatomus saltatrix*), must seek out their thermal niche, which results in a broader distribution and greater movement (Cranshaw and O'Connor 1997). The greatest temperature-induced movement, however, occurs in species like Atlantic herring (*Clupea harengus*), which may migrate over 100 km in response to a 1°C temperature change (Cranshaw and O'Connor 1997). Locally, thermal refuge may be found in bottom waters; however, the low oxygen levels may prevent non-demersal animals from remaining in the bottom layer for long periods of time. Eventually, these animals would need to move farther offshore until temperatures dropped and oxygen increased in the fall. Warm-water fish species would likely benefit from the competitive advantage of being capable of utilizing the entire water column in the summer months, but may need to migrate southward during the winter. Benthic organisms are more vulnerable to stress due to temperature extremes or oxygen levels since they are less mobile. The existing conditions, as well as the potential impacts of dredge activities, are discussed for both benthos and fishes in the following sections.

4.1 BENTHIC COMMUNITY COMPARISONS

The findings of this study are consistent with previous studies and reports conducted in the East Rockaway Borrow Area (Table 17). The offshore benthic environment is dominated by fine sand, which supports a variety of organisms and commercially important species.

Table 17: Summary of Parameters and Comparison with Past Studies in New York Borrow Areas

	Current study East Rockaway Borrow Area		**USACE (2007)** East Rockaway Borrow Area	
Parameters	**Spring**	**Fall**	**Spring**	**Fall**
Number of grabs	50	50	50	50
Dominant sediment	Fine sand	Fine sand	Fine sand	Fine sand
Avg H' diversity index	1.99	2.28	Not calculated	Not calculated
Dominant infauna	Capitellidae spp. (Annelida)	*Ampelisca verrilli* (Arthropoda)	*Prionospio pygmaea* (Annelida)	*Asabellides oculata* (Annelida)
Avg species richness	20	21	22	22
Avg individuals per grab	159.3	188.3	195.8	289.5

Note: all studies used a 0.1-m^2 benthic grab

Compared to a similar study conducted in the East Rockaway Borrow Area in 2006 by the USACE (2007), the overall dominant sediment type has not changed. Bottom sediment in the East Rockaway Borrow Area has shown variation between spring and fall of 2014, though. This study revealed that fine-sized particle sediments were nearly homogeneous in the Borrow Area in the spring; however, in the northern

portion of the borrow area, fine sediment was replaced with coarser sand in the fall. The reference areas were still primarily fine sand in the fall, with the exception of one site dominated by coarse sand, which was in close proximity to the areas that shifted from fine to coarse sand. Despite these differences between spring and fall, it is not yet clear from the data how dredging activities outside of this borrow area may have factored in to those results (e.g., sediment transport processes).

Offshore, continental shelf benthic communities are often diverse, especially along the eastern United States. A review by Allen Brooks et al. (2006) revealed that diversity was greater on the East Coast relative to the Gulf of Mexico. This paper also found a lack of strong correlation between species and sediment or depth. Annelids were the most abundant in both spring and fall, but the most dominant species found in the Borrow Area differed. Diversity (H'), species richness (R), and organism density were all greater in fall samples, but only on-site. As was observed in the USACE's previous study in 2007, this increase in abundance and diversity is common in the fall, due to higher productivity. At reference sites, however, there was no difference between seasons, so this increase in productivity was only apparent on-site, which may be related to the change in sediment type. At the species level, there was a shift from dominance by a polychaete in the spring to dominance by an amphipod in the fall.

4.2 Fisheries Considerations

The fishes collected in this study have both commercial and biological importance. This study revealed a high diversity of fishes, with 34 distinct species identified over six months of trawl sampling. Of these, 27 species have some commercial significance, based on 2013 landings in New York (NOAA 2014a; Table 18). Additionally, four of the species generated over $1 million in revenue last year: longfin squid, summer flounder, scup, and silver hake; longfin squid being valued at almost $6 million. Maintaining these populations, as well as the smaller industries, ensures an economic resource for the local fishing fleet. Within the study area, various gears are used to target species. Landings data indicate that commercial dredge, gillnet, and pot have low landings from the study area; commercial otter trawls land relatively higher catches. No landings are evident from longline or seine (NYS DOS 2013). Recreational charter and party boats have high use in the area (NYS DOS 2013).

Near the Rockaway Inlet, juvenile squid show moderate abundance in both the spring and fall; adult squid, however, have greater densities near the study area in the spring relative to the fall (NYS DOS 2013). Longfin squid spawn year round, with peaks in summer and winter. They have a short life span (around 6 to 8 months), and can grow up to 488 mm, but usually reach a maximum of 305 mm (NOAA 2014c). Most of the individuals captured were juveniles, with peak abundances in July and October. This seasonal pattern of squid abundance was also observed in New York waters east of the study area (USACE 2004). In the New York Bight, summer flounder are typically found offshore in the spring and closer to shore in the fall (NYS DOS 2013), though the highest abundances for this study were in the spring. They spawn over open areas on the continental shelf during fall and winter. With sexes combined, half of the summer flounder population is sexually mature at 276 mm (MAFMC 2013a); Based on the lengths of the summer flounder in this study it can be inferred that both juveniles and adults were collected. Scup move seasonally, from offshore in the winter to inshore in the summer; the greatest abundances for this study were in the fall. Scup spawn once a year in the summer over weedy or sandy areas; 50% are sexually mature at 2 years, or about 170 mm total length (MAFMC 2013b). Both juveniles and adults are likely present in the study area, since, accounting for the use of standard length as measurement, some of the larger fishes would probably be sexually mature. Silver hake inhabit shallow waters in spring and summer, moving to continental shelf and slope waters in the winter. They spawn multiple times in the spring, and about half reach sexual maturity at 2 years old, or 200-300 mm

(NOAA 2014d; Col and Traver 2006). Most of the fishes captured in this study were juveniles, though a few adults were likely captured; unlike historic data, the highest abundances were in the fall.

Essential Fish Habitat (EFH) is designated by lifestage and is broadly defined in the 1996 Magnuson-Stevens Act as "water and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Mid-Atlantic Fishery Management Council aims to designate EFH for each managed species in the study area. Twelve of the captured fish species have EFH designated in the same area as the East Rockaway Borrow Area (NOAA 2014b; Table 18).

Table 18: Commercial Use and Essential Fish Habitat Overlap of Each Captured Fish Species

Species	Commercial fishery	Essential Fish Habitat (EFH) in Project Area
Anchovy	x	
Atlantic herring	x	x
Atlantic stingray		
Black sea bass	x	x
Butterfish	x	x
Clearnose skate	x (skates)	
Fourspot flounder	x	
Hickory shad	x	
Flying gurnard		
Juvenile hake	x	
Kingfish sp.	x (northern kingfish)	
Little skate	x (skates)	x
Lizardfish sp.		
Longfin squid	x	x
Northern puffer	x	
Northern searobin	x (searobins)	
Pompano		
Juvenile skate	x (skates)	
Red goatfish		
Red hake	x	x
Rough scad		
Scup	x	x
Shortfin squid	x	x
Silver hake	x	
Smallmouth flounder		
Smooth dogfish	x	
Spiny dogfish	x	
Spotted hake		
Striped searobin	x (searobins)	
Summer flounder	x	x
Tautog	x	

Species	Commercial fishery	Essential Fish Habitat (EFH) in Project Area
Windowpane flounder	x	x
Winter flounder	x	x
Winter skate	x (skates)	x

Note: species in bold support a >$1 million fishery

The last fish study conducted in the East Rockaway Borrow Area (USACE 2007), as well as a different study on fish communities west of Shinnecock Inlet, but east of the study area (USACE 2008), both found that little skates accounted for the greatest biomass, which is in agreement with the findings of the current study. Not in agreement, however, was the most dominant species by number. The 2007 East Rockaway study captured over 41,000 bay anchovy in September. Similarly, bay anchovy numerically dominated the catch in the Shinnecock Inlet study. The current study only collected two in October, with anchovy abundant in May. Both bay and striped anchovies are important to coastal food webs. Feeding on plankton, anchovy are then consumed by larger predators that often have commercial or recreational significance (e.g., striped bass, bluefish, and spotted seatrout) (Murdy et al. 1997).

Because a small number of species were present every month, and quite a few were seen only once, there is considerable temporal variation. This is also reflected in the fluctuation of the dominant species each month. Similarly, abundance, indexed by CPUE, indicated that temporal changes were stronger than spatial variation since CPUE varied more from month to month rather than among areas (i.e., on-site and reference sites) within any given month.

4.3 Potential Impacts and Recovery in East Rockaway Borrow Area

The marine offshore environment, particularly the sea floor, would be impacted by dredging activities due to an acute disturbance, followed by a period of recovery. Dredging removes the surface sediments, creating a shallow depression. Typically, following this type of disturbance, a diverse benthic infaunal community would recolonize from adjacent undisturbed areas within a matter of 3 months to 3 years (Allen Brooks et al. 2006; Byrnes et al. 2004; Lundquist et al. 2010). Areas of high dredging intensity, however, have been observed with low species richness and abundance relative to areas of low or no dredging, even 3 years later (Boyd et al. 2005).

Physically, bottom sediment is suspended during dredge activities, resulting in increased turbidity and decreased water quality. Suspended particles usually remain within 49 to 131 ft (15 to 40 m) of activity, so adjacent areas would be minimally impacted (Spencer 1997); however, local oceanographic features would determine the extent of dispersal. Most sediment resettles within 30 minutes to 24 hours (Lambert and Goudreau 1996), with coarse pebbles and shell settling before finer sand and clay (Ruffin 1995). The greatest turbidity and slowest dissipation rates generally result from dredging in shallow environments with high silt and clay (Tarnowski 2006). The East Rockaway Borrow Area, which may be used for beach nourishment, is dominated by fine-sized sediment, so turbidity would be expected to be moderate. Therefore, any dredge activities in this expansion site should not result in long-lasting sediment plumes. Excavation depths of borrow sites are similar to natural bathymetry and topography of New York's offshore environment, so the recovery of the physical system is expected to follow natural patterns (Byrnes et al. 2004).

Mobile macroinvertebrates, such as crab, jellyfish, and squid species, are likely to avoid and evade dredge equipment. Any organism that cannot escape the dredge, however, would experience immediate mortality. A few months of recovery time between dredging any one particular area should

provide sufficient time for recolonization by benthic invertebrates, due to their short life cycles, high reproductive potential, and recruitment of planktonic larvae from nearby areas (Naqvi and Pullen 1982). Recolonization usually occurs by an opportunistic species (either adult or larvae) from the surrounding area, if the sediment is similar (Boyd et al. 2005). The type of benthic organisms that are first to recruit may be affected by the timing of dredge activities; for example, ending dredge activities by spring would encourage the settlement of crustaceans, while ending in fall would benefit annelids (Diaz et al. 2004). A change in sediment size following sediment extraction may result in a restructuring of the marine benthic community (Desprez 2000). The current environment of the Borrow Area is primarily fine-sized sand, and a change in the dominant sediment type may alter the benthic community composition. Alternatively, if post-dredging sediment does not achieve physical stability, recovery of organisms may be stalled in an early successional stage (Boyd et al. 2005).

Although dredging usually impacts benthos more than fish populations due to differences in mobility, fish species may also be affected. A recent USACE borrow area assessment off the New Jersey coast found that the habitats of ocean pout, black sea bass, and the early life history stages of winter flounder may be directly impacted by dredging (USACE 2014). Black sea bass and winter flounder were collected in this study, though in small numbers. In addition to direct impacts, indirect trophic effects may also impact fishes, since benthic organisms are an important prey resource (Diaz et al. 2004). Following benthic invertebrate recolonization after dredging activity, though, most fishes would be expected to return to the area in similar numbers as nearby reference areas, with natural seasonal variation in community composition (USACE 2008). Since fish community composition in the East Rockaway Borrow Area displayed variation among months, the timing of dredge activities will likely affect demersal species differently.

5.0 CONCLUSIONS

The recovery of bottom habitat from dredging activities within or adjacent to the borrow area is contingent upon the homogeneity of the underlying sediment. Similar-sized sand particles are needed to provide habitat for invertebrates that make up the offshore benthic environment. Recolonization and the accumulation of biomass usually occurs quickly, but the complete recovery of species diversity usually takes longer, and depends on many factors, such as available sediment, hydrodynamics, nearby resources, and the intensity of dredging activity. This study found that the East Rockaway Borrow Area has fine-sized sediment as the top layer of sediment, so similar suitable habitat should be available and stable for the re-settlement of benthic infauna. This study revealed that nearby sites have similar habitat and populations of benthic organisms, which could provide a source of recruits. If dredge activity occurs at a high intensity, the Borrow Area would likely require a longer recovery period. Since the sediment type in part of the Borrow Area changed from spring to fall, it is possible that the ability of organisms to recolonize may be affected. While the observed sediment type was different in the northern portion of the borrow area between spring and fall, the cause of this change is not clear, since dredging occurred outside of this borrow area (Figures 11 and 13)). Greater impacts such as trophic effects are unlikely given the expected rapid recovery of benthos which provides an important prey resource for organisms such as crustaceans and fishes.

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Appendix A – Field Data Sheets

Water Quality

Date: _____ Vessel: _____ Borrow Area: _____

Crew: _____

Gear Type: _____ Calibration: _____GPS Taken:_____

Weather Conditions: _____

Additional Notes: _____

_____

_____

STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/^{c}cm)
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
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			middle							
			surface							

STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (ºC)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/^{c}cm)
			bottom							
			middle							
			surface							
			bottom							
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			middle							
			surface							

Benthic Samples

Date: _____ Vessel: _____ Borrow Area: _____

Crew: _____

Gear: _____GPS Taken:_____

Weather Conditions: _____

Additional Notes: _____

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STATION ID	TIME	DEPTH (m)	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE

STATION ID	TIME	DEPTH (m)	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line?					
											Start ___		End ___			
Species																
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1																
2																
3																
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	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Species																
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
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	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Project		**Date**	
Client		**Location**	
Sampler		**Report to**	

	Sample ID	Date	Time	Grab	Container	Media	Preservative	Analysis Required				Lab ID	Remarks
1													
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11													
12													
13													
	Relenquished By:				Date:		Received By:					Date:	Destination:
	Signature:				Time:		Signature:					Time:	

Benthic Samples

Date: 18 June 2014 Vessel: Hudson Borrow Area: East Rockaway
Crew: B. Drasser, K. Lamontagne, T. Gaudet, N. Johnson, D. Anderson
Gear: Smith-MacIntyre grab GPS Taken: ✓ (Yuma)
Weather Conditions: Sunny / hazy, ~90°F, 15-20 kt winds, ~3' seas
Additional Notes: Site IDs correspond to GPS but not previous sampling map

STATION ID	TIME	DEPTH ~~(m)~~ (ft)	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE
RS004	9:36	47'	50	Medium fine Sand + crushed shells	1	✓
ER001	10:00	43'	50	Fine brown Sand + crushed shells	1	✓
ER002	10:09	44'	50	Brown medium Sand	1	✓
ER003	10:16	45'	50	Brown-Med Sand w/ organics	1	✓
ER004	10:22	46'	50	Brown Fine Sand	1	✓
ER005	10:28	46'	50	Fine Dark Brown Sand w/ organics	1	✓
ER006	10:35	48'	50	Medium brown sand	1	✓
ER007	10:42	47'	50	Medium brown Sand, crushed shells	1	✓
ER008	10:49	48'	50	Medium brown Sand, crushed shells	1	✓
ER009	10:55	48'	50	Med brown Sand, shell bits	1	✓
ER010	11:01	50'	50	Med brown Sand, crushed shell, organics	1	✓
ER011	11:10	52'	50	Med brown Sand	1	✓
ER012	11:19	51'	50	Med brown Sand	1	✓
ER013	11:28	52'	50	Med brown Sand, shell bits	1	✓
ER014	11:59	40'	75%	Med brown Sand, shell hash	1	✓
ER015	12:08	41'	50	Med brown Sand	1	✓
ER016	12:14	42'	50	Med brown Sand	1	✓
ER017	12:21	42'	50	Med brown Sand	1	✓
ER018	12:29	42'	50	Dark brown, med Sand	1	✓
ER019	12:35	43'	50	Med brown Sand	1	✓
ER020	12:43	44'	50	Med brown Sand w/ organics	1	✓

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects
01 April—30 Sept 2014

Sheet ____ of ____

STATION ID	TIME	DEPTH ~~(m)~~ ft	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE
ER021	12:50	44'	50	Med brown Sand	1	✓
ER022	12:57	44'	75	Med brown Sand	1	✓
ER023	13:02	45'	50	Med, dark brown Sand	1	✓
ER024	13:08	45'	50	Med, brown Sand	1	✓
ER025	13:16	47'	50	Med brown Sand	1	✓
ER026	13:23	48'	50	Med brown Sand	1	✓
ER027	13:28	50'	50	Med brown Sand, Shell hash	1	✓

Benthic Samples

Date: 19 June 2014 Vessel: Hudson Borrow Area: East Rockaway
Crew: T. Gaudet, N. Johnson, D. Anderson, K. Lamontagne
Gear: Smith-MacIntyre grab GPS Taken: ✓ (June)
Weather Conditions: Overcast, mid-70s, ~10 kt winds, ~2' seas
Additional Notes: Site IDs match GPS but not original sampling map.

STATION ID	TIME	DEPTH ~~(m)~~ ft	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE
ER028	8:44	39'	50	Dark brown Sand, shell bits	1	✓
ER029	8:53	40'	50	Dark brown Sand	1	✓
ER030	8:59	40'	50	Dark brown Sand	1	✓
ER031	9:06	40'	50	Dark brown Sand	1	✓
ER032	9:13	40'	50	Dark brown Sand	1	✓
ER033	9:20	42'	50	Dark brown Sand	1	✓
ER034	9:26	31'	50	Dark brown Sand, Some organics	1	✓
ER035	9:33	44'	50	Dark brown Sand	1	✓
ER036	9:39	43'	50	Dark brown Sand	1	✓
RS002 → ~~[illegible]~~	9:55	38'	50	Medium brown Sand, some organics	1	✓
RS001	10:09	44'	100	Organic muck	1	✓
ER037	10:28	42'	50	Medium brown Sand	1	✓
ER038	10:35	43'	50	Medium brown Sand	1	✓
ER039	10:43	44'	50	Medium brown Sand	1	✓
ER040	10:49	44'	50	Med brown Sand, Some organics	1	✓
ER041	10:56	44'	50	Med brown Sand	1	✓
ER042	11:03	46'	50	Med brown Sand	1	✓
ER043	11:10	47'	50	Med brown Sand	1	✓
ER044	11:16	48'	50	Med brown Sand, Some organics	1	✓
RS003	11:27	56'	50	Med brown Sand	1	✓
RS005	11:39	52'	50	Med brown Sand	1	✓

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01 April—30 Sept 2014

STATION ID	TIME	DEPTH ~~(m)~~ ft	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE
RS001	11:57	37'	50	Med brown Sand	1	✓

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Benthic Samples

Date: 10/9/2014 Vessel: HUDSON Borrow Area: EAST ROCK
Crew: DRESSER, GAUDET, LAMONTAGNE
Gear: SMITH MAC GPS Taken: ____
Weather Conditions: ____
Additional Notes: ____

STATION ID	TIME	DEPTH (m)	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE
ER 1	0900	41'	60%	lt. brown/grey sand w/clay	1	✓
ER 2	0910	43'	80%	" NO CLAY	1	✓
ER 3	0920	42	60%	lt. brown/grey sand SHELL HASH NO CLAY	1	✓
ER 4	0930	43'	60%	" "	1	✓
ER 5	0935	43'	"	" "	1	✓
ER 6	0943	43'	"	" "	1	✓
ER 7	0950	43'	"	" "	1	✓
ER 8	0958	44'	"	" "	1	✓
ER 9	1004	44'	"	" " w/some organics	1	✓
ER 10	1013	45'	60%	lt. brown sand shell hash	1	✓
ER 11	1037	41'	"	" "	1	✓
ER 12	1045	41'	"	" "	1	✓
ER 13	1051	42'	"	" "	1	✓
ER 14	1058	43'	"	" "	1	✓
ER 15	1106	43	"	" "	1	✓
ER 16	1114	44	"	" "	1	✓
ER 17	1118	43	"	" "	1	✓
ER 18	1127	44.7	"	"	1	✓
ER 19	1151	41.3	"	"	1	✓
ER 20	12:00	41.0	50%	" "	1	✓
ER 21	1204	41.4	60	"	1	✓

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01 April—30 Sept 2014

STATION ID	TIME	DEPTH (m)	% FULL	SAMPLE DESCRIPTION	ORGANISM SAMPLE # OF #	GRAIN SIZE SAMPLE
ER22	1211	41.7'	60	"	1	✓
ER23	1217	42.3	60	Gray Sand w/organics	1	✓
ER24	1225	43.0'	60	Gray Sand	1	✓
ER25	1233	43.7	"	" w/organic	1	✓
ER26	1239	44	"	"	1	✓
ER27	1258	39.7	50%	" "	1	✓
ER28	1305	41.2	60%	" "	1	✓
ER29	900	46.5	80	Brown Sand	1	✓
ER30	908	47.5	80	" "	1	✓
ER31	914	48.5	"	" "	1	✓
ER32	923	49	"	" "	1	✓
ER33	929	50.3	"	" "	1	✓
ER34	937	51.6	"	" "	1	✓
*RS ER35	950	58	50	" "	1	✓
*RS ER36	1004	51	80	" "	1	✓
*RS ER37	1020	49.2	80	Gray Sand	1	✓
ER38	1031	46.6	60	Brown Sand	1	✓
ER39	1037	46	60	Brown Sand w/organic	1	✓
ER40	1043	46.3	60	"	1	✓
ER41	1049	47.5	80	Brow + Gray Sand	1	✓
ER42	1056	46.8	60	Brown Sand	1	✓
ER43	1103	47.7	60	" "	1	✓
ER44	1109	48.5	60	Brown Sand w/organic	1	✓
ER45	1115	49.1	"	" "	1	✓
ER46	1122	50	"	Brown/Gray Sand	1	✓
ER47	1128	51.1	"	" "	1	✓
*RS ER48	1145	41.1	90	Brown - large gravels	1	✓
*RS ER49	1203	50.0	100	muck - all organic	1	✓
*RS ER50	1219	35.8	100	black Brown Sand	1	✓

ref

ref

5/14/14

Offshore Fish Trawls - Lengths

10:41 EST

42'

Site ID	Haul #
ER-T1	1

Species																
Number of fish																
Weight (composite, if necessary)	Little Skate		Winter Skate		Porgie		Summer Flounder		Windowpane		Rock Crab		~~Red Hake~~ ~~Flounder~~		Spotted Hake	
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	475	1820	380	360			310	50g	190	160g	-		130		100	30
2	450	1720	640	2100					160	120	-				75	20
3	430	1820	630	2000											95	20
4	445	1720	620	1800											107	30
5	450	1820	365	320											107	20
6	420	1720	400	500											105	30
7	425	1720	590	1600											70	25
8	460	1720	~~475~~													
9	480	1820														
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*Standard length (SL) in millimeters; weight (Wt) in grams

Species																
Number of fish																
Weight (composite, if necessary)	~~Bowfin~~ Clearnose		Spider Crab		+300g Anchovy (5mm)?		Red Hake		~~Shortfin~~ Squid		Northern Searobin		Scup			
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	690	1900	-		85	20	120	35	105	70	70	35	88	40		
2					82	20			90	50	56	30	137	60		
3					88	20			100	55	65	30				
4					79	20			55	25	50	15				
5					78	25			85	40						
6					81	20			58	25						
7					78	20										
8					75	~~25~~ 15										
9					79	20										
10					80	20										
11					84	20										
12					78	15										
13					87	20										
14					91	20										
15					78	20										
16					65	20										
17					75	20										
18					80	20										
19					84	20										
20					82	20										
21					78	20										
22					77	20										
23					82	20										
24					80	20										
25					85	20										
26					75	15										
27					75	15										
28					92	25										
29					80											
30					81											

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

5/14/14

TIME = 1126
DEPTH = 38'

Site ID	Haul #
ELT-2	2

Species	Rock Crab		L. Skate		W Skate		Sp Hake		R. Hake		N. Searob		Summer Fl.		S. Anchovy	
Number of fish																
Weight (composite, if necessary)															+ 190g	
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	–		405	1520	421	1720	88	45	80	50	74	70	56	20	66	20
2			345	420	606	1820	92	65			77	75			68	20
3			472	1820			105	80			40	10			65	25
4							90	45			82	90			82	25
5							54	10							79	15
6							95	55							67	20
7							105	70							65	15
8							55	10							83	25
9							47	5							66	25
10															70	15
11															70	15
12															59	15
13															73	20
14															65	25
15															76	25
16															68	20
17															76	25
18															60	15
19															82	30
20															69	30
21															95	40
22															74	40
23															78	30
24															59	10
25															85	30
26															70	25
27															83	35
28															59	15
29															71	15
30															70	25

*Standard length (SL) in millimeters; weight (Wt) in grams

5/14/14

Offshore Fish Trawls - Lengths

Time = 1210
Depth = 37'

Site ID	Haul #
ERT-3	3

Species	S. Flounder		W. Skate		Clearnose sk.		L. Skate		Windowpane		Bonnethead		N. Searobin		S. Anchovy	
Number of fish															+2200g	
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	292	800	405	500	590	1300	469	800	217	520	125	40	105	40	70	15
2							436	650					65	15	69	15
3							499	820					88	25	90	25
4							470	820					77	20	90	20
5							496	920							81	15
6															89	20
7															65	15
8															59	10
9															67	15
10															90	20
11															58	10
12															82	15
13															62	15
14															90	20
15															69	15
16															84	20
17															58	10
18															72	15
19															75	15
20															66	10
21															64	10
22															66	10
23															73	10
24															85	20
25															78	15
26															84	20
27															79	20
28															93	25
29															68	15
30															92	25

*Standard length (SL) in millimeters; weight (Wt) in grams

Species	Spotted Hake		Squid		juv. Hake sp.											
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	88	20	–		35	5										
2	48	10			35	5										
3	55	10														
4	102	20														
5	97	25														
6	105	30														
7	102	30														
8	95	25														
9	89	20														
10	95	25														
11																
12																
13																
14																
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21																
22																
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24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

5/14/14

Site ID	Haul #
ERT4	4

REFERENCE Time: 12:55 Depth: 33'

Species	Rock Crab		Spider Crab		Windowpane		Winter Skate		Little Skate		Anchovy		N. Sandlance		Spy Mako	
Number of fish											–					
Weight (composite, if necessary)											+110g					
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	–		–		180	170	432	420	407	400	86	15	79	15	89	20
2	–						432	560	429	560	86	15	72	15	76	15
3	–						341	220			82	15	76	15	78	15
4							517	850			84	15	94	25	70	15
5							576	1250			84	15	69	15	110	25
6							578	1000			84	15	79	15	76	15
7											86	15	54	10	100	25
8											82	15			75	15
9											72	10			88	20
10											75	10			82	15
11											88	20			90	20
12											85	15			50	10
13											80	15				
14											83	15				
15											77	15				
16											84	15				
17											82	15				
18											90	20				
19											81	15				
20											85	15				
21											85	15				
22											81	15				
23											78	15				
24											71	15				
25											84	20				
26											84	20				
27											78	15				
28											83	20				
29											82	15				
30											78	15				

*Standard length (SL) in millimeters; weight (Wt) in grams

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects
01 April—30 Sept 2014

Sheet _____ of_____

Species	Longfin Squid		Hickory Shad		S cup		Bottentail		Atl Herring		Unid Hake Juv					
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	48	~~15~~	260	220	91	25	139	200	235	110	41	10				
2	30	—					113	60								
3							129	60								
4							148	100								
5							148	100								
6							94	40								
7							155	120								
8							115	40								
9							96	40								
10																
11																
12																
13																
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27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

5/14/14 13:45 36'

Site ID	Haul #
ERT5	5

Species	S. Searobin		Summer Fl.		Horseshoe		Winter Skate		Little Skate		Clearnose		S. Anchovy		N. Searobin	
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	295	400	373	900	–		780	4200	454	820	679	1600	72	~~30~~	88	20
2			205	~~475~~			345	240	450	540			80		64	
3							340	220	447	640			76		86	
4							361	270	446	620			79		95	
5							344	270	481	440			72		88	
6									422	490			80		92	
7													66		58	
8													60		45	
9													52		52	
10													65		61	
11													72		53	
12													59		49	
13													69			
14													60			
15													61			
16													72			
17													62			
18													71			
19													70			
20													60			
21													57			
22													70			
23													60			
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

TOTAL WT = 60g (23 fish)

TOTAL WT = 105 (12 fish)

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects **Sheet ____ of____**
01 April—30 Sept 2014

Species	Sp. Hake		Windowpane		Red Hake											
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	86	~~140~~	210	180	85	20										
2	83		205	200												
3	80		200	240												
4	81		66	15												
5	94															
6	49															
7	64															
8	71															
9	94															
10	82															
11	65															
12	80															
13	83															
14	77															
15	77															
16	79															
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

TOTAL WT = 110
(16 fish)

5/14/14

Offshore Fish Trawls - Lengths

14:20, 36'

Site ID	Haul #
ERT-6	6

Species	Rock Crab		Spider Crab		Windowpane		Little Skate		Winter Skate		Sr. Searobin		Summer Fl.		Sea Anchovy	
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	–		–		180	140	443	600	349	200	300	610	360	800	70	15
2			–		190	170	419	520	341	260			195	160	70	15
3			–		205	250	414	520	374	360						
4					65	20	452	560	615	1600						
5					180	130	485	730	725	3200						
6							436	570	375	330						
7							456	650	4							
8							446	500								
9							468	600								
10							464	630								
11							465	640								
12							409	470								
13							437	580								
14							457	520								
15							447	600								
16							437	600								
17							445	500								
18							447	530								
19							469	650								
20							484	700								
21							483	700								
22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Species	N. Searob		S. Hake		Spotted Hake											
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	97		95		86											
2	82		95		77											
3	84		86		102											
4	92		~~95~~													
5	61		~~79~~													
6																
7																
8																
9																
10																
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14																
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23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Total Wt. = 90 (5 Wt)

Total Wt = 30

Total Wt = 90

Offshore Fish Trawls - Lengths

5/14/14

14:50, 38'

Site ID	Haul #
ERT-7	7

Species	Spider Crab		Whiskeye		Summer Flounder		Winter Stone		Little Stone		Winter Flounder		N. Searsh		Green Crab	
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	–		190	70	205	290	410	410	471	670	300	620	75		–	
2	–		150	60	180	160	731	3200	457	620			88			
3	–		235	85	125	150	434	560	456	310			92			
4					315	490			405	430			79			
5					475	670			474	340			74			
6					73	15			446	560			78			
7					75	15			371	310			66			
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Small scale broke; used composites for fish less than 20g

Total wt = 90g

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects
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Sheet ____ of____

Species	Silver Hake		Spotted Hake		Str. Anchovy		Bowerfish		L.F. Squid		Scup					
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	72		133	50	58	15	103	40	69	–	93	40				
2	86		100		59	15										
3			85		68	20										
4			74		60	15										
5			98													
6			79													
7			79													
8			60													
9			82													
10			55													
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
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25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Total Wt = 30g

Total Wt = 70g (9 fish)

Offshore Fish Trawls - Lengths

5/14/14

15:25, 38'

Site ID	Haul #
ERT-8	8

Species	Longhorn Sculpin		Rock Crab		White Hake		Summer Fl.		Windowpane		Winter Skate		L. f. Squid		Butterfish	
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	478	230	–		275	430	310	510	190	150	346	240	197		155	90
2	443	280							195	170			81		75	20
3	406	340							195	160			111			
4	443	510														
5	455	610														
6	479	530														
7	439	280														
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects **Sheet _____ of_____**
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Species	N. Seahorse		Sp. Hake		Sil. Hake		S. Flounder		Sr. Anchovy							
Number of fish									–							
Weight (composite, if necessary)									~~115g~~ +375g							
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	80		97	25	85	15	50	<5'	75							
2	85								65							
3	68								73							
4									80							
5									60							
6									63							
7									67							
8									68							
9									70							
10									74							
11									66							
12									66							
13									64							
14									70							
15									65							
16									70							
17									74							
18									65							
19									69							
20									70							
21									67							
22									73							
23									63							
24									68							
25									74							
26									66							
27									66							
28									71							
29									71							
30									66							

*Standard length (SL) in millimeters; weight (Wt) in grams

30= 115g

TOTAL
~~LENGTH~~
WT = 40

Offshore Fish Trawls - Lengths

5/14/14

15:55, 41'

Site ID	Haul #
ERT-9	9

Species	Windowpane		Sm. Ambony		Rock Crab		Sil. Hake		N. Searobin		Spotted Hake		Juv. Hake			
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	205	200	65		—		74	15	59	<5	102	25	39			
2	195	210	69				89	20			74	15				
3	205	250	60													
4			60													
5			70													
6			54													
7			68													
8			55													
9			63													
10			68													
11			54													
12			69													
13			73													
14			70													
15			55													
16			70													
17			55													
18			65													
19			77													
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

wt = 70g

Offshore Fish Trawls - Lengths

Site ID	Haul #
ERT-10	10

16:25, 44'

Species	Rock Crab		Summer Fl.		Sp. Hake		Windowpane		Little Skate		Bonnethead		N. Searobin		Sea Robin	
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	–		305	570	260	390	174	140	407	550	100	30	87		62	
2					74		170	130	444	620	93	35	92		65	
3					88				335	290			89		60	
4					67				442	550			64		72	
5					92				444	560			65		66	
6					80				280	160					60	
7					84										69	
8					77										62	
9					74											
10					78											
11																
12																
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21																
22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

GPS crashed After ERT-10
"Fine report" then None of the pound nets were visible

Wt = 80g

Total Wt = 92 g

Total Wt. = 40g

Offshore Fish Trawls - Lengths

5/14/14

16:50, 39'

Site ID	Haul #
ERT-11	11

Species	Rock Crab		Clearnose Skate		W. Skate		Little Skate		Summer Fl.		Butterfish		Windowpane		Sm. Skate	
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	—		683	2000	860	4060	444	540	301	440	115	40	208	190	73	
2					476	400	440	550	228	200			213	260	83	
3					592	1200	417	470					200	180	50	
4					552	1100	430	290					168	100	83	
5							412	480					95	30	85	
6													92	40	78	
7															69	
8															47	
9															77	
10															82	
11															58	
12															56	
13															56	
14																
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22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Total Wt = 110

Sheet ____ of____

Species	Sp. Hake		Juv. Hake		Str. Anchovy		Str. Sealdrum									
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	77		40	<5	80		255	420								
2	81				70											
3	74				60											
4	78				69											
5	74				58											
6	66				76											
7	66				52											
8	80				66											
9					60											
10																
11																
12																
13																
14																
15																
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22																
23																
24																
25																
26																
27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

TOTAL WT. = 70g

TOTAL WT = 40g

Offshore Fish Trawls - Lengths

5/14/14

17:30, 45'

Site ID	Haul #
ERT-12	12

Species	Rock Crab		W. Bass		Little Skate		Clear Nose		SCUP		N. Sea Robin		Weakfish		Blk Sea Bass	
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	–		443	530	452	310	703	1800	96	40	65		175	150	65	20
2	–		479	490	430	570	705	1600			72					
3	–		445	490	436	570										
4			370	265	446	560										
5			370	275	399	420										
6			392	360	423	410										
7			378	300	431	180										
8			320	180	470	560										
9					414	510										
10					419	560										
11					407	590										
12					490	720										
13																
14																
15																
16																
17																
18																
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20																
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25																
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27																
28																
29																
30																

*Standard length (SL) in millimeters; weight (Wt) in grams

Total
17:20

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects
01 April—30 Sept 2014

Sheet ____ of ____

Species	Sea Anch		Sp. Hotee		L.F. Spot											
Number of fish																
Weight (composite, if necessary)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	71		84		75											
2			74													
3			89													
4			72													
5			76													
6			76													
7			67													
8			94													
9			87													
10			68													
11			86													
12			72													
13			90													
14			85													
15			121													
16			90													
17			78													
18			82													
19			79													
20			73													
21			65													
22			65													
23			74													
24			76													
25			77													
26			96													
27			75													
28			53													
29			75													
30			78													

*Standard length (SL) in millimeters; weight (Wt) in grams

31 90

32 75

Total

Wt=230

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line? ERT01A
ERT01A	1	6/17/14	0944	45ft	Start ✓ End ✓

Species	L. Skate		S. FL		S. HAKE		W. SKATE		LF SQ		USQ		WFL		R SCAD	
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	390	800	82	4	123	15	390	250	215	100	192	100	80	40	49	2
2	482	600							173	100						
3	395	500							142	50						
4	466	700							181	100						
5	407	400							142	50						
6									122	75						
7									155	100						
8									134	75						
9									144	75						
10									110	50						
11									152	75						
12									95	27.5						
13									109	27						
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Species	UMSQ															
Number of fish	3															
Weight (composite, if needed)	9															
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	35															
2	21															
3	36															
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line? ERT02A
ERT02A	2	6/17/14	11:03	46 ft	Start ✓ End ✓

Species	CNSK		HSQ FL		SCUP		LFSQ		Un SQ							
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	195	1100	214	120	76	12	75	17.5	41	75						
2			287	420			54	7	46	45						
3									42	4						
4									39	3.7						
5									42	4						
6									30	2.25						
7									31	2						
8									30	3						
9									31	3						
10									36	3.5						
11									33	3						
12									35	3.5						
13									34	4						
14									34	2.5						
15									33	2.5						
16									30	3						
17									32	3.5						
18									31	3						
19									31	3						
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth ~~(m)~~ DA		GPS line? ERT03					
ERT03	3		6/17/14		11:25				45		Start ✓		End ✓			
Species	SM DOG		CNSKATE		WP-FLDR		L SKATE		SP HAKE		LF SQ		SM FLDR		But Fish	
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	330	250	603	1100	160	90	446	500	91	9.5	124	75	115	50	41	3
2					222	250			108	17.5	95	75				
3											82	16				
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Species	UnSQ															
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	45	5														
2	36	3														
3	32	3.5														
4	35	3														
5	36	3														
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth ~~(m)~~ ft		GPS line? ERT04					
ERT04	4		6/11/14		1141				48		Start ✓		End ✓ 1149			
Species	LH/Skate		CN-Skate		N-SQ.b		SM-FLDR		Sum-FLDR		LF-SQ		Unkn-SQ			
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	395	400	195	200	111	28	131	75	240	100	191	100	54	7.5		
2					76	8	79	10.5			242	125	44	4		
3					68	4					115	50	42	3.5		
4											102	50	51	6.5		
5											75	18.5	42	4		
6											80	16.5	56	8		
7											70	14	31	2.5		
8												6	30	2.5		
9													57	7.5		
10													64	10.5		
11													60	9		
12													60	9		
13													42	3		
14													28	1.5		
15													65	9.5		
16													61	8		
17													—	6		
18													30	2		
19													41	4		
20													60	9		
21													51	5.5		
22													40	3		
23													68	12		
24													35	2		
25													54	6.5		
26													28	1		
27													57	7.5		
28													49	5		
29													52	6.5		
30													39	3		
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish													7	35		

*Standard length (SL) in millimeters; weight (Wt) in grams

2 - Spider Crab

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth ~~(m)~~ ft		GPS line? ERT05					
ERT05	5		6/17/14								Start ✓			End ✓		
Species	CN-SKATE		L. SKATE		WIN SKATE		N-SEA ROB		SQ-GRW							
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	714	1600	1150	500	470	600	1685	600	40	4						
2			460	500			165	75	50	3						
3							170	100	33	2.5						
4							173	100	22	1						
5							161	100	35	3						
6							171	100	40	4						
7							162	75	27	1.5						
8							175	100	32	3						
9							162	100	36	3						
10							191	100	32	3						
11									40	4						
12									34	5						
13									40	~~5.5~~						
14									45	5						
15									50	6						
16									54	7.5						
17									31	2						
18									33	1.5						
19									35	2						
20									44	5						
21									45	5						
22									46	4						
23									51	7						
24									25	1						
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

30 - Sp. Crab

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth ~~(m)~~ ft		GPS line? ERT06					
ERT06	6		6/17/14								Start ✓		End ✓			
Species	Fluke		Little Skate		SM-FLDR		[illegible]		[illegible]							
Number of fish																
Weight (composite, if needed)							LF Sand		Short Fin SQ							
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	279	320	413	300	87	13	92	24.5	56	4						
2			445	500			75	17	60	4						
3			442	600			60	5	61	5.5						
4							52	5	54	4.5						
5							70	7.5	61	5						
6							62	5.5	61	5						
7							56	3	60	5						
8							52	6.5	60	4.5						
9							48	5	61	4.5						
10							56	4.5	65	5.5						
11							76	15.5	64	5.5						
12							41	3								
13							61	8								
14							41	2.5								
15							35	2								
16							34	2								
17							35	2.5								
18							45	4.5								
19							61	14								
20							30	1.5								
21							46	5								
22							50	6.5								
23							57	8								
24							30	2.5								
25							64	11								
26							35	2								
27							55	7.5								
28							65	11.5								
29							44	2								
30							38	3								
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish							23	75								

*Standard length (SL) in millimeters; weight (Wt) in grams

1 Spider Crab

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line? ERT07					
ERT07	7		6/17/14		8 min				47 Ft		Start ✓		End ✓			
Species	Clearnose Skate		little skate		N. sea rob		S. mouth flounder		w. hdow		long fin squid					
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	655	1600	432	500	195	100	136	75	155	100	65	23.5				
2			444	500	69	11.5	92	9			70	13				
3			493	620	88	14.5	80	7.5			34	2				
4			552	400			66	3.5			40	4				
5			443	350							30	1				
6			425	400							52	5.5				
7			470	500							32	1.5				
8			473	700							31	1.5				
9											30	1.5				
10											46	4				
11											68	18				
12											60	7.5				
13											35	2				
14											33	1.5				
15											30	1.5				
16											27	1				
17											40	3.5				
18											66	14.5				
19											62	11				
20											44	4.5				
21											37	2.5				
22											75	15.5				
23											35	2				
24											47	6				
25											45	5.5				
26											69	11.5				
27											35	2.5				
28											35	2.5				
29											46	5				
30											37	2.5				
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish											29	100				

*Standard length (SL) in millimeters; weight (Wt) in grams

1 spider crab

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line? ERT08					
ERT08	8		6/17/14		13:08						Start ✓		End ✓			
Species	LSR-FLDR		ST-Sea Rob		LTL-SKATE		N.Sea Rob		SM-FLDR		UN-Skate		LF-SQ			
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	233	220	219	200	391	300	57	3	105	225	312	150	34	1		
2	205	100			448	420							45	4		
3					415	400							32	2		
4					464	320							40	3		
5													30	2		
6													46	2		
7													32	2		
8													35	2.5		
9													45	4		
10													45	2.5		
11													32	2		
12													42	3		
13													35	2		
14													37	1.5		
15													31	2		
16													32	1.5		
17													37	2.5		
18													33	2		
19													36	2		
20													32	1.5		
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

1-Jonn Cab

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line? ERT 09
ERT 09	9	6/17/14	6 min	44 ft	Start ✓ End ✓

Species	window	4 spot flounder	winter skate	little skate	longfin squid			
Number of fish								
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	208	150	233	150	472	600	411	450	81	24.5						
2 (fresh dead)	174	100			431	500	466	600	36	3						
3							467	500	36	3						
4							437	500	37	3						
5							450	400	55	8						
6							421	500	40	3						
7							460	500	42	3.5						
8									35	2						
9									33	2						
10									38	2						
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)		Depth ~~(m)~~ ft	GPS line? ERT10		
ERT10	10	6/17/14			46.9	Start ✓	End ✓	
Species	Clearnose	winter skate	little skate	N. searob	small flounder	1F squid		
Number of fish								
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	614	1406	475	620	476	420	176	100	136	25	131	75				
2	630	600			462	520	176	100	69	4.5	27	1.5				
3							91	13								
4							94	12.5								
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

1 spider crab
1 rock crab

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line? ERT11
ERT 11	11	6/17/14	8		Start ___ End ___

Species	CN, SKATE		Little Skate		Win Skate		Striped Sea Robin		Spot Hake		IF Squid					
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	621	1300	486	520	496	620	213	150	108	15	210	43				
2			440	520			226	200			81	14.5				
3			461	420			215	200			86	13.5				
4							170	100								
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

50 Spider Crabs

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line? ERT12
ERT 12	12		9min	43 ft	Start ✓ End ✓

Species	Fluke	Little Skate	Scup	Spotted Hake	Small Mouth Flounder	IF Squid		
Number of fish								
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	364	900	502	720	79	17.5	107	15.5	84	10	197	125				
2					80	17.5					185	100				
3					84	19					147	100				
4					85	19.5					165	100				
5					85	19.5					145	100				
6					90	22					135	100				
7					94	23					153	100				
8					74	12					131	75				
9					95	29					147	100				
10					95	28.5					141	100				
11					84	18.5					176	150				
12					72	12					75	13.5				
13											72	14				
14											56	7.5				
15											58	9.5				
16											47	6.5				
17											35	2.5				
18											56	6				
19											31	1				
20											30	1				
21											10	9				
22											42	3.5				
23											41	4				
24											45	5.5				
25											31	2.5				
26											31	2.0				
27											32	2				
28											40	3				
29											30	1.5				
30											32	2				
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish											29	100				

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

ER1A

Site ID	Haul #	Date	Time (gear set)	Depth (~~m~~) ft	GPS line?
~~[illegible]~~ 11	1	7/15	8 min; 10:21	41'	Start ✓ End ✓

Species	Smooth Dog Fish		Spiny Dog Fish		Little Skate		Spotted Hake		Butterfish		Rough Sked		Longfin Squid			
Number of fish	1		2		8		3		1		1		153			
Weight (composite, if needed)													(A)			
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	668	600	211	400	435	350	178	170	50	3	82	10	152	60		
2			435	420	459	200	134	120					135	70		
3					425	200	140	170					122	60		
4					412	200							153	80		
5					440	250							46	40		
6					442	250							91	50		
7					431	250							96	55		
8					427	200							72	40		
9													73	35		
10													50	35		
11													41	30		
12													110	55		
13													182	110		
14													74	50		
15													51	30		
16													103	45		
17													55	35		
18													34	20		
19													30	35		
20													40	30		
21													45	35		
22													94	40		
23													55	35		
24													91	50		
25													78	40		
26													61	35		
27													91	40		
28													80	30		
29													51	25		
30													42	20		
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish													123	850		

*Standard length (SL) in millimeters; weight (Wt) in grams

(A) Weights for small longfin squid ~~[illegible]~~ ~~[illegible]~~ 0.1 calibrate to ER2 weights

1
36
87
123

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
ER2	2	7/15/14	10:48	39'	Start ✓ End ✓

Species	Lightning whelk	Sand dollar	Smallmouth flounder	Roughshed	Longfin squid	Spotted hake	Butterfish	
Number of fish	2	1	1	1	215	1	2	
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	480	700	480	400	148	16	49	4	135	40	311	300	25	0.5		
2	479	610							149	60			39	0.5		
3									160	120						
4									75	45						
5									65	20						
6									48	20						
7									65	15						
8									40	3						
9									46	6						
10									32	2						
11									65	10						
12									64	12						
13									35	3						
14									35	4						
15									70	13						
16									62	13						
17									35	3						
18									28	1						
19									75	18						
20									57	10						
21									53	9						
22									46	7						
23									41	4						
24									39	4						
25									35	3						
26									42	4						
27									44	5						
28									43	6						
29									28	2						
30									64	15						
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish									185	390						

*Standard length (SL) in millimeters; weight (Wt) in grams

* Sand eggs

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth ~~(m)~~ ft		GPS line?					
ER 3	3		7/15/14		11:10				40'		Start ✓		End ✓			
Species	① horseshoe crab		little skate		~~skap~~ scup		Longfin squid		Rough skad							
Number of fish	1		2		2		141		1							
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	228	–	446	600	84	25	40	4	74	8						
2			457	300	99	30	41	4								
3							35	3								
4							30	3								
5							66	17								
6							32	4								
7							34	4								
8							35	4								
9							61	10								
10							50	6								
11							48	6								
12							35	4								
13							28	1.5								
14							28	1.5								
15							27	1								
16							62	13								
17							70	15								
18							82	16								
19							36	4								
20							59	10								
21							60	10								
22							67	10								
23							66	12								
24							30	2								
25							61	9								
26							72	15								
27							33	2								
28							39	4								
29							37	3								
30							35	3								
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish							111	875								

*Standard length (SL) in millimeters; weight (Wt) in grams

① width of shell measured

-5 moon snails
- squid eggs present

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
FR004	4	7/15/14	11:30	43	Start ✓ End ✓

Species	N. Searobin	Little SK	Scup	Uldiap (Longhd)	Summer Fldr			
Number of fish	1	2	43	34	1			
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	220	155	430	560	100	24	95	22	60	3						
2			430	450	110	41	95	22								
3					110	44	80	15								
4					110	32	87	22								
5					90	22	27	3								
6					105	38	50	6								
7					90	25	55	9								
8					90	19	45	5								
9					90	21	35	3								
10					105	26	40	4								
11					105	41	40	3								
12					87	19	35	2								
13					110	48	50	8								
14					115	48	67	11								
15					105	39	45	5								
16					102	36	30	2								
17					90	21	44	4								
18					88	18	57	9								
19					90	21	29	1								
20					108	48	38	5								
21					100	32	42	4								
22					100	29	45	5								
23					88	17	60	10								
24					104	36	44	6								
25					86	16	53	5								
26					110	34	50	7								
27					95	26	39	4								
28					92	23	39	5								
29					103	29	44	5								
30					100	24	30	2								
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish					13	360	4	25								

*Standard length (SL) in millimeters; weight (Wt) in grams

* Blue mussels present

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ (ft)	GPS line?
FR005	5	7/15/14	11:52	44'	Start ✓ End ✓

Species	Clearnose Skate	Little Sk.	Striped Searobin	Scup	Loligo (Long fin)			
Number of fish	1	3	2	3	46			
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	520	1100	460	570	[redacted]		97	30	273	192						
2			410	510	220	200	103	28	225	124						
3			450	590	240	300	100	32	195	84						
4									140	46						
5									165	64						
6									115	38						
7									65	12						
8									35	2						
9									58	10						
10									88	17						
11									75	15						
12									65	13						
13									60	9						
14									49	6						
15									39	3						
16									49	5						
17									38	3						
18									77	14						
19									40	4						
20									50	5						
21									62	8						
22									45	4						
23									48	5						
24									40	3						
25									35	2						
26									70	14						
27									55	9						
28									45	5						
29									40	3						
30									67	9						
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish									16	102						

*Standard length (SL) in millimeters; weight (Wt) in grams

*3 moonsnails

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
FR006	6	7/15/14	12:10	43'	Start ✓ End ✓

Species	Spiny dogfish	Summer Fldr	Little Sk	Windowpane Fldr	Spot Hake	N. Searobin	Scup	Smallmouth Fldr
Number of fish	1	1	11	1	1	2	2	1
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	448	340	280	300	420	530	120	42	170	76	195	110	98	29	85	9
2					425	450					205	162	90	11	80	6
3					430	340										
4					460	600										
5					450	600										
6					430	460										
7					465	560										
8					440	580										
9					470	620										
10					480	580										
11					450	510										
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Species	Uoligo (Long Fin)		Butterfish													
Number of fish	68		1													
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	235	156	43	1												
2	111	36														
3	112	34														
4	112	38														
5	110	32														
6	132	38														
7	132	35														
8	92	18														
9	55	5														
10	55	6														
11	35	3														
12	41	4														
13	36	3														
14	60	9														
15	67	11														
16	73	17														
17	98	18														
18	55	10														
19	95	23														
20	52	6														
21	57	8														
22	41	3														
23	65	15														
24	39	3														
25	58	11														
26	38	3														
27	55	7														
28	51	7														
29	75	18														
30	70	14														
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish	38	240														

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (~~m~~ ft)	GPS line?
ER007	7	7/15/14	12:30	42'	Start ✓ End ✓

Species	Little Skate	Spiny Dogfish	Winter Flounder	Smallmouth Flounder	Pompano	Spotted Hake	Northern Searobin	Longfin Squid
Number of fish	9	2	2	2	1	2	1	88
Weight (composite, if needed)								

Individual	Little Skate SL	Little Skate Wt	Spiny Dogfish SL	Spiny Dogfish Wt	Winter Flounder SL	Winter Flounder Wt	Smallmouth Flounder SL	Smallmouth Flounder Wt	Pompano SL	Pompano Wt	Spotted Hake SL	Spotted Hake Wt	Northern Searobin SL	Northern Searobin Wt	Longfin Squid SL	Longfin Squid Wt
1	465	700	450	[illegible]	195	30	88	15	92	16	175	72	[illegible]	18	98	34
2	450	610	305	120	120	32	98	18			118	12			83	23
3	445	620													48	6
4	440	570													46	7
5	445	560													108	37
6	445	540													105	40
7	430	540													90	30
8	460	650													91	23
9	450	570													95	19
10															73	23
11															86	10
12															55	[illegible] 7
13															107	25
14															86	16
15															71	[illegible] 20
16															43	[illegible] 4
17															78	[illegible] 20
18															68	14 [illegible]
19															88	26
20															40	5
21															46	5
22															62	11
23															53	9
24															58	11
25															50	6
26															59	9
27															55	10
28															52	6
29															53	9
30															92	21
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish															58	620

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line?
ERO8B	8	7/15/14	12:50	43'	Start ✓ End ✓

Species	Smooth Dogfish		spiny dogfish		Little skate		Summer Flounder		Windowpane		Scalloped hake		butter fish		longfin squid	
Number of fish	1		1		5		1		1		1		1		124	
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	810	1800	394	250	497	620	290	520	144	240	158	60	55	5	71	14
2					490	630									176	70
3					458	520									85	19
4					482	670									88	21
5					463	540									103	29
6															92	29
7															65	13
8															54	9
9															73	15
10															81	17
11															51	8
12															35	3
13															42	3.5
14															50	7
15															48	6
16															45	5.5
17															54	6.5
18															44	5
19															55	8
20															51	7.5
21															45	6
22															35	3
23															27	3
24															85	21
25															92	25
26															75	16
27															60	10
28															56	8.5
29															51	7
30															42	4.5
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish															94	700

*Standard length (SL) in millimeters; weight (Wt) in grams

- Horseshoe crab
- 2 Spider crabs

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line?					
ER009	9		7/15/14		13:13				42'		Start ✓		End ✓			
Species	Striped sea robin		N. searobin		Spiny dogfish		little skate		Skate sp.Ⓐ		winter skate		Smallmouth flounder		butterfish	
Number of fish	2		1		1		11		1		2		7		5	
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	226	320	104	19	425	300	467	640	325	200	398	420	91	10	77	12
2	216	300					458	470			382	340	94	15	55	4
3							444	630					112	19	66	6.5
4							441	470					85	10	64	7.5
5							470	420					85	10	60	8
6							447	570					78	8		
7							449	630					90	15		
8							468	570								
9							450	530								
10							397	370								
11							455	520								
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Ⓐ too small to sex

- sider crab

Species	Silver Hake		Longfin Squid													
Number of fish	1		159													
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	87	9	104	45												
2			53	6												
3			50	6												
4			87	23												
5			122	38												
6			82	20												
7			79	19												
8			65	13												
9			51	7												
10			42	4												
11			33	2.5												
12			45	4												
13			49	5												
14			49	5												
15			30	1.5												
16			32	1.5												
17			33	1.75												
18			29	1.5												
19			76	16												
20			40	3.5												
21			104	32												
22			142	34												
23			90	20												
24			86	22												
25			83	22												
26			62	11												
27			50	5												
28			36	1.5												
29			45	5.5												
30			30	1.5												
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish			129	1000												

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (~~m~~) ft	GPS line?
ER10	10	7/15/14	13:37	47'	Start ✓ End ✓

Species	Sm. Dog	Little Skate	White Skate	St. Robin	Smallmouth Flounder	Longspoed		
Number of fish	1	3	3	1	4	188		
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	725	1100	458	600	436	520	203	190	97	15	103	20				
2			464	580	415	490			88	12	92	21				
3			442	540	359	230			90	13	162	68				
4									93	17	85	34				
5											80	22				
6											66	12				
7											45	5				
8											50	8				
9											97	27				
10											113	34				
11											82	19				
12											80	19				
13											61	11				
14											59	12				
15											58	12				
16											52	9				
17											55	9				
18											46	6				
19											44	5				
20											55	8				
21											41	4				
22											60	10				
23											45	5				
24											39	3				
25											40	3				
26											45	3				
27											55	5				
28											42	5				
29											39	3				
30											36	3				
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish											158	1100				

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (~~m~~) ft		GPS line?					
Ref 11	11		7/16/14		10:20				47		Start ✓		End ✓			
Species	little SK		UK Skate		winter Skate		Strip Searobin		Smooth Dog		Spot Hake		Butterfish		Small mouth Fldr	
Number of fish	17		1		5		2		2		3		1		5	
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	455	680	335	240	478	470	293	300	535	250	183	82	140	72	186	9
2	453	610			353	300	310	400	373	140	173	87			180	7
3	435	500			360	300					130	84			91	10
4	451	600			345	230									81	9
5	420	430			323	250									92	13
6	417	480														
7	460	600														
8	340	240														
9	445	600														
10	387	360														
11	310	180														
12	465	640														
13	400	380														
14	395	390														
15	434	570														
16	450	540														
17	445	500														
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

* Squid eggs present

Species	Uoliao															
Number of fish	(Longfin) 35															
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	92	27														
2	109	36														
3	91	28														
4	87	18														
5	70	13														
6	49	5														
7	35	2														
8	28	2														
9	62	10														
10	82	18														
11	51	8														
12	108	27														
13	94	34														
14	89	28														
15	36	2														
16	86	34														
17	100	34														
18	46	6														
19	35	2														
20	77	13														
21	35	2														
22	36	3														
23	110	38														
24	41	4														
25	65	10														
26	45	5														
27	46	6														
28	41	4														
29	43	4														
30	35	3														
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish	5	30														

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
ER 12	12	7/16/14	9:40	47'	Start ✓ End ✓

Species	Striped Searobin		Smooth Dog		Black SB		Little Sk.		Scup		Butterfish		Spot Hake		Windowpane Fldr	
Number of fish	1		1		1		12		4		1		4		1	
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	225	240	591	600	170	120	450	580	109	24	60	5	198	106	135	48
2							462	540	105	19			190	92		
3							430	580	97	20			188	86		
4							488	660	100	21			200	96		
5							420	570								
6							465	680								
7							467	600								
8							400	450								
9							475	600								
10							462	590								
11							352	360								
12							491	650								
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Species	N. Searobin		Smallmouth Flounder		Hogchoker											
Number of fish	1		3		(Longfin) 67											
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	109	15	80	8	82	19										
2			101	14	149	50										
3			88	11	51	8										
4					95	19										
5					65	10										
6					80	20										
7					58	9										
8					52	4										
9					35	2										
10					50	9										
11					40	4										
12					81	18										
13					47	4										
14					32	4										
15					38	3										
16					47	4										
17					40	3										
18					41	4										
19					39	3										
20					55	8										
21					37	3										
22					35	2										
23					50	7										
24					80	15										
25					25	1										
26					55	8										
27					32	1										
28					35	1										
29					52	5										
30					45	20										
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish					37	230										

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
ER13	13	7/16/14	10:00	42'	Start ✓ End ✓

Species	Tautog		Spiny Dog		N. Searay		Little Skate		Little Skate		Spotted Hake		Pogy		Longfin Squid	
Number of fish	1		3		1		4		3		2		1		56	
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	175	180	457	400	215	160	470	580	478	520	155	58	105	24	70	4
2			477	460			410	480	465	540	133	18			55	7
3			470	400			455	510	470	520					37	3
4							455	590							55	9
5															68	12
6															64	10
7															35	2.5
8															35	2
9															40	2.5
10															47	4
11															43	5
12															36	2
13															31	1
14															57	9
15															35	1.5
16															33	1
17															46	5
18															34	2
19															41	3
20															51	5
21															42	3
22															90	26
23															40	4
24															41	4
25															47	3
26															41	4
27															49	5
28															45	4
29															39	5
30															76	14
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish															26	170

*Standard length (SL) in millimeters; weight (Wt) in grams

☆ Skate Case

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (~~m~~) 84	GPS line?
ER 14	14	7/16/14	10:22	44'	Start ✓ End ✓

Species	Smooth Ray	White Skate	Stray Dog	Gadfly fish	N. Sea Robin	Summer Flounder	L. fin squid	
Number of fish	1	10	2	9	1	2	100	
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	810	2000	470	600	445	320	20.5	.5	98	17.5	80	6	247	164		
2	470		472	600	442	300	21	.5			92	10	52	8		
3			458	500	[redacted]	40	60	4					45	5		
4			490	690			58	4					50	6.5		
5			439	460			63	4.5					37	4		
6			424	500			77	7					29	1		
7			442	530			20	.5					54	5		
8			440	530			44	3					39	1		
9			442	500			65	5					45	1.5		
10			365	290									32	1.5		
11													40	3		
12													55	9		
13													74	13		
14													77	17		
15													36	2		
16													45	3		
17													75	15		
18													51	5		
19													45	5		
20													50	6		
21													76	17		
22													45	5		
23													44	5		
24													40	3		
25													36	3		
26													32	3		
27													40	3		
28													35	2		
29													68	12		
30													35	2		
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish													70	440		

*Standard length (SL) in millimeters; weight (Wt) in grams

- spider crab
- Big Jellyfish

hermit crab

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (~~m~~) ft	GPS line?
ER 15	15	7/16/14	11:00	42'	Start ✓ End ✓

Species	Spiny Dog	Winter Skate	Little Skate	Spotted Hake	Smallmouth Flounder	Northern Searobin	Longfin Squid	
Number of fish	3	1	7	3	4	2	51	
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	481	400	465	200	434	530	236	148	105	30	183	88	64	11		
2	398	200			465	670	174	80	106	30	120	24	37	3		
3	426	200			480	570	135	38	74	7			39	3		
4					456	600			178	5.5			62	11		
5					474	540							50	6		
6					425	550							40	4		
7					431	500							55	8		
8													31	1.5		
9													36	2		
10													45	4		
11													55	9		
12													40	3		
13													44	5		
14													38	3		
15													29	2		
16													32	2		
17													45	5		
18													50	7		
19													48	5		
20													61	10		
21													46	5		
22													41	4		
23													38	3		
24													52	7		
25													41	4		
26													99	32		
27													69	11		
28													63	12		
29													51	7		
30													39	4		
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish													21	80		

*Standard length (SL) in millimeters; weight (Wt) in grams

Spider crab
Hermit crab

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
FR001	1	8/5/14	9:05	42'	Start ✓ End ✓

Species	Clearnose Skate	Summer Flder	Winter	L.F Sand D				
Number of fish	1	4	6	8				
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	632	1,100	102	19	64	10	115	418								
2			106	19.5	62	8.5	92	418								
3			89	10	65	9	22	1								
4			68	4	65	9	32	1								
5					68	8.5	23	1								
6					57	7	28	1								
7							25	1								
8							25	1								
9																
10																
11																
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27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
FR002	2	8/5/14	9:31	45	Start ✓ End ✓

Species	Little Skate	Smooth S.R	N Puffer	Fluke	LF Squid			
Number of fish	1	1	8	3	5			
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	450	520	185	180	65	9.5	80	10.5	33	1						
2					66	11.5	95	12	28	1						
3					71	16.5	96	12	32	1						
4					60	10			22	1						
5					71	13			27	1						
6					66	9.5										
7					66	12										
8					72	10										
9																
10																
11																
12																
13																
14																
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28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

* Squid eggs

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
FR003	3	8/5/14	9:53	46'	Start ✓ End ✓

Species	Butterfish		Fluke		L.F. SQUID		N. Puffer									
Number of fish	1		1		4		10									
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	53	4	102	195	67	11	72	11								
2					94	26	66	11								
3					72	16	68	10								
4					62	10	65	11								
5							66	13								
6							66	11								
7							62	11								
8							65	9								
9							62	10								
10							60	9								
11																
12																
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27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth ~~(m)~~ IF		GPS line?					
ER004	4		8/5/14		10:18				40'		Start ✓		End ✓			
Species	GRUNARD*		Butterfish		N. Sea		N. Puffer		Striped		Smallmouth		Hollign			
Number of fish	1		2		Robbin 5		12		Sea robin 1		Fldr 4		1			
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	42	4	48	3	127	36	65	H2O	255	440	81	7	90	22		
2			38	2	135	40	65	H2O			85	13				
3					125	34	53	H2O			105	15				
4					126	32	65	H2O			78	6				
5					130	38	70	11								
6							70	10								
7							70	10								
8							61	9								
9							68	9								
10							64	9								
11							61	8								
12							69	10								
13																
14																
15																
16																
17																
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23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

*Spider Crab * need to look up species

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
ER005	5	8/5/14	10:47	43	Start ✓ End ✓

Species	Clearnose Skate		Scup		Black SB		N. Puffer		Smallmouth Fldr		Striped Searobin		Uoligo			
Number of fish	1		2		1		9		1		1		2			
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	641	1100	127	70	175	150	70	13	92	14	215	230	105	40		
2			115	50			70	11					64	12		
3							66	14								
4							65	11								
5							65	10								
6							62	12								
7							72	7								
8							66	8								
9							60	12								
10																
11																
12																
13																
14																
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27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

*squid eggs

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
FR006	6	8/5/14	11:15	44'	Start ✓ End ✓

Species	Smallmouth Flndr	Butterfish	Loligo	N. Puffer				
Number of fish	2	1	6	7				
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	87	9	41	2	60	8	83	17								
2	115	32			95	27	54	8								
3					90	22	69	10								
4					75	15	62	6								
5					78	14	70	10								
6					84	14	67	9								
7							60	7								
8																
9																
10																
11																
12																
13																
14																
15																
16																
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25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
ER007	7	8/5/14	11:41	43'	Start ✓ End ✓

Species	Scup	N. Puffer	Smallmouth Fldr	Uoligo				
Number of fish	1	3	3	5				
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	83	17	68	8	91	11	28	2								
2			66	8	75	7	31	2								
3			67	9	96	12	91	23								
4							94	27								
5							77	16								
6																
7																
8																
9																
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29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
FR008	8	8/5/14	12:06	42'	Start ✓ End ✓

Species	Loligo	N. Searobin	Smallmouth Flounder	N. Puffer				
Number of fish	2	1	1	8				
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	79	16	148	38	101	9	70	14								
2	39	4					86	24								
3							73	7								
4							91	14								
5							74	9								
6							76	9								
7							72	7								
8							70	9								
9																
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29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ ft	GPS line?
ER009	9	8/5/14	12:28	38'	Start ✓ End ✓

Species	Red goat fish	Butterfish	Striped Seabass	N. Seahorse	N. Puffer	Hog Lego		
Number of fish	1	2	3	1	10	4		
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	65	4	45	4	235	270	140	48	69	14	38	5				
2			32	1	235	280	*		62	8	84	28				
3					215	190			64	9	87	27				
4									70	10	96	32				
5									65	8						
6									66	10						
7									61	8						
8									65	9						
9									55	8						
10									65	11						
11																
12																
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27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

* Spider crab

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ Ft	GPS line?
ER010	10	8/5/14	12:52	40'	Start ✓ End ✓

Species	Windowpane	Butterfish	Weakfish	Smallmouth Flder	N. Puffer	Clearnose Skate		
Number of fish	1	6	5	1	5	1		
Weight (composite, if needed)								

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	125	40	30	1	26	1	91	10	65	12	438	380				
2			30	1	169	82			65	11						
3			30	1	31	1			61	8						
4			30	1	28	2			58	6						
5			32	1	33	3			58	7						
6			28	1												
7																
8																
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27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line? ✓					
ERT-1			9/16/2014		0920						Start ___		End ___			
Species	Smallmouth Flounder		Blk Sea Bass		LF. Squid											
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	40	2	41	1	20	<1										
2	36	1	42	2	20	<1										
3	35	1	46	2	17	<1										
4			37	1												
5																
6																
7																
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29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

- Jellyfish
Hermit crabs

W90FYQ-10-D-0009

Offshore Fish Trawls - Lengths

EAST ROCKAWAY

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line? ✓					
ERT2			9/16		0950				43'		Start ___		End ___			
Species	Atl. Sangrey		Small Flounder		Black Seabass		L.F. Squid									
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	620	860	105	16	45	2	22	<1								
2			40	2	37	1	24	<1								
3			36	1	30	1	25	<1								
4			40	2			25	<1								
5			32	1			10	<1								
6			38	1			20	<1								
7			41	2			13	<1								
8			35	<1			20	<1								
9			33	<1			20	<1								
10																
11																
12																
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30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects
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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line? ✓
ERT3		9/16	1015	4/1	Start ___ End ___

Species	Scup	N. Searobin	Blk Seabass	S.M. Flounder	L.F. Squid			
Number of fish								
Weight (composite, if needed)	8020							

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	80	8	42	1	38	2	35	<1	20	<1						
2	55	6	35	1	38	2	35	<1	22							
3	50	5	38	1	35	1	42	1	21							
4	70	9					35	<1	21							
5	62	7					35	1	20							
6	45	3					34	1	23							
7	63	5					31	1	20							
8	55	3					37	1	20							
9	60	5					32	1	20							
10	48	4					34	1	21							
11	50	3					32	1	22							
12	55	3					30	↓	24							
13	52	3					40	1	25							
14	50	2					33	<1	20							
15	40	1					34	1	21							
16	45	2					34	1	22							
17	50	3					31	1	22							
18	50	3					40	1	23							
19	45	2					35	↓	24							
20	48	3							20							
21	46	2							19							
22	38	1							20							
23	48	2							21							
24	46	2							22							
25	45	2							22							
26	45	2							22							
27	44	2							23							
28	45	2							24							
29	44	2							25							
30	42	1							19							
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish	–	570							10	11						

*Standard length (SL) in millimeters; weight (Wt) in grams

120
200
170
180

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line? ✓
ERT4		9/16/14	1050	42'	Start ___ End ___

Species	Scup		Blk Seabass		Smallmouth Flounder		Round Scad									
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	50	2	40	1	35	<1	60	3								
2	52	3			80	8	60	3								
3	52	3			30	<1										
4	48	2														
5	52	3														
6	50	3														
7	46	3														
8	45	2														
9	45	2														
10	45	2														
11	48	3														
12	45	2														
13	45	2														
14	42	2														
15	43	2														
16	46	2														
17	45	2														
18	42	2														
19	42	2														
20	40	1														
21	40	1														
22	40	1														
23	50	3														
24	40	2														
25	35	<1														
26	42	1														
27	40	2														
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line? ✓
ERT5		9/16/14	12 20	48	Start ___ End ___
Species	S.n. Flounder				
Number of fish					
Weight (composite, if needed)					

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	45	1														
2	30	<1														
3	30	<1														
4	40	<1														
5	42	1														
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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* ERT6 = No Fish, Jellys only

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (~~m~~) Ft	GPS line?
ER	T7	9/17/14	9:20 am	40.5	Start ___ End ___

Species	BLACK SEA BASS		SMALL MOUTH FLOUNDER		NORTHERN STARGAZER		LONGFIN SQUID									
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	38	2 g	42	2	45	3	40	3.6								
2			37	1			35	10								
3			35	1			56	6								
4							45	7								
5							29	2								
6							30	<1								
7							20	<1								
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth ~~(m)~~ ft		GPS line?					
ER	T8		9/17/14		9:45				41.6		Start ___		End ___			
Species	PORGY SCUP		SUMMER FLOUNDER		BLACK SEA BASS		SMALL MOUTH FLOUNDER		LONG FIN SQUID							
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	45	2	77	110	48	2	36	1	80	22						
2	52	3			46	2	36	1	74	20						
3	58	5			38	1	28	0.5	52	8						
4	54	5			50	2	40	1	45	7						
5	56	5			43	2	38	1	45	7						
6	50	4			28	1	34	1	48	7						
7	56	5			32	1	40	1	38	5						
8	55	5			35	1	38	1	38	5						
9	48	3			40	2	33	1	42	5						
10	54	4			31	1			38	4						
11	54	4			35	1			40	3						
12	60	6			38	1			27	2						
13	63	6			38	1			25	2						
14	58	6			40	1			22	1						
15	45	4			40	1			20	1						
16	48	4			40	1										
17	44	3														
18	49	4														
19	53	5														
20	63	6														
21	44	3														
22	52	3														
23	45	2														
24	46	2														
25	46	2														
26	50	4														
27	50	4														
28	46	3														
29	50	3														
30	52	3														
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish	–	2.34 kg														

*Standard length (SL) in millimeters; weight (Wt) in grams

HERMIT CRAB
NOOJ SNAIL
PERIWINKLE
ROCK CRAB

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ FT	GPS line?
ER	T9	9/17/14	1023	40.3	Start ___ End ___

Species	CLEARNOSE SKATE		SUMMER FLOUNDER		SMALL MOUTH FLOUNDER		POGGY		BLACK SEA BASS		LONG FIN SQUID		NORTHERN PUFFER		NORTHERN SEA ROBIN	
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	470	500	290	350	111	19	45	2	38	1	200	90	120	70	55	3
2			185	115	42	2	62	8	45	3	95	30	48	5		
3			190	100	40	1	60	9	35	1	100	29				
4					35	1	65	9	36	1	85	24				
5					52	2	70	10	48	2	50	6				
6					38	1	58	5	50	2	55	6				
7					40	1	60	6	38	1	52	9				
8					35	1	53	5	48	2	54	9				
9					28	.5	45	3	43	1	48	8				
10							48	5	46	1	42	5				
11							52	4	36	1	32	2				
12							54	5	44	1	120	48				
13							42	2			38	3				
14							48	2			34	1				
15							52	3			60	12				
16							42	2			55	11				
17							43	2			55	10				
18							45	2			45	5				
19							43	1			48	5				
20							55	4			25	1				
21							45	3			28	1				
22							40	2			30	1				
23							50	2								
24							45	1								
25							55	5								
26							52	5								
27							42	2								
28							48	2								
29							45	2								
30							48	2								
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish							-	2								

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line?
ER	T10	9/17/14	1107	43.2	Start ___ End ___

Species	SMALL MOUTH FLOUNDER		PORGY		SUMMER FLOUNDER		BLACK SEA BASS		NORTHERN SEA ROBIN		LONG FIN SQUID					
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	45	2	60	5	220	210	48	2	40	1	95	27				
2	28	1	55	5	160	110	42	2	40	1	85	21				
3	42	1	50	3	340	550	34	1			62	15				
4	48	2	60	5			36	1			65	15				
5	50	2	48	2			40	1			78	23				
6	42	1	52	3			42	1			62	12				
7	38	1	40	2			40	1			62	12				
8	32	1	52	4			40	1			60	11				
9			50	4			40	1			62	11				
10			55	5			42	1			62	11				
11			55	5			42	1			81	10				
12			45	3			38	1			65	14				
13			50	2			40	1			65	12				
14			52	3			45	2			68	11				
15			50	3			38	1			45	6				
16			38	3			45	2			50	9				
17			56	4			35	1			60	5				
18			55	5							58	16				
19			55	5							45	5				
20			52	4							50	6				
21			54	4							45	6				
22			55	5							40	3				
23			50	4							40	3				
24			57	5							40	3				
25			43	3							42	4				
26			55	5												
27			52	4												
28			50	4												
29			55	5												
30			48	3												
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish			–	750												

*Standard length (SL) in millimeters; weight (Wt) in grams

SPIDER CRAB

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Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line?					
ER	T11		9/17/14		1143				47.1		Start ___		End ___			
Species	SUMMER FL.		NORTHERN PUFFER		NORTHERN SEA ROBIN		STRIPED SEA ROBIN		PORGY		BLACK SEA BASS		SM. MOUTH FLOUNDER		LONG FIN SQUID	
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	320	750	50	6	140	60	75	10	60	5	45	2	38	1	50	6
2					155	75	75	10	55	4	38	1	40	1	45	7
3									55	4	40	1	40	1	65	10
4									55	4	45	2				
5									50	3	38	1				
6									48	3	48	3				
7									55	4	48	3				
8									60	5	55	3				
9									38	2						
10									42	2						
11									55	4						
12									50	4						
13									52	4						
14									50	3						
15									55	3						
16									42	2						
17									42	2						
18									52	3						
19									45	2						
20									55	5						
21									48	2						
22									52	4						
23									52	5						
24									50	3						
25									45	2						
26									42	2						
27									55	5						
28									55	5						
29									50	5						
30									45	2						
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish									-	90						

*Standard length (SL) in millimeters; weight (Wt) in grams

– HERMIT CRAB

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line?
ER	T12	9/17/14	1224	52	Start ___ End ___

Species	SUMMER FLOUNDER		BLACK SEA BASS		PORGY		LONG FIN SQUID		SM. MOUTH FLOUNDER		ATLANTIC STING RAY					
Number of fish																
Weight (composite, if needed)																
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	220	150	40	2	50	3	110	42	42	1	490	4.8Kg				
2			35	1	45	2	100	31	35	0.5						
3			40	2	45	2	110	35	30	0.5						
4			40	2			120	41	35	0.5						
5			42	2			115	45								
6			35	1			100	31								
7			40	2			70	20								
8			40	2			70	19								
9			29	1			50	6								
10			40	1			50	5								
11			40	1												
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Random trawl locations

Start

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ FT	GPS line? 40 32.306 73 48.787
GR 1	1	10/20/14	0915	44	Start ___ End ___

Species	Scup	L. Skate	N. Puffer	Silver hake	Spotted hake	Butterfly	Longfin squid	Smallmouth
Number of fish								
Weight (composite, if needed)	390g	500g	12g	58g	130g	10g	600g (30 ind)	2g

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	85	20	420		76	12	175		212		55		120		38	
2	95	20	470				50						170		43	
3	96		395										65			
4	81		410										55			
5	100		440										75			
6	92		430										89			
7	100		425										65			
8	96		435										70			
9	101		448										150			
10	90		390										64			
11	111		420										84			
12	112												100			
13	90												71			
14	90												75			
15	81												80			
16	89												81			
17	77												105			
18	79												70			
19	77												90			
20													75			
21													81			
22													86			
23													76			
24													92			
25													60			
26													87			
27													83			
28													82			
29													62			
30													74			
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

870g
add'l

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Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line? 40 32.487 73 47.976 / 40 32.530 73 47.769					
GR 2	2		10/20/2014		0940				45.2 ft		Start ___		End ___			
Species	Sm. Dogfish		Flume		Little Stud		N. Puffer		Scup		spotted hake		Smallmouth Flounder		Bl Sea bass	
Number of fish																
Weight (composite, if needed)	750 g		900 g		1720 g		270 g		550 g		250 g		32 g		38 g	
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	644	750	235		410		112	90	77		207	110	81	19	[illegible]	[illegible]
2			190		405		60	20	75		206	140	67	14	67	
3					435		83		87				63	4	91	37
4					420		81		94				37	1	35	1
5					435		79		84				40	1		
6					455		77		81				66			
7					456				85							
8					434				96							
9					384				94							
10					410				87							
11					468				76							
12					420				83							
13					415				82							
14					375				86							
15					434				93							
16					458				93							
17					374				82							
18					412				91							
19					455				85							
20					436				84							
21					436				82							
22					450				79							
23					475				77							
24					404				90							
25					418											
26					448											
27					414											
28					445											
29					370											
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

ER 2

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Species																
Number of fish	Long Fin Squid		Silver hake		N. searobin											
Weight (composite, if needed)	950 g (30) + 800 g		59		9 g											
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	150		65		95											
2	85		52		53											
3	124		63		35											
4	86															
5	72															
6	80															
7	74															
8	81															
9	89															
10	92															
11	90															
12	57															
13	84															
14	83															
15	78															
16	76															
17	82															
18	54															
19	117															
20	74															
21	76															
22	100															
23	79															
24	60															
25	143															
26	69															
27	93															
28	73															
29	71															
30	76															
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line? 4032.6964 7347.0716 / 4033.0994 7346.855
GR3	3	10/20/2014	1010	47 ft	Start ___ End ___

Species	Sand Dog Fish	Little Skate	Small Mouth Flounder	Fluke	Scup	Windowpane	Silver Hake	Bl. Seabass
Number of fish								
Weight (composite, if needed)	1240 g	6100 g	139	140	13	188	260 g	8 g

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	500	690	433		58		170	140	87	13	191	150	172		57	
2	450	550	376		55						121	38	203		55	
3			424		56								50		46	
4			465		55								209			
5			440		45								48			
6			398		49								56			
7			405		39								46			
8			446													
9			392													
10			448													
11			434													
12			431													
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

ER3

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Species	Spotted hake		N. seaborn		Longfin squid											
Number of fish																
Weight (composite, if needed)	100		2		950 g + 950 g											
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	191	100	42	2	105											
2					115											
3					90											
4					142											
5					105											
6					142											
7					99											
8					104											
9					73											
10					71											
11					77											
12					76											
13					79											
14					103											
15					60											
16					101											
17					139											
18					71											
19					76											
20					71											
21					76											
22					84											
23					80											
24					72											
25					71											
26					64											
27					79											
28					69											
29					75											
30					64											
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (m)		GPS line? 40 33.127 73 47.506					
ER 4	4		10/21/2014		1035				42.5 ft		Start ___		End ___			
Species	Clearnose		Little		N. puffer		Smallmouth		Smooth		Silver		Longfin		N. searching	
Number of fish	Shade		Shade				Flounder		Dogfish		Hake		Squid			
Weight (composite, if needed)	1100 g		750 g		260 g		50 g		400 g		9 g		850 g		3 g	
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	564		415		60		34		420	400	56	2	130		56	
2			434		151		37				62	2	86		51	
3			414		123		39				35	1	62			
4			432		61		36				50	2	103			
5			414				43				56	2	110			
6			454				48						90			
7			390				48						94			
8			428				50						109			
9			458				38						97			
10			464				56						93			
11			456				45						97			
12			397				37						70			
13			408				39						78			
14			443										82			
15			425										97			
16													70			
17													130			
18													89			
19													75			
20													70			
21													42			
22													62			
23													80			
24													105			
25													52			
26													53			
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

40 33.064
73 47.887

*Standard length (SL) in millimeters; weight (Wt) in grams

ER 4

Species	~~Bi-shade~~															
Number of fish	winter shade															
Weight (composite, if needed)	1.100 g															
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	591															
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line? 40 32.940 / 73 48.396
GR 5	5	10/21/2014	1102	40 ft	Start ___ End ___

40 32.
73 47.

Species	Fluke		Fourspot Flounder		Lizard fish		Black sea bass		Little skate		Scup		N. searobin		Silver hake	
Number of fish																
Weight (composite, if needed)	100 g		30 g		60 g		2 g		1030 g		250 g		7 g		110 g	
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	187	100	126	30	205	60	45	2	448		80		59	3	203	110
2									471		82		40	1		
3									466		93		58	3		
4									439		83					
5									396		65					
6									472		90					
7									396		85					
8									415		90					
9									393		97					
10									421		81					
11									444		82					
12									461		69					
13									414							
14									438							
15									410							
16									396							
17									476							
18									457							
19									407							
20									421							
21									470							
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

ER 5

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Species	Smallmouth		Bay		Longfin		Winter									
Number of fish	Flounder		anchovy		Squid		Skate									
Weight (composite, if needed)	55g		2g		1100(SD) + 875		1900g									
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	65		50		131		498									
2	50		51		82		533									
3	38				67											
4	54				80											
5	43				100											
6	47				160											
7	53				76											
8	51				60											
9	26				80											
10	41				70											
11	36				84											
12	51				61											
13	39				120											
14	53				89											
15	50				95											
16	25				75											
17					76											
18					132											
19					154											
20					83											
21					120											
22					142											
23					71											
24					79											
25					72											
26					71											
27					73											
28					81											
29					70											
30					100											
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line? 4/0 33,017 73 48,924																
FR 6	6	10/28/2014	1030	38.7 (A)	Start ___ End ___																
Species	Smooth dogfish	Little skate	Fluke	Kingfish	~~Scup~~ Longfin squid						~~Scup~~ Bluefish ~~Scup~~		Small ~~Bluefish~~ flounder		Silverhake						
Number of fish																					
Weight (composite, if needed)	1700 g		1050 g		540 g		560 g		850 g (20) + 1200 g		150 g		2 g		1170 g						
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt					
1	600	1000	398		260	260	219	560	81		90		38	1	20						
2	505	700	480		330	300			90		71		35	1	25						
3			451						91		93										
4			426						82		103										
5			443						77		91										
6			426						98		95										
7			435						100												
8			440						98												
9			408						86												
10			409						76												
11			450						81												
12			390						130												
13			432						74												
14			430						86												
15			405						61												
16			450						66												
17			410						104												
18			446						66												
19									110												
20									81												
21									73												
22									62												
23									71												
24									46												
25									66												
26									81												
27									76												
28									90												
29									97												
30									~~[illegible]~~	87											
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt					
>30 fish																					

4/0 33,105
73 48,583

*Standard length (SL) in millimeters; weight (Wt) in grams

ER6

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Species	~~[illegible]~~ Slate		Small		N.											
Number of fish	Winter		Mouth Flounder		Searchin											
Weight (composite, if needed)	1750g		10g		14g											
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	493		55		62											
2	587		60		51											
3			44		53											
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

40 33.176 / 73 48.085

40 33.276 / 73 47.687

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line?	
ER 7	7	10/21/2014	1153	40.1 ft	Start ___	End ___

Species	Little Skate	Scup	Longfin Squid	Fluke	N. puffer	Small mouth flounder	Silver hake	N. Sea robin
Number of fish								
Weight (composite, if needed)	7100 g	1100 g	1100 g (30) + 1850 g	530 g	20 g	22 g	2 g	2 g

Individual	Little Skate SL	Little Skate Wt	Scup SL	Scup Wt	Longfin Squid SL	Longfin Squid Wt	Fluke SL	Fluke Wt	N. puffer SL	N. puffer Wt	Small mouth flounder SL	Small mouth flounder Wt	Silver hake SL	Silver hake Wt	N. Sea robin SL	N. Sea robin Wt
1	370		95		96		330	530	71		121		67		56	
2	412		87		59				65		45					
3	415		86		64											
4	428				128											
5	468				101											
6	435				103											
7	405				103											
8	430				133											
9	418				87											
10	452				75											
11	431				79											
12	442				77											
13	450				109											
14	492				120											
15					99											
16					87											
17					78											
18					95											
19					112											
20					77											
21					101											
22					96											
23					109											
24					155											
25					80											
26					66											
27					80											
28					102											
29					83											
30					86											
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

Butterfish 46 / 19

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth (m)	GPS line? 40 32.950 / 73 47.723	40 32.861 / 73 48.143
ER 8	8	10/20/2014	1216	42.6 ft	Start ___ End ___	

Species	Little Skate	Sea Robin (Striped)	N. pollack	Longfin Squid	Scup	Small Mouth	Sea bass	Silver Hake
Number of fish								
Weight (composite, if needed)	1350 g	56 g	230 g	450 g	200 g	10 g	10 g	6 g

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	445		130		140		66		55		45		81		44	
2	404				62		67		84		42				61	
3	488				125		62		91		45				51	
4	463						70		99		33					
5	454						50		101		56					
6	424						90		87		30					
7	435						69		76		31					
8	425						66		[illegible]							
9	477						60		[illegible]							
10	452						64		[illegible]							
11	439						63		[illegible]							
12	434						61		[illegible]							
13	432						61		[illegible]							
14	440						79		[illegible]							
15	475						82									
16	425						75									
17	443						66									
18	445						70									
19	442						63									
20	451															
21	460															
22	459															
23	440															
24	550															
25	462															
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

CR8

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Species																
Number of fish	N. Sea Robin		Clearnose Skate													
Weight (composite, if needed)	10g		1500g													
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	49		650													
2	43															
3	49															
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

CR9

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Species	Striped	N.	Clamnose	Longfin				
Number of fish	Sea robin	Sea robin	Skate	Squid				
Weight (composite, if needed)	16 g	17 g	1500 g	475 g				

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	111		76		646		85									
2			60				112									
3			65				53									
4							111									
5							58									
6							81									
7							71									
8							80									
9							65									
10							79									
11							60									
12							70									
13							63									
14							71									
15							65									
16							65									
17							30									
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #	Date	Time (gear set)	Depth ~~(m)~~ (ft)	GPS line? 40 32.665 73 48.411 / 40 32.605 73 49.238
A9	9	10/2/2014	1240	40.8	Start ___ End ___

Species	Little	Fluke	Scup	Smallmouth	Northern	Black	Silver	Butterfish
Number of fish	Shade			Fluke	Puffer	Sea bass	hake	
Weight (composite, if needed)	1400 g	500 g	480 g	13 g	15 g	4 g	2 g	8 g

Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	446		315	500	115		116		73		53	4	50		65	
2	435				104		55									
3	492				105		55									
4	471				106		54									
5	435				86		39									
6	461				109											
7	456				97											
8	458				93											
9	350				111											
10	485				105											
11	437				104											
12	442				100											
13	476				110											
14	445				101											
15	372				100											
16	342				98											
17	410				95											
18	444				110											
19	466				96											
20	457				95											
21	435				72											
22	462				112											
23	443				92											
24	416				105											
25	455															
26	405															
27	471															
28																
29																
30																
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

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Offshore Fish Trawls - Lengths

Site ID	Haul #		Date		Time (gear set)				Depth (~~m~~) ft		GPS line? 40 32.593 73 48.285 / 40 32.645 73 48.084					
FR10	10		10/21/2014		1302				43.3		Start ___		End ___			
Species	~~Smooth~~		~~Little~~		spotted		~~[illegible]~~ Scup		Smallmouth		Longfin		N.		Silver	
Number of fish	~~Dogfish~~ Little		~~Smooth~~ Smooth		hake				flounder		squid		Searobin		hake	
Weight (composite, if needed)	Skate 1190g		dogfish 500g		90g		675g (30) + 500g		13g		950g (30) + 1000g		20g		6g	
Individual	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt	SL	Wt
1	475	~~500~~	460		192	90	68		64		90		57		60	
2	430						82		47		145		82		50	
3	451						95		39		71		46			
4	381						105		35		72					
5	426						91		57		93					
6	427						86				91					
7	425						91				92					
8	441						85				61					
9	474						91				81					
10	473						79				86					
11	430						81				78					
12	441						76				89					
13	458						91				86					
14	400						83				74					
15	426						94				107					
16	446						95				89					
17	379						81				~~[illegible]~~ 86					
18	432						77				105					
19	427						85				70					
20	455						72				89					
21	460						87				68					
22	411						75				71					
23	412						84				87					
24							75				103					
25							64				90					
26							76				84					
27							81				120					
28							83				74					
29							78				77					
30							92				66					
	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt	#	Wt
>30 fish																

*Standard length (SL) in millimeters; weight (Wt) in grams

Appendix B – Water Quality Data

Water Quality

Date: 5/14/2014 Vessel: TNY GIANT Borrow Area: E. ROCKAWAY
Crew: GAUDET, DRESSER, LAMONTAGNE, ANDERSON
Gear Type: TRAWL/YSI 60' Calibration: LAB GPS Taken: ✓
Weather Conditions: OVERCAST, 50°F LT. WIND
Additional Notes:

STATION ID	TIME	DEPTH (m) ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER-T1	1055	42'	bottom	11.47	8.32	–	8.31 ~~34.86~~	126.4 ~~46.93~~	34.86	46.93
			middle	11.45	8.52	–	12.53	136.7	32.54	44.64
			surface	11.47	8.57	–	12.89	140.7	31.09	43.17
ER-T2	1140	38'	bottom	11.27	8.04	–	11.38	125.9	34.87	46.72
			middle	11.26	8.10	–	11.98	131.4	34.01	46.07
			surface	11.68	8.24	–	11.93	131.5	32.10	44.31
ER-T3	1210	37'	bottom	11.97	8.00	–	11.29	126.1	35.09	46.69
			middle	11.26	8.05	–	12.18	134.1	34.18	46.07
			surface	11.86	8.15	–	12.28	135.2	32.26	43.05
ERT4	1255	33'	bottom	11.53	8.07	–	11.18	125.5	34.49	46.02
			middle	11.24	8.11	–	12.25	134.0	33.67	45.57
			surface	12.01	8.13	–	12.35	135.7	31.57	42.01
ERT5	1345	36'	bottom	12.22	8.10	–	11.04	124	34.92	46.21
			middle	12.48	8.11	–	11.25	127.9	34.84	45.87
			surface	12.03	8.12	–	12.22	135.2	32.51	43.21
ERT6	1420	36'	bottom	12.37	8.09	–	11.17	124.0	33.25	46.41
			middle	12.33	8.16	–	11.88	133.0	33.98	44.97
			surface	12.00	8.15	–	12.25	135.4	32.55	43.27
ERT7	1450	34'	bottom	12.15	8.06	–	10.58	119.1	35.23	43.81
			middle	12.94	8.14	–	11.06	125.4	35.22	45.72
			surface	12.02	8.17	–	12.35	136.6	32.51	43.22

STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/°cm)
ERT8	1525	38'	bottom	12.46	8.11	–	11.04	123.5	35.22	46.31
			middle	12.54	8.14	–	11.55	129.4	34.82	45.65
			surface	12.00	8.20	–	12.34	136.3	32.48	43.19
ERT9	1555	41'	bottom	12.01	8.02	–	10.75	119.5	35.33	46.92
			middle	11.98	8.22	–	12.39	137.3	32.95	42.92
			surface	11.98	8.22	–	11.96	132.5	32.43	43.17
ERT10	1625	44'	bottom	11.38	8.05	–	11.02	122.1	34.77	46.95
			middle	10.99	8.10	–	11.90	130.4	33.74	46.03
			surface	11.95	8.23	–	11.83	130.9	32.35	43.08
ERT11	1650	39'	bottom	11.42	8.14	–	11.57	127.5	34.12	46.15
			middle	10.85	8.22	–	12.54	136.4	33.13	45.44
			surface	12.06	8.28	–	11.94	132.7	32.68	43.19
ERT12	1730	45'	bottom	11.35	8.06	–	11.04	122.0	34.85	47.11
			middle	11.12	8.19	–	12.08	132.7	33.54	45.52
			surface	11.92	8.26	–	12.15	133.8	32.12	42.81
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							

Water Quality

Date: 18 June 2014 Vessel: Hudson Borrow Area: East Rockaway
Crew: B. Dresser, K. Lamontagne, T. Gaudet, M. Johnson, D. Anderson
Gear Type: YSI 6920 Calibration: N/A - in lab GPS Taken: ✓ (Yuma)
Weather Conditions: Sunny / hazy ~90°F 15-20 kt winds, ~3' seas
Additional Notes: Site IDs correspond to GPS; not original sampling map
DO Readings are off / problematic - NO RECORDING

STATION ID	TIME	DEPTH ~~(m)~~ (ft)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
RS004	9:36	47'	bottom	15.22	8.05	5.4				47.35
			middle	16.90	8.09	6.0				45.64
			surface	8.10	8.16	6.4	~~3.81~~	~~48.1?~~		45.07
ER001	10:00	43'	bottom	15.53	8.08	5.4				47.26
			middle	16.29	8.08	5.5				47.13
			surface	18.27	8.18	6.0				45.68
ER002	10:09	44'	bottom	15.60	8.08	5.4				47.31
			middle	15.75	8.09	5.4				47.32
			surface	18.23	8.20	6.0				45.70
ER003	10:16	45'	bottom	15.60	8.08	5.3				47.37
			middle	15.82	8.09	5.4				47.28
			surface	18.44	8.21	5.8				45.71
ER004	10:22	46'	bottom	15.67	8.06	5.3				47.39
			middle	15.86	8.09	5.4				47.28
			surface	18.50	8.21	6.0				45.70
ER005	10:28	46'	bottom	15.31	8.04	5.3				47.36
			middle	15.95	8.09	5.4				47.30
			surface	18.59	8.20	5.9				45.73
ER006	10:35	48'	bottom	15.88	8.09	5.4				47.33
			middle	16.05	8.09	6.4				47.28
			surface	18.61	8.21	6.0				45.71

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STATION ID	TIME	DEPTH ~~(m)~~	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER007	10:42	47'	bottom	15.22	8.01	5.4				47.26
			middle	16.05	8.09	5.4				47.30
			surface	18.59	8.21	6.0				45.80
ER008	10:49	48'	bottom	14.61	8.04	5.8				47.46
			middle	16.12	8.10	5.4				47.28
			surface	18.65	8.22	6.0				45.81
ER009	10:55	48'	bottom	14.26	8.02	5.4				47.34
			middle	16.27	8.11	5.4				47.27
			surface	18.74	8.22	6.0				45.78
ER010	11:01	50'	bottom	14.06	7.97	5.5				47.45
			middle	16.59	8.10	5.6				47.09
			surface	18.94	8.21	5.9				45.76
ER011	11:10	52'	bottom	14.25	8.03	5.3				47.42
			middle	16.42	8.11	5.4				47.24
			surface	19.11	8.22	6.2				45.88
ER012	11:19	51'	bottom	14.55	8.06	5.3				47.45
			middle	16.57	8.10	5.4				47.23
			surface	19.23	8.21	6.0				45.89
ER013	11:28	52'	bottom	14.66	8.04	5.2				47.39
			middle	16.60	8.11	5.4				47.22
			surface	19.20	8.22	6.1				45.91
~~ER014~~	~~11:45~~	~~47'~~	bottom	~~19.42~~	~~8.01~~	~~5.4~~				~~47.45~~
			middle	~~16.52~~	~~8.12~~	~~5.6~~				~~47.00~~
			surface	~~19.02~~	~~8.20~~	~~6.0~~				~~45.86~~
ER014	11:59	40'	bottom	15.19	8.08	5.3				47.46
			middle	16.16	8.10	5.4				47.25
			surface	18.33	8.15	5.8				46.45

No grab collected (erased)

Water Quality

Date: 18 June 2014 Vessel: Hudson Borrow Area: East Rockaway
Crew: B. Dresser, K. Lamontagne, T. Gaudet, N. Johnson, D. Anderson
Gear Type: YSI 6920 Calibration: N/A in lab GPS Taken: ✓ (Yuma)
Weather Conditions: Sunny ~90°F, 20 kt winds, ~1-3' seas
Additional Notes:

STATION ID	TIME	DEPTH ~~(m)~~ (ft)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/cm)
ERØ15	12:08	41'	bottom	15.02	8.06	5.8				47.38
			middle	15.93	8.10	5.5				47.26
			surface	18.21	8.14	5.8				46.37
ERØ16	12:14	42'	bottom	14.98	8.05	5.5				47.33
			middle	16.79	8.10	5.5				47.00
			surface	18.43	8.17	5.8				46.35
ERØ17	12:21	42'	bottom	14.87	8.02	5.4				47.35
			middle	17.62	8.14	5.7				46.58
			surface	18.84	8.16	5.9				46.30
ERØ18	12:29	42'	bottom	14.81	8.02	5.4				47.39
			middle	16.45	8.09	5.5				47.26
			surface	18.91	8.18	5.9				46.23
ERØ19	12:35	43'	bottom	14.71	7.98	5.5				47.48
			middle	16.48	8.09	5.4				47.26
			surface	19.03	8.18	6.1				46.26
ERØ20	12:43	44'	bottom	14.61	7.98	5.4				47.46
			middle	16.54	8.09	5.4				47.25
			surface	19.08	8.18	5.9				46.28
ERØ21	12:50	44'	bottom	14.53	7.98	5.4				47.46
			middle	15.97	8.06	5.3				47.15
			surface	19.16	8.18	6.0				46.29

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STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ERØ22	12:57	44'	bottom	14.50	7.97	5.4				47.44
			middle	16.05	8.08	5.4				47.17
			surface	19.17	8.18	5.9				46.26
ERØ23	13:02	45'	bottom	14.48	7.98	5.4				47.44
			middle	16.10	8.07	5.4				47.19
			surface	19.17	8.17	5.9				46.43
ERØ24	13:08	45'	bottom	14.43	7.93	5.5				47.50
			middle	16.00	8.06	5.4				47.23
			surface	19.07	8.16	5.9				46.38
ERØ25	13:16	47'	bottom	14.28	7.96	5.4				47.60
			middle	16.25	8.07	5.3				47.12
			surface	19.13	8.18	5.9				46.31
ERØ26	13:23	48'	bottom	14.10	7.94	5.4				47.55
			middle	16.53	8.08	5.4				47.33
			surface	19.11	8.16	5.8				46.41
ERØ27	13:28	50'	bottom	13.91	7.96	5.3				47.58
			middle	16.50	8.09	5.4				47.30
			surface	19.17	8.19	5.8				46.24
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							

Water Quality

Date: 19 June 2014 Vessel: Hudson Borrow Area: East Rockaway
Crew: T. Goudet, N. Johnson, D. Anderson, K. Lamontagne
Gear Type: YSI 6920 Calibration: N/A - In lab GPS Taken: ✓ (Yuma)
Weather Conditions: Overcast, mid-70s, ~10 kt winds, ~2' seas
Additional Notes: DO sensors not stabilizing/not reliable, so not recorded.

STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO* (mg/L)	DO* %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ERØ28	8:44	39'	bottom	14.63	7.93	5.4	6.42	75.1		47.44
			middle	17.99	8.08	5.8	6.15	71.2		45.98
			surface	18.01	8.10	5.9	6.09	74.2		45.95
ERØ29	8:53	40'	bottom	15.34	8.00	5.4				47.43
			middle	17.99	8.09	5.7				46.16
			surface	17.98	8.10	5.8				46.13
ERØ30	8:59	40'	bottom	15.26	8.02	5.4				47.48
			middle	18.00	8.09	5.8				46.55
			surface	18.02	8.11	5.8				46.52
ERØ31	9:06	40'	bottom	15.76	8.03	5.5				47.32
			middle	17.68	8.10	5.7				46.71
			surface	17.72	8.10	5.8				46.72
ERØ32	9:13	40'	bottom	15.38	8.02	5.4				47.34
			middle	17.55	8.10	5.7				46.80
			surface	17.54	8.09	5.8				46.76
ERØ33	9:20	42'	bottom	15.11	8.00	5.7				47.49
			middle	17.43	8.09	5.7				46.84
			surface	17.52	8.10	5.8				46.79
ERØ34	9:26	31'	bottom	15.46	8.04	5.4				47.40
			middle	17.60	8.09	5.7				46.80
			surface	17.65	8.08	5.8				46.79

* DO recorded but values were still jumping a lot

* GPS not recorded

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STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER035	9:33	44'	bottom	14.67	8.02	5.5				47.57
			middle	17.54	8.08	5.8				46.88
			surface	17.62	8.09	5.8				46.81
ER036	9:39	43'	bottom	14.47	7.99	5.3				47.60
			middle	17.39	8.07	5.8				46.86
			surface	17.55	8.08	5.9				46.85
RS002	9:55	38'	bottom	14.90	7.99	5.7				47.45
			middle	17.33	8.01	6.0				46.98
			surface	18.34	8.05	6.4				46.53
RS046	10:09	44'	bottom	14.95	8.00	6.7				47.52
			middle	16.34	8.02	5.8				47.24
			surface	17.52	8.06	6.0				46.85
ER037	10:28	42'	bottom	14.75	8.01	5.4				47.56
			middle	18.27	8.13	5.7				46.35
			surface	18.33	8.14	5.8				46.32
ER038	10:35	43'	bottom	14.72	8.03	5.5				47.64
			middle	17.82	8.12	5.7				46.69
			surface	18.28	8.14	5.8				46.50
ER039	10:43	44'	bottom	14.60	8.01	5.3				47.55
			middle	17.78	8.11	5.6				46.68
			surface	18.07	8.13	5.8				46.69
ER040	10:49	44'	bottom	14.35	8.00	5.4				47.65
			middle	17.87	8.11	5.7				46.79
			surface	18.06	8.12	5.7				46.77
ER041	10:56	44'	bottom	14.37	8.00	5.4				47.63
			middle	17.82	8.09	5.8				46.82
			surface	18.07	8.11	5.8				46.78

Water Quality

Date: 6/19/14 Vessel: Hudson Borrow Area: East Rockaway
Crew: T. Gaudet, N. Johnson, K. Lamartagne, D. Anderson
Gear Type: YSI 6920 Calibration: N/A - In lab GPS Taken: ✓ (Yuma)
Weather Conditions: Overcast, mid-70s, ~5 kt winds, <1' seas
Additional Notes: Site IDs match GPS but not original sampling map.

STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER042	11:03	46'	bottom	15.06	8.07	5.7				47.67
			middle	17.81	8.09	5.7				46.80
			surface	17.87	8.09	5.9				46.77
ER043	11:10	47'	bottom	15.23	8.07	5.4				47.56
			middle	17.89	8.09	5.9				46.81
			surface	17.92	8.08	5.9				46.80
ER044	11:16	48'	bottom	14.96	8.06	5.2				47.67
			middle	17.92	8.08	5.7				46.84
			surface	18.25	8.06	6.2				46.66
RS003	11:27	56'	bottom	14.39	8.04	5.2				47.93
			middle	17.91	8.11	5.8				46.85
			surface	18.50	8.14	5.8				46.74
RS005	11:39	52'	bottom	12.18	7.92	5.5				48.06
			middle	17.68	8.12	5.7				46.49
			surface	18.91	8.16	5.9				46.30
RS001	11:57	37'	bottom	15.37	8.02	5.8				47.43
			middle	17.26	8.08	5.8				46.83
			surface	18.17	8.13	5.8				46.51
			bottom							
			middle							
			surface							

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Water Quality

Date: 6/17/14 Vessel: Tiny Giant Borrow Area: E. Rock
Crew: DA, TG, KL, NJ
Gear Type: YSI Calibration: N/A - lab GPS Taken: ✓ (Yuma)
Weather Conditions: Sunny / Hazy - 85° SW - Variable
Additional Notes: Working YSI - no turbidity + Short (12') cord

STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ERT 01	0944	45ft	bottom							
			~~12 ft~~ middle	18.96	8.08		8.55	110.6	41.93	47.37
			surface	19.26	8.06		8.42	108.8	42.17	47.35
ERT 02	1103	46'	bottom							
			~~12 ft~~ middle	18.89	8.11		8.97	116.7	41.95	47.40
			surface	19.45	8.12		8.97	117.4	42.29	47.35
ERT 03	1125	45'	bottom							
			~~12 ft~~ middle	18.87	8.17		9.51	123.5	41.79	47.36
			surface	18.96	8.16		9.21	119.6	41.79	46.90
ERT 04	1149	48'	bottom							
			~~12 ft~~ middle	19.20	8.17		9.50	122.6	41.77	47.22
			surface	19.32	8.15		9.50	123.6	41.74	46.84
ERT 05			bottom							
			~~12 ft~~ middle	18.89	8.17		9.59	124.0	41.78	47.36
			surface	19.72	8.18		9.70	126.5	41.55	46.03
ERT 06			bottom							
			~~12 ft~~ middle	18.90	~~8.66~~		9.48	122	41.67	47.37
			surface	19.96	8.17		9.48	123.4	41.93	46.86
ERT 07		47'	bottom							
			middle	19.04	8.18		9.62	124.7	41.84	47.29
			surface	20.03	8.17		9.57	125.6	42.00	46.75

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects **Sheet _____ of_____**
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STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/°cm)
ERT 08	1308		bottom							
			middle	19.39	8.15		9.70	126.1	41.94	47.13
			surface	19.78	8.16		9.42	124.0	42.23	46.83
ERT 09		44'	bottom							
			middle	[illegible]	8.19		9.25	118.7	42.06	47.16
			surface	19.86	8.17		9.42	123.7	42.30	46.86
ERT 10		46'	bottom							
			middle	19.79	8.20		10.12	133.2	42.46	47.18
			surface	20.16	8.18		9.65	127.9	42.56	47.04
ERT 11			bottom							
			middle	19.42	8.20		10.3	136.4	42.25	47.21
			surface	19.79	8.21		9.66	127.2	42.45	47.00
ERT 12		43'	bottom							
			middle	20.08	8.21		9.81	129.4	42.30	46.72
			surface	20.03	8.26		9.81	129.1	42.22	46.71
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							

Water Quality

Date: 7/15/14 Vessel: Tiny Giant Borrow Area: East Rockaway [redacted] area

Crew: BD, TG, DA, KL

Gear Type: Trawl 30' Calibration: N/A GPS Taken: Lines (Yuma)

Weather Conditions: Overcast ~80°F, rolling waves (2-4ft)

Additional Notes: tow speed ~ 2 knots

STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
Ref 1			bottom							
			middle							
			surface							
ER1	9:45	43	bottom	13.42	7.74	3.5	5.29	63.6	37.65	48.38
			middle	13.48	7.73	1.9	5.42	61.4	37.66	48.31
			surface	19.76	8.15	0.8	9.73	130.4	41.58	46.19
ER1A	10:21	41	bottom	13.58	7.76	1.4	5.70	76.6	37.81	48.40
			middle	19.92	8.10	2.1	9.30	125.6	41.59	45.83
			surface	20.28	8.12	2.8	9.52	125.9	41.82	45.93
ER2	10:48	39	bottom	13.40	7.74	1.9	4.60	50.1	37.69	48.41
			middle	19.56	8.12	.7	10.01	127.8	41.58	46.49
			surface	19.96	8.14	1.4	9.39	123.1	41.79	46.19
ER3	11:10	40	bottom	13.29	7.76	1.4	3.58	42%	~~37.61~~	48.46
			middle	18.37	8.07	0.8	9.93	126.1	40.86	47.23
			surface	19.97	8.18	0.9	10.98	141.4	42.00	46.47
ER4	11:30	43	bottom	13.09	7.76	1.2	4.34	50.2	37.45	45.09
			middle	13.11	7.78	1.2	3.90	41.0	37.44	48.49
			surface	20.88	8.17	0.4	9.70	127.8	42.40	46.77
ER5	11:52	44	bottom	13.01	7.76	1.5	4.50	52.8	37.42	48.51
			middle	13.05	7.77	1.3	3.72	45.7	37.48	48.57
			surface	20.10	8.18	0.5	9.73	128.4	42.25	46.64

Reference area

No catch — re-do

STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER6	12:10	43'	bottom	13.04	7.75	1.7	4.44	49.9	37.46	48.56
			middle	13.14	7.76	1.2	3.16	37.6	37.57	48.56
			surface	20.14	8.18	0.6	9.78	128.7	42.17	46.51
ER7	12:30	42'	bottom	13.20	7.76	2.0	3.87	43.0	37.61	48.54
			middle	13.40	7.78	1.2	3.12	36.5	37.77	48.54
			surface	21.41	8.24	2.1	10.88	145.1	42.83	46.02
ER8	12:50	43'	bottom	13.33	7.75	3.0	5.08	55.0	37.74	48.53
			middle	13.77	7.80	1.1	4.39	50.9	38.08	48.49
			surface	21.20	8.17	1.7	10.99	49.9	42.82	46.05
ER9	13:13	42'	bottom	13.32	7.75	2.2	3.66	42.6	37.74	48.61
			middle	14.35	7.89	0.7	3.90	46.2	38.53	48.54
			surface	20.61	8.22	1.6	9.96	131.3	42.77	46.48
ER10	13:37	47'	bottom	13.15	7.75	1.9	4.12	50.7	37.69	48.67
			middle	14.32	7.89	0.7	5.02	63.6	38.50	48.65
			surface	20.77	8.18	0.6	9.55	127.4	42.85	46.61
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							

Water Quality

Date: 7/16/14 Vessel: Tiny Giant Borrow Area: East Rockaway
Crew: TG, KL, BKD, DA
Gear Type: 30' Bottom trawl Calibration: N/A GPS Taken: ✓
Weather Conditions: Overcast, Slight Breeze, ~10 kt winds
Additional Notes: Tow speed ~2 kts

STATION ID	TIME	DEPTH (~~m~~) ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
Reference 11	9:20	47'	bottom	13.63	7.86	1.6	7.30	86.5	38.49	49.15
			middle	18.66	8.11	0.2	9.10	116.6	42.16	47.96
			surface	20.29	8.17	.8	9.49	126.1	46.59	42.38
ER 12	9:40	47'	bottom	13.61	7.84	2.7	7.15	85.4	38.44	49.16
			middle	18.38	8.11	0.3	9.22	117.2	41.99	48.08
			surface	19.72	8.08	1.8	8.91	116.6	42.08	46.74
ER13	10:00	42'	bottom	13.90	7.86	1.7	7.61	91.9	38.71	49.06
			middle	18.19	8.11	0.4	9.29	118.5	41.93	48.17
			surface	20.02	8.13	1.4	9.21	120.9	42.14	46.57
ER14	10:22	44'	bottom	13.82	7.84	1.6	7.35	88.6	38.61	49.09
			middle	18.36	8.11	0.3	9.11	114.9	41.95	48.09
			surface	20.04	8.15	1.2	9.36	123.2	42.15	46.56
ER15	11:00	42'	bottom	14.27	7.85	1.9	7.30	86.9	38.97	48.98
			middle	17.89	8.09	0.3	9.06	115.5	41.69	48.35
			surface	19.69	8.06	1.6	8.92	116.7	42.04	46.83
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							

Water Quality

Date: 05 August 2014 Vessel: Tiny Giant Borrow Area: East Rockaway
Crew: T. Gaddet, N. Johnson, K. Lamontagne, D. Anderson
Gear Type: 30' bottom trawl Calibration: N/A - in lab GPS Taken: ✓
Weather Conditions: mid-80s, sunny, <1 ft seas ~5kt winds
Additional Notes: YUMA gps unit not working - ArcGIS (on phone) used instead

STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER001	9:13	42'	bottom	18.27	7.95	5.7	5.21	69.1	42.60	48.87
			middle	22.70	8.17	0.2	7.37	96.9	45.71	47.81
			surface	22.77	8.33	0.5	8.93	122.8	44.87	46.86
ER002	9:39	45'	bottom	18.23	7.92	3.7	4.50	58.2	42.57	48.91
			middle	22.65	8.17	0.2	7.57	99.0	45.65	47.78
			surface	22.92	8.32	0.4	9.23	128.1	45.05	46.92
ER003	10:01	46'	bottom	18.33	7.98	2.4	5.12	67.8	42.66	48.89
			middle	22.59	8.19	0.2	7.88	108.4	45.60	47.80
			surface	22.96	8.34	0.5	9.30	129.2	44.99	46.80
ER004	10:26	40'	bottom	18.85	7.96	1.0	4.83	63.1	42.91	48.66
			middle	22.72	8.30	0.6	9.12	125.5	44.92	46.95
			surface	23.04	8.36	0.5	9.20	128.3	45.09	46.83
ER005	10:55	43'	bottom	18.30	7.92	2.1	4.40	57.2	42.62	48.86
			middle	22.79	8.23	0.4	8.86	125.2	44.93	46.91
			surface	23.08	8.34	0.5	9.25	130.5	45.24	46.93
ER006	11:23	44'	bottom	18.22	8.02	1.4	5.42	73.6	42.57	48.92
			middle	22.58	8.19	0.1	7.54	101.5	45.67	47.84
			surface	23.02	8.31	1.2	8.57	116.9	44.70	46.39
ER007	11:49	43'	bottom	18.32	8.02	2.6	5.60	74.9	42.63	48.88
			middle	22.49	8.19	0.1	7.93	109.1	45.56	47.86
			surface	23.53	8.33	0.5	9.16	127.3	44.74	46.03

STATION ID	TIME	DEPTH ~~(m)~~ ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/cm)
ER008	12:14	42'	bottom	18.43	7.94	3.0	4.91	64.4	42.68	48.80
			middle	22.40	8.13	0.2	6.83	91.0	45.56	47.91
			surface	23.60	8.31	0.4	9.23	129.4	45.58	46.83
ER009	12:36	38'	bottom	18.83	7.81	2.2	5.01	64.1	42.91	48.61
			middle	22.60	8.13	0.1	7.89	109.4	45.73	47.95
			surface	23.67	8.30	0.3	8.90	125.2	45.86	47.02
ER010	13:00	40'	bottom	18.85	7.96	2.3	5.20	68.8	42.94	48.66
			middle	22.91	8.13	0.2	7.46	104.7	46.03	47.92
			surface	23.67	8.27	0.3	8.74	123.8	46.00	47.17
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							

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Water Quality

Date: 9/16/2014 Vessel: HUDSON Borrow Area: EAST ROCK
Crew: GAUDET, DRESSER, JOHNSON, SMITH
Gear Type: TRAWL Calibration: LAB ✓ GPS Taken: ___
Weather Conditions: SHOWERS, OVC, SEAS 1-2'
Additional Notes: ___

STATION ID	TIME	DEPTH (FT)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/cm)
ER-T1	0920	43'	bottom	21.49	8.03	0.3	6.73	91.0	43.65	46.78
			middle	21.51	8.03	0.1	6.74	91.2	43.63	46.75
			surface	21.48	7.97	0.3	6.64	89.7	43.51	46.67
ER-T2	0955	43'	bottom	21.59	8.02	0.1	6.64	89.9	43.71	46.76
			middle	21.59	8.00	0.1	6.62	89.7	43.72	46.76
			surface	21.36	7.90	0.2	6.48	87.2	43.00	46.21
ER-T3	1025	41'	bottom	21.48	8.02	0.2	6.76	91.4	43.69	46.84
			middle	21.47	8.00	0.2	6.77	91.5	43.65	46.80
			surface	21.41	7.95	0.2	6.67	90.1	43.52	46.72
ER-T4	1100	42'	bottom	21.47	8.03	0.4	6.76	91.3	43.65	46.80
			middle	21.44	8.02	0.2	6.76	91.4	43.50	46.69
			surface	21.40	7.95	0.7	6.66	90.0	43.51	46.70
ER-T5	1230	48'	bottom	21.45	7.98	0.2	6.08	82.0	43.75	46.93
			middle	21.49	7.98	0.3	6.43	86.4	43.77	46.92
			surface	21.46	7.91	0.1	6.60	89.3	43.73	46.89
ER-T6	1300	49	bottom	21.49	8.03	0.1	6.71	90.8	43.78	46.92
			middle	21.43	8.01	0.1	6.73	91.2	43.66	46.86
			surface	21.39	7.97	0.1	6.73	91.1	43.62	46.84
ER-T7	0930	42.4	bottom	21.32	7.97	0.8	6.01	80.7	44.05	47.37
			middle	21.29	8.03	0.9	6.48	87.6	43.59	46.92
			surface	21.29	8.04	1.1	6.53	88.1	43.50	46.99

9/17/14

W90FYQ-10-D-0009

- Lost Net on First Attempt @ T5, Removed and Re-Rigged For Redo

Water Quality

Date: 09/17/2014 Vessel: HUDSON Borrow Area: EAST ROCK

Crew: GAUDET, JOHNSON, LUGO

Gear Type: TRAWL Calibration: LAB GPS Taken:

Weather Conditions: CLEAR, SEAS CALM

Additional Notes:

	STATION ID	TIME	DEPTH (m)/Ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER	T8	1000	40.9	bottom	21.35	7.95	0.2	5.90	79.8	44.02	47.32
				middle	21.26	8.02	0.5	6.32	86.1	43.57	46.92
				surface	21.28	8.04	0.2	6.62	89.9	43.59	46.93
ER	T9	1035	40.3	bottom	21.39	7.91	0.7	5.85	78.9	43.98	47.24
				middle	21.38	7.99	0.9	5.94	80.8	43.74	47.00
				surface	21.38	8.02	0.8	6.42	87.0	43.65	46.89
ER	T10	1120	43.2	bottom	21.30	7.97	0.9	6.19	83.6	44.09	47.44
				middle	21.32	8.02	0.2	6.48	87.7	43.60	46.89
				surface	21.44	8.03	0.1	6.62	89.4	43.72	46.90
ER	T11	1158	47.0	bottom	21.22	7.97	1.7	5.99	80.9	44.06	47.50
				middle	21.29	8.02	0.4	6.40	87.8	43.60	46.91
				surface	21.69	8.02	0.6	6.77	91.8	43.56	46.93
ER	T12	1239	51.7	bottom	21.13	8.00	1.3	6.32	85.1	44.14	47.67
				middle	21.30	8.04	0.2	6.70	90.4	43.7	47.07
				surface	21.84	8.05	0.0	7.01	95.5	44.15	46.98
				bottom							
				middle							
				surface							
				bottom							
				middle							
				surface							

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Water Quality

Date: 10/9/2014 Vessel: HUDSON Borrow Area: EAST ROCK
Crew: DRESSLER, GAUDET, LAMANTAGNE
Gear Type: SMART-MAC 4 Calibration: IN-LAB GPS Taken: ____
Weather Conditions: YSI-6820 CLEAR, NW WIND 5-10 KT 1-2' SWELL
Additional Notes: ____

STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER1	0900	41'	bottom	17.55	7.90	0.7	5.87	74.0	42.4	49.47
			middle	17.92	7.91	0.8	7.34	93.2	41.02	47.47
			surface	17.88	7.90	0.8	7.44	94.4	40.98	47.43
ER2	0910	43	bottom	17.57	7.92	0.7	6.23	79.3	42.50	49.53
			middle	17.91	7.94	0.8	7.42	93.9	40.98	47.42
			surface	17.89	7.94	0.8	7.52	95.1	40.93	47.37
ER3	0920	42'	bottom	17.61	7.93	0.7	6.76	83.7	42.54	49.55
			middle	17.91	7.95	0.7	7.46	94.3	40.95	47.35
			surface	17.89	7.85	0.8	7.57	95.9	40.90	47.32
ER4	0930	43'	bottom	17.55	7.94	0.8	7.32	93.0	42.48	49.54
			middle	17.93	7.97	0.7	7.58	96.1	40.92	47.30
			surface	17.92	7.96	0.7	7.59	96.3	40.89	47.28
ER5	0935	43'	bottom	17.58	7.98	0.9	6.25	78.9	42.49	49.53
			middle	17.98	7.99	0.7	6.79	85.0	41.19	47.95
			surface	17.94	7.99	0.7	7.36	92.7	40.86	47.22
ER6	0943	43'	bottom	17.54	8.03	0.7	6.04	76.4	42.46	49.52
			middle	18.00	8.05	0.8	6.30	79.9	41.17	47.55
			surface	17.97	8.06	0.8	5.93	75.3	40.84	47.17
ER7	0950	43'	bottom	17.58	8.04	0.8	5.37	67.9	42.50	49.52
			middle	17.70	8.05	0.7	5.92	74.9	42.70	49.46
			surface	18.03	8.07	0.8	6.08	77.1	40.91	47.19

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STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/°cm)
ER8	0958	44'	bottom	17.58	8.05	0.9	5.66	72.0	42.50	49.51
			middle	18.06	8.07	0.8	5.95	75.9	41.59	47.90
			surface	18.07	8.09	0.7	5.98	76.0	40.93	47.17
ER9	1004	44'	bottom	17.60	8.07	0.8	5.21	66.0	42.52	49.48
			middle	17.87	8.09	0.6	5.43	69.4	42.17	48.86
			surface	18.12	8.10	0.7	5.72	72.6	40.99	47.20
ER10	1013	45'	bottom	17.62	8.07	0.7	5.54	70.6	42.53	49.52
			middle	18.17	8.11	0.7	5.88	74.9	41.05	47.25
			surface	18.15	8.11	0.7	5.86	74.7	41.06	47.21
ER11	1037	41'	bottom	17.38	8.06	0.7	5.44	68.4	42.23	49.44
			middle	17.96	8.09	0.7	5.67	72.0	41.68	48.16
			surface	~~18.01~~ 17.90	8.10	0.8	5.88	74.4	40.99	47.43
ER12	1045	41'	bottom	17.53	8.07	0.7	5.54	69.8	42.28	49.47
			middle	18.02	8.10	0.7	5.55	70.7	41.39	47.77
			surface	17.93	8.10	0.8	5.65	71.7	41.06	47.47
ER13	1051	42'	bottom surface	17.93	8.11	1.4	5.71	72.3	41.05	47.44
			middle	17.97	8.10	0.7	5.57	70.8	41.12	47.50
			bottom surface	17.44	8.07	0.7	5.53	69.7	42.20	49.38
ER14	1058	43'	bottom	17.44	8.07	0.7	5.61	71.2	42.3	47.47
			middle	17.94	8.10	0.7	5.74	72.9	41.04	47.43
			surface	17.93	8.11	0.7	5.76	73.1	40.99	47.38
ER15	1106	43'	bottom	17.45	8.08	0.7	5.60	71.1	42.32	49.45
			middle	17.92	8.10	0.7	5.67	72.0	40.94	47.33
			surface	17.93	8.11	0.7	5.70	72.3	40.94	47.33
ER16	1114	44	bottom	17.50	8.08	0.7	5.66	71.5	42.39	49.51
			middle	17.93	8.11	0.7	5.72	72.6	40.90	47.28
			surface	17.94	8.12	0.8	5.74	72.8	40.89	47.27

Water Quality

Date: _____ Vessel: _____ Borrow Area: _____

Crew: _____

Gear Type: _____ Calibration: _____ GPS Taken: _____

Weather Conditions: _____

Additional Notes: _____

STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER17	1118	43	bottom	17.53	8.07	.7	5.1	64.4	42.41	49.57
			middle	17.95	8.11	.7	4.96	61.0	40.92	47.51
			surface	17.9	8.11	.9	5.77	73.3	40.91	47.29
ER18	1127	44.5	bottom	17.64	8.10	1.1	5.66	71.0	42.47	49.51
			middle	18.04	8.12	.7	5.23	66.3	40.98	44.26
			surface	18.02	8.13	.7	5.79	73.7	40.97	47.26
ER19	1151	41.3	bottom	17.24	8.06	.7	5.77	73.2	42.12	49.45
			middle	17.67	8.11	.8	5.06	64.2	41.03	47.45
			surface	17.84	8.12	.8	5.90	75.1	41.01	47.45
ER20	1200	41.0	bottom	17.51	8.10	.6	5.48	71.1	42.27	49.26
			middle	17.91	8.11	.7	5.15	65.4	41.04	47.44
			surface	17.85	8.13	1.7	5.80	73.6	41.01	47.43
ER21	1204	41.4	bottom	17.55	8.08	.7	5.77	71.6	42.16	49.39
			middle	17.87	8.11	.7	5.28	67.0	41.06	47.45
			surface	17.90	8.12	.7	5.81	73.9	41.01	47.43
ER22	1211	41.7	bottom	17.38	8.08	.7	5.60	69.1	42.20	49.40
			middle	17.92	8.11	.7	5.11	64.8	41.07	47.46
			surface	17.88	8.13	1.1	5.92	75.3	41.06	47.44
ER23	1217	42.9	bottom	17.52	8.09	.7	5.66	70.3	42.24	49.40
			middle	17.94	8.12	.7	4.97	63.3	41.11	47.47
			surface	17.95	8.13	.8	5.69	72.4	41.09	47.46

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STATION ID	TIME	DEPTH (m) (ft)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO (mg/L)	DO %	CONDUCTIVITY (µS/cm)	CONDUCTIVITY (µS/°cm)
ER24	1225	43'	bottom	17.57	8.09	.6	5.82	73.4	42.25	49.39
			middle	17.95	8.12	.7	5.41	67.8	41.11	47.51
			surface	17.92	8.14	.7	5.80	73.7	41.09	47.45
ER25	1233	43.7	bottom	17.72	8.09	.6	5.87	74.1	42.29	47.41
			middle	17.95	8.12	.7	5.25	66.8	41.08	47.42
			surface	17.93	8.13	.7	5.76	73.2	41.08	47.43
ER26	1239	44.0	bottom	17.73	8.09	.6	5.89	74.6	42.24	49.17
			middle	17.98	8.12	.7	5.50	69.9	41.09	47.42
			surface	17.99	8.13	.7	5.90	75.0	41.04	47.38
ER27	1258	39.7	bottom	17.59	8.06	.7	6.15	77.0	41.76	49.05
			middle	17.89	8.10	.8	5.62	71.1	41.10	47.55
			surface	17.87	8.12	.8	6.09	77.3	41.10	47.54
ER28	1305	41.6	bottom	17.21	8.06	.7	5.97	75.0	42.03	49.39
			middle	17.93	8.11	.7	6.07	75.3	41.09	47.53
			surface	17.90	8.12	.8	6.01	76.2	41.09	47.50
ER29	900	46.5	bottom	16.18	8.08	.6	5.64	69.9	41.55	49.99
			middle	18.09	8.13	.5	5.04	64.5	42.23	48.64
			surface	17.56	8.11	.7	5.67	71.4	40.74	47.45
ER30	908	47.5'	bottom	16.12	8.08	.7	5.88	72.0	41.53	50.04
			middle	17.71	8.11	.8	5.30	67.0	41.63	48.42
			surface	17.62	8.14	.6	5.74	72.9	40.76	47.42
ER31	914	48.6	bottom	16.35	8.13	.6	5.62	69.4	41.59	49.85
			middle	17.97	8.13	.5	5.56	71.0	42.45	48.96
			surface	17.40	8.14	.7	5.67	71.5	40.59	47.40
ER32	923	49	bottom	16.47	8.11	.6	5.65	69.7	41.58	49.95
			middle	18.06	8.14	.5	5.50	70.5	42.51	48.99
			surface	17.53	8.14	.6	5.54	70.3	41.50	46.32

Water Quality

Date: _____ Vessel: _____ Borrow Area: _____

Crew: _____

Gear Type: _____ Calibration: _____ GPS Taken: _____

Weather Conditions: _____

Additional Notes: _____

STATION ID	TIME	DEPTH (m)	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/°cm)
ER33	929	50.3	bottom	17.11	8.08	.7	5.68	71.1	41.96	49.44
			middle	17.51	8.10	.6	5.65	71.5	41.62	48.54
			surface	17.50	8.14	.7	5.63	71.1	41.05	47.82
~~ER34~~	~~937~~	~~51.6~~	bottom							
			middle							
			surface							
ER34	937	51.6	bottom	16.27	8.07	.6	5.63	69.8	41.59	50.09
			middle	17.49	8.10	.7	5.69	71.6	40.43	48.55
			surface	17.55	8.12	.7	5.71	72.2	41.20	48.04
ER35	950	58	bottom	17.32	8.08	.5	5.60	70.4	42.07	49.25
			middle	17.62	8.12	.7	5.90	74.4	41.44	48.34
			surface	17.65	8.15	.6	5.87	74.5	41.06	47.70
ER36	1004	51.0	bottom	17.23	8.11	.4	5.48	74.6	41.89	49.27
			middle	18.25	8.13	.5	5.91	76.0	42.62	48.88
			surface	17.81	8.15	.7	5.94	74.9	40.70	47.15
ER37	1020	49.2	bottom	17.51	8.11	.6	5.89	74.1	41.82	49.50
			middle	18.24	8.15	.6	5.99	77.0	40.37	48.76
			surface	17.92	8.16	.6	5.95	75.7	40.73	47.03
ER38	1031	46.6	bottom	16.68	8.08	.6	5.77	71.5	41.66	49.76
			middle	17.56	8.14	.6	6.04	76.6	40.14	49.07
			surface	17.93	8.18	.6	5.93	75.4	40.88	47.25

USACE Borrow Area Study for the Atlantic Coast Long Island, NY Storm Damage Reduction Projects

Sheet _____ of_____

01 April—30 Sept 2014

STATION ID	TIME	DEPTH (m) Ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/°cm)
ER39	1037	46	bottom	16.20	8.05	.6	5.95	73.5	41.52	49.93
			middle	18.10	8.14	.5	5.84	74.7	42.14	48.64
			surface	17.86	8.16	.7	5.82	73.9	40.79	47.22
ER40	1043	46.3	bottom	16.62	8.10	.6	5.98	74.3	41.70	49.71
			middle	17.99	8.13	.6	5.99	76.3	42.03	48.77
			surface	17.83	8.16	.9	5.82	73.8	40.77	47.22
ER41	1049	47.5	bottom	17.18	8.08	.7	5.73	71.0	41.67	49.73
			middle	17.91	8.14	.6	6.13	74.2	40.34	48.76
			surface	17.88	8.15	1.1	6.03	76.4	40.85	47.27
ER42	1056	46.8	bottom	17.07	8.09	.6	5.94	74.3	41.91	49.40
			middle	17.95	8.11	.6	5.92	75.3	42.02	48.71
			surface	17.82	8.15	.6	5.94	75.2	40.70	47.14
ER43	1103	47.7	bottom	17.69	8.09	.5	5.95	75.0	42.09	49.36
			middle	17.90	8.12	.5	5.90	75.2	41.99	48.66
			surface	17.68	8.14	.5	5.91	74.7	40.70	47.34
ER44	1109	48.5	bottom	17.37	8.12	.4	5.69	71.7	42.14	49.33
			middle	18.08	8.14	.5	5.93	74.6	41.81	48.27
			surface	17.75	8.16	.5	5.99	74.9	40.78	47.34
ER45	1115	49.1	bottom	17.44	8.11	.5	5.73	72.9	42.21	49.30
			middle	18.04	8.13	.5	5.78	73.9	42.39	48.84
			surface	17.98	8.15	.8	5.94	75.6	41.13	47.49
ER46	1122	50.0	bottom	17.57	8.10	.5	5.75	72.6	42.26	49.26
			middle	18.24	8.12	.5	5.83	74.8	42.58	48.89
			surface	17.70	8.14	.7	5.85	74.2	40.94	47.32
ER47	1128	51.1	bottom	17.64	8.08	.5	5.70	71.5	42.78	49.23
			middle	17.53	8.10	.6	5.79	72.8	41.53	48.47
			surface	17.98	8.12	.9	6.04	76.6	41.08	47.42

Water Quality

Date: _____ Vessel: _____ Borrow Area: _____

Crew: _____

Gear Type: _____ Calibration: _____ GPS Taken: _____

Weather Conditions: _____

Additional Notes: _____

STATION ID	TIME	DEPTH (m) ft	LOCATION	H2O TEMP (°C)	pH	TURBIDITY (NTU)	DO		CONDUCTIVITY	
							(mg/L)	%	(µS/cm)	(µS/cm)
ER48	11:45	41.1	bottom	17.17	8.02	.6	5.72	72.2	42.19	49.70
			middle	17.26	8.04	.7	5.88	74.1	41.62	48.84
			surface	17.32	8.07	1.1	6.17	77.8	41.57	48.67
ER49	1203	50.0	bottom	17.12	8.00	.6	6.03	75.6	42.09	49.54
			middle	17.31	8.05	.7	5.96	74.8	41.35	48.47
			surface	17.61	8.08	.7	5.97	75.6	41.24	47.91
ER50	1219	35.8	bottom	16.94	8.03	.6	5.97	74.7	41.97	49.66
			middle	17.26	8.08	.5	6.07	76.2	40.04	48.58
			surface	17.42	8.14	.7	6.22	78.2	41.21	48.21
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							
			bottom							
			middle							
			surface							

Tide Information

Date (2014)	Latest high tide		Latest low tide	
	Time EDT	Height (ft.)	Time EDT	Height (ft.)
14 May	12:06	4.923	6:18	0.449
17 June	3:24	6.390	10:06	0.012
18 June	4:36	6.062	11:06	0.088
19 June	5:36	5.806	12:06	-0.027
15 July	2:30	6.626	8:54	-0.881
16 July	3:18	6.341	9:54	-0.086
05 August	7:12	4.697	13:12	1.144
16 September	6:18	5.225	12:18	1.718
17 September	7:12	4.924	13:24	1.718
09 October	00:36	6.298	6:54	-0.801
10 October	1:12	5.760	7:54	-0.769
20 October	10:18	5.471	4:36	0.790
Site 8531680	http://tidesandcurrents.noaa.gov/			

Appendix C – Benthic and Trawl Site Coordinates

Benthic Site Coordinates

Site	Date	Latitude	Longitude
Spring 2014			
ER001	6/18/2014	40.535579	-73.824483
ER002	6/18/2014	40.536564	-73.820120
ER003	6/18/2014	40.537792	-73.815597
ER004	6/18/2014	40.538727	-73.811241
ER005	6/18/2014	40.539303	-73.809582
ER006	6/18/2014	40.539491	-73.806991
ER007	6/18/2014	40.540653	-73.805092
ER008	6/18/2014	40.540797	-73.802315
ER009	6/18/2014	40.541576	-73.798001
ER010	6/18/2014	40.542548	-73.793849
ER011	6/18/2014	40.543252	-73.789434
ER012	6/18/2014	40.544765	-73.784955
ER013	6/18/2014	40.545234	-73.780693
ER014	6/18/2014	40.547374	-73.828820
ER015	6/18/2014	40.547878	-73.825191
ER016	6/18/2014	40.548966	-73.820244
ER017	6/18/2014	40.549608	-73.815932
ER018	6/18/2014	40.551175	-73.811809
ER019	6/18/2014	40.551416	-73.806678
ER020	6/18/2014	40.553192	-73.802804
ER021	6/18/2014	40.554310	-73.798023
ER022	6/18/2014	40.555400	-73.793650
ER023	6/18/2014	40.556563	-73.789209
ER024	6/18/2014	40.557387	-73.784692
ER025	6/18/2014	40.552017	-73.787723
ER026	6/18/2014	40.553299	-73.783363
ER027	6/18/2014	40.549538	-73.781756
RS004	6/18/2014	40.526578	-73.830225
ER028	6/19/2014	40.543712	-73.827896
ER029	6/19/2014	40.544604	-73.823234
ER030	6/19/2014	40.545560	-73.818908
ER031	6/19/2014	40.546649	-73.814480
ER032	6/19/2014	40.547557	-73.810031
ER033	6/19/2014	40.548649	-73.805577
ER034	6/19/2014	40.549619	-73.801106
ER035	6/19/2014	40.550550	-73.796735
ER036	6/19/2014	40.551624	-73.792254
ER037	6/19/2014	40.541598	-73.818216

ER038	6/19/2014	40.542855	-73.812973
ER039	6/19/2014	40.543702	-73.808544
ER040	6/19/2014	40.544739	-73.804074
ER041	6/19/2014	40.545717	-73.799637
ER042	6/19/2014	40.546634	-73.795014
ER043	6/19/2014	40.547517	-73.790788
ER044	6/19/2014	40.548723	-73.786203
RS001	6/19/2014	40.551495	-73.840465
RS002	6/19/2014	40.566254	-73.778856
RS003	6/19/2014	40.541347	-73.770280
RS005	6/19/2014	40.532274	-73.798385
RS006	6/19/2014	40.561067	-73.809977
Fall 2014			
ER01	10/9/2014	40.547677	-73.828901
ER02	10/9/2014	40.548675	-73.823555
ER03	10/9/2014	40.549729	-73.819004
ER04	10/9/2014	40.550712	-73.814327
ER05	10/9/2014	40.551801	-73.809413
ER06	10/9/2014	40.552962	-73.804184
ER07	10/9/2014	40.553995	-73.799655
ER08	10/9/2014	40.555023	-73.795209
ER09	10/9/2014	40.556141	-73.789954
ER10	10/9/2014	40.557103	-73.784829
ER11	10/9/2014	40.545301	-73.823978
ER12	10/9/2014	40.546571	-73.817644
ER13	10/9/2014	40.547466	-73.813142
ER14	10/9/2014	40.548613	-73.808432
ER15	10/9/2014	40.549541	-73.804180
ER16	10/9/2014	40.550788	-73.798498
ER17	10/9/2014	40.551921	-73.792901
ER18	10/9/2014	40.553772	-73.785808
ER19	10/9/2014	40.542812	-73.822944
ER20	10/9/2014	40.543704	-73.816776
ER21	10/9/2014	40.544786	-73.811969
ER22	10/9/2014	40.545878	-73.806775
ER23	10/9/2014	40.547148	-73.801688
ER24	10/9/2014	40.548162	-73.796764
ER25	10/9/2014	40.549456	-73.791269
ER26	10/9/2014	40.550485	-73.786092
ER27	10/9/2014	40.539753	-73.823021
ER28	10/9/2014	40.541239	-73.814042

ER29	10/10/2014	40.542773	-73.809491
ER30	10/10/2014	40.543388	-73.804872
ER31	10/10/2014	40.544432	-73.800392
ER32	10/10/2014	40.545306	-73.795662
ER33	10/10/2014	40.546586	-73.790948
ER34	10/10/2014	40.548104	-73.782248
ER38	10/10/2014	40.535613	-73.825434
ER39	10/10/2014	40.536526	-73.821640
ER40	10/10/2014	40.537460	-73.817079
ER41	10/10/2014	40.538325	-73.812664
ER42	10/10/2014	40.539467	-73.807833
ER43	10/10/2014	40.540726	-73.802663
ER44	10/10/2014	40.541620	-73.797981
ER45	10/10/2014	40.542744	-73.792938
ER46	10/10/2014	40.543815	-73.787627
ER47	10/10/2014	40.544937	-73.782684
RS35	10/10/2014	40.539680	-73.774106
RS36	10/10/2014	40.533913	-73.802561
RS37	10/10/2014	40.525217	-73.828794
RS48	10/10/2014	40.564123	-73.781485
RS49	10/10/2014	40.558533	-73.809498
RS50	10/10/2014	40.550811	-73.838474

Trawl Site Coordinates

Site	Date	Latitude	Longitude
May 2014			
ER01	5/14/2014	40.551273	-73.783004
ER02	5/14/2014	40.555356	-73.789766
ER03	5/14/2014	40.553545	-73.796755
REF04	5/14/2014	40.557638	-73.806891
ER05	5/14/2014	40.547005	-73.810852
ER06	5/14/2014	40.546269	-73.816937
ER07	5/14/2014	40.543731	-73.823413
ER08	5/14/2014	40.541720	-73.817965
ER09	5/14/2014	40.541873	-73.808557
ER10	5/14/2014	40.545205	-73.794826
ER11	5/14/2014	40.545517	-73.798860
ER12	5/14/2014	40.546781	-73.785933
June 2014			
ER01	6/17/2014	40.557742	-73.783444

REF02	6/17/2014	40.555029	-73.807300
ER03	6/17/2014	40.547468	-73.808029
ER04	6/17/2014	40.543564	-73.812774
ER05	6/17/2014	40.537642	-73.815246
ER06	6/17/2014	40.542016	-73.812787
ER07	6/17/2014	40.541267	-73.803262
ER08	6/17/2014	40.542939	-73.793554
ER09	6/17/2014	40.546271	-73.783723
ER10	6/17/2014	40.552724	-73.785213
ER11	6/17/2014	40.553160	-73.803002
ER12	6/17/2014	40.544468	-73.819152
July 2014			
ER01	7/15/2014	40.552045	-73.810140
ER02	7/15/2014	40.550039	-73.819777
ER03	7/15/2014	40.545608	-73.826317
ER04	7/15/2014	40.541030	-73.826215
ER05	7/15/2014	40.538350	-73.822023
ER06	7/15/2014	40.541560	-73.814719
ER07	7/15/2014	40.546407	-73.806759
ER08	7/15/2014	40.550329	-73.798794
ER09	7/15/2014	40.553072	-73.788769
ER10	7/15/2014	40.545922	-73.786230
REF11	7/16/2014	40.554333	-73.769919
ER12	7/16/2014	40.543816	-73.794839
ER13	7/16/2014	40.542196	-73.805049
ER14	7/16/2014	40.538977	-73.816129
ER15	7/16/2014	40.544958	-73.813689
August 2014			
ER01	8/5/2014	40.551673	-73.804512
ER02	8/5/2014	40.542533	-73.805686
ER03	8/5/2014	40.548496	-73.802690
ER04	8/5/2014	40.548092	-73.799373
ER05	8/5/2014	40.546138	-73.809229
ER06	8/5/2014	40.542934	-73.816236
ER07	8/5/2014	40.541070	-73.811251
ER08	8/5/2014	40.548942	-73.813616
ER09	8/5/2014	40.549387	-73.822460
REF10	8/5/2014	40.543002	-73.834270
September 2014			
ER01	9/16/2014	40.537407	-73.816007
ER02	9/16/2014	40.539892	-73.817968

ER03	9/16/2014	40.542285	-73.820098
ER04	9/16/2014	40.546951	-73.815379
ER05	9/16/2014	40.541239	-73.798656
ER06	9/16/2014	40.545845	-73.791816
ER07	9/17/2014	40.549597	-73.803675
ER08	9/17/2014	40.555110	-73.794137
ER09	9/17/2014	40.551941	-73.808100
ER10	9/17/2014	40.545721	-73.809454
ER11	9/17/2014	40.552519	-73.784660
REF12	9/17/2014	40.533475	-73.794675
October 2014			
ER01	10/20/2014	40.538781	-73.811417
ER02	10/20/2014	40.541750	-73.797911
ER03	10/20/2014	40.544577	-73.783677
ER04	10/20/2014	40.551630	-73.794970
ER05	10/20/2014	40.547633	-73.807048
ER06	10/20/2014	40.551059	-73.808818
ER07	10/20/2014	40.553800	-73.798139
ER08	10/20/2014	40.548489	-73.798910
ER09	10/20/2014	40.544492	-73.817927
ER10	10/20/2014	40.543692	-73.803993

Appendix D – Raw Laboratory Data; Grain Size

Grain Size Analysis Report

Submitted To: Tetra Tech

Prepared By: Cashin Associates, P.C.
1200 Veterans Memorial Highway
Hauppauge, New York 11788

August 2014

Grain Size Analysis Summary

Sample ID	% Total Gravel	% Total Sand	% Silt & Clay
ER001	0.14%	98.72%	1.14%
ER002	0.16%	94.40%	5.43%
ER003	0.91%	65.36%	33.73%
ER004	0.39%	95.03%	4.58%
ER005	0.72%	86.25%	13.04%
ER006	0.73%	90.13%	9.14%
ER007	0.23%	97.85%	1.92%
ER008	32.60%	58.86%	8.53%
ER009	0.81%	86.11%	13.08%
ER010	0.78%	79.22%	20.01%
ER011	0.45%	83.69%	15.86%
ER012	0.98%	75.33%	23.70%
ER013	1.29%	92.25%	6.46%
ER014	10.41%	78.13%	11.46%
ER015	1.93%	91.32%	6.76%
ER016	0.27%	94.84%	4.89%
ER017	1.25%	74.72%	24.03%
ER018	0.00%	93.75%	6.25%
ER019	0.84%	93.71%	5.45%
ER020	1.87%	96.88%	1.25%
ER021	1.05%	92.11%	6.84%
ER022	0.33%	85.51%	14.16%
ER023	1.55%	76.58%	21.87%
ER024	2.64%	83.56%	13.79%
ER025	0.69%	94.72%	4.59%

Sample ID	% Total Gravel	% Total Sand	% Silt & Clay
ER026	1.10%	87.32%	11.58%
ER027	0.60%	87.40%	12.00%
ER028	2.10%	88.11%	9.79%
ER029	1.15%	93.35%	5.50%
ER030	0.06%	98.54%	1.40%
ER031	0.82%	86.27%	12.91%
ER032	0.23%	88.26%	11.51%
ER033	0.34%	91.12%	8.53%
ER034	0.00%	87.81%	12.19%
ER035	2.01%	86.15%	11.84%
ER036	0.91%	91.49%	7.60%
ER037	3.48%	89.36%	7.15%
ER038	1.22%	87.92%	10.85%
ER039	2.09%	95.15%	2.75%
ER040	2.22%	69.26%	28.53%
ER041	0.46%	79.13%	20.41%
ER042	0.83%	89.74%	9.43%
ER043	0.49%	87.87%	11.64%
ER044	0.39%	89.75%	9.85%
RS001	1.68%	90.93%	7.39%
RS002	0.77%	93.53%	5.70%
RS003	0.74%	92.31%	6.95%
RS004	0.78%	99.19%	0.03%
RS005	0.00%	66.01%	33.99%
RS006	1.05%	68.11%	30.85%

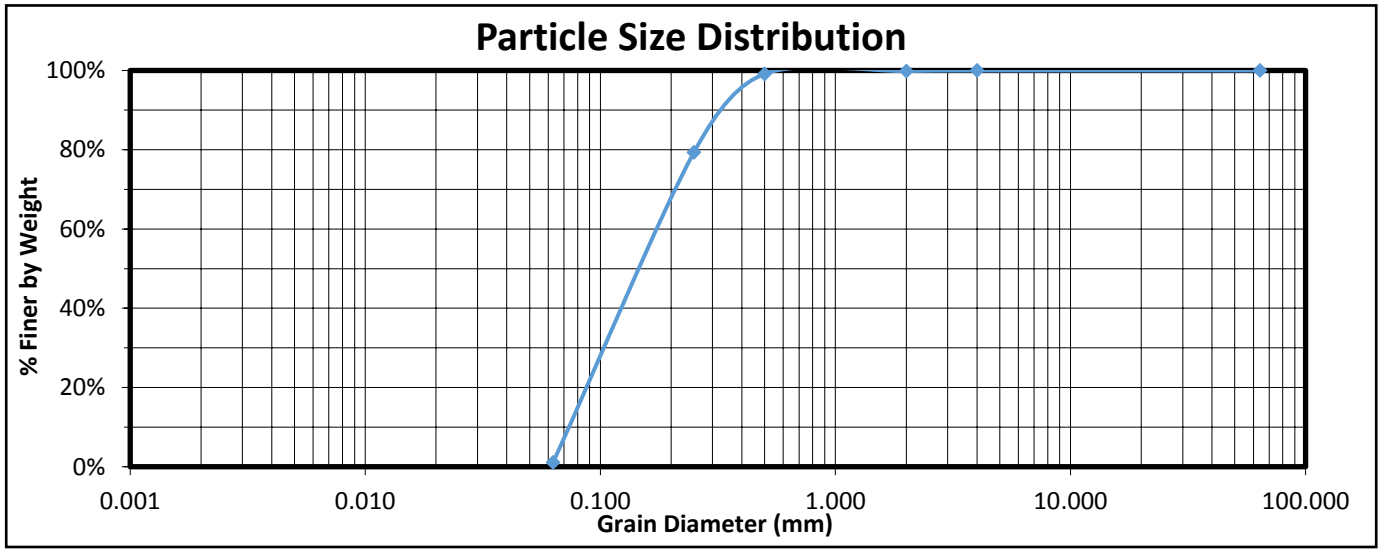
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER001	Total Dry Weight	43.86

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.86	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	43.86	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.06	43.8	99.86%	0.14%	Granule Gravel	Total Gravel	0.14%
35	0.0197	0.500	0.31	43.49	99.16%	0.71%	Very Coarse & Coarse Sand		
60	0.0098	0.25	8.69	34.8	79.34%	19.81%	Medium Sand		
230	0.0025	0.063	34.3	0.5	1.14%	78.20%	Very Fine & Fine Sand	Total Sand	98.72%
-	-	-	0.5	-	-	1.14%	Silt & Clay	Total Silt & Clay	1.14%



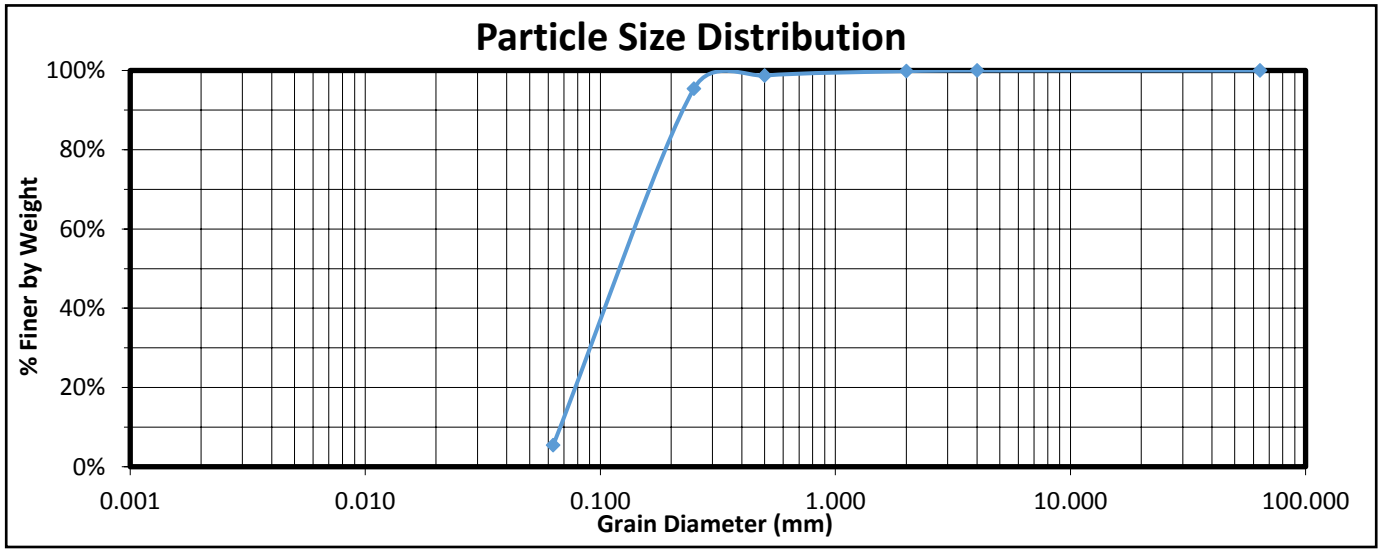
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER002	Total Dry Weight	36.8

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	36.8	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	36.8	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.06	36.74	99.84%	0.16%	Granule Gravel	Total Gravel	0.16%
35	0.0197	0.500	0.41	36.33	98.72%	1.11%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.22	35.11	95.41%	3.32%	Medium Sand		
230	0.0025	0.063	33.11	2	5.43%	89.97%	Very Fine & Fine Sand	Total Sand	94.40%
-	-	-	2	-	-	5.43%	Silt & Clay	Total Silt & Clay	5.43%



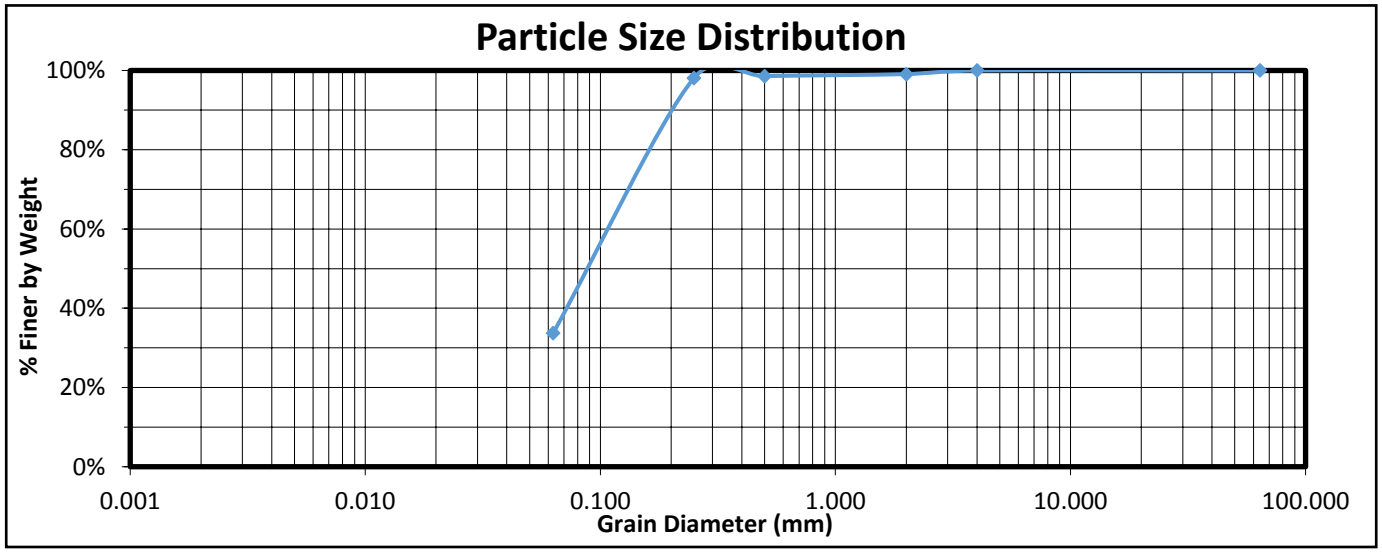
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER003	Total Dry Weight	47.43

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	47.43	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	47.43	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.43	47	99.09%	0.91%	Granule Gravel	Total Gravel	0.91%
35	0.0197	0.500	0.24	46.76	98.59%	0.51%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.24	46.52	98.08%	0.51%	Medium Sand		
230	0.0025	0.063	30.52	16	33.73%	64.35%	Very Fine & Fine Sand	Total Sand	65.36%
-	-	-	16	-	-	33.73%	Silt & Clay	Total Silt & Clay	33.73%



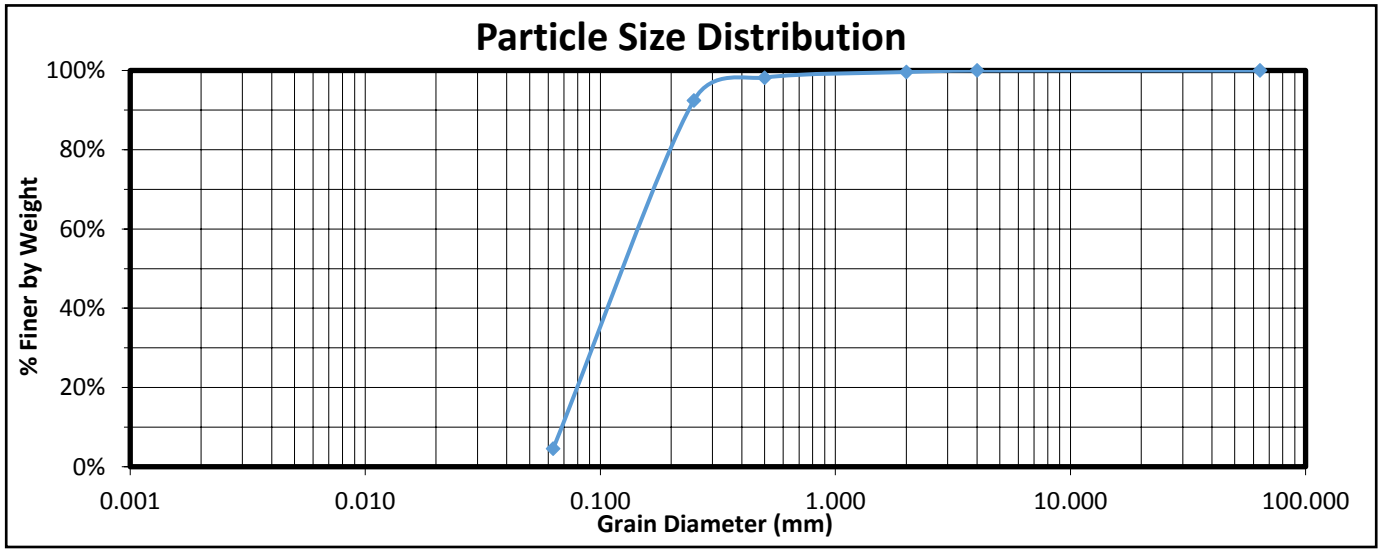
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER004	Total Dry Weight	43.65

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.65	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	43.65	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.17	43.48	99.61%	0.39%	Granule Gravel	Total Gravel	0.39%
35	0.0197	0.500	0.61	42.87	98.21%	1.40%	Very Coarse & Coarse Sand		
60	0.0098	0.25	2.51	40.36	92.46%	5.75%	Medium Sand		
230	0.0025	0.063	38.36	2	4.58%	87.88%	Very Fine & Fine Sand	Total Sand	95.03%
-	-	-	2	-	-	4.58%	Silt & Clay	Total Silt & Clay	4.58%



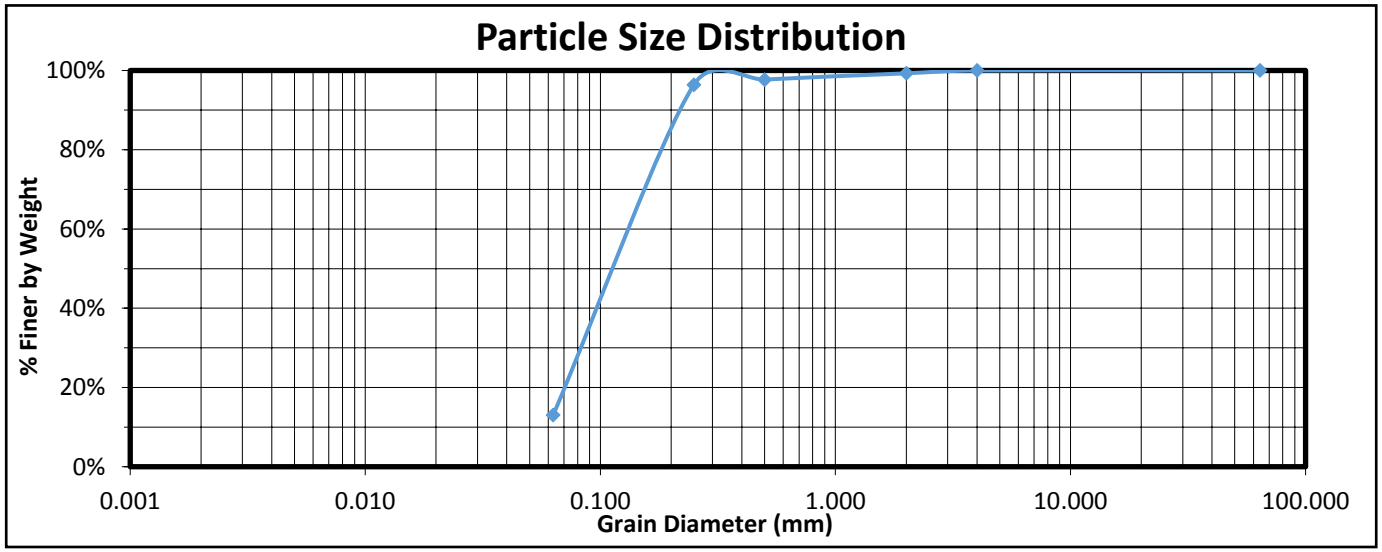
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER005	Total Dry Weight	30.68

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	30.68	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	30.68	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.22	30.46	99.28%	0.72%	Granule Gravel	Total Gravel	0.72%
35	0.0197	0.500	0.48	29.98	97.72%	1.56%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.4	29.58	96.41%	1.30%	Medium Sand		
230	0.0025	0.063	25.58	4	13.04%	83.38%	Very Fine & Fine Sand	Total Sand	86.25%
-	-	-	4	-	-	13.04%	Silt & Clay	Total Silt & Clay	13.04%



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1200 Veterans HWY
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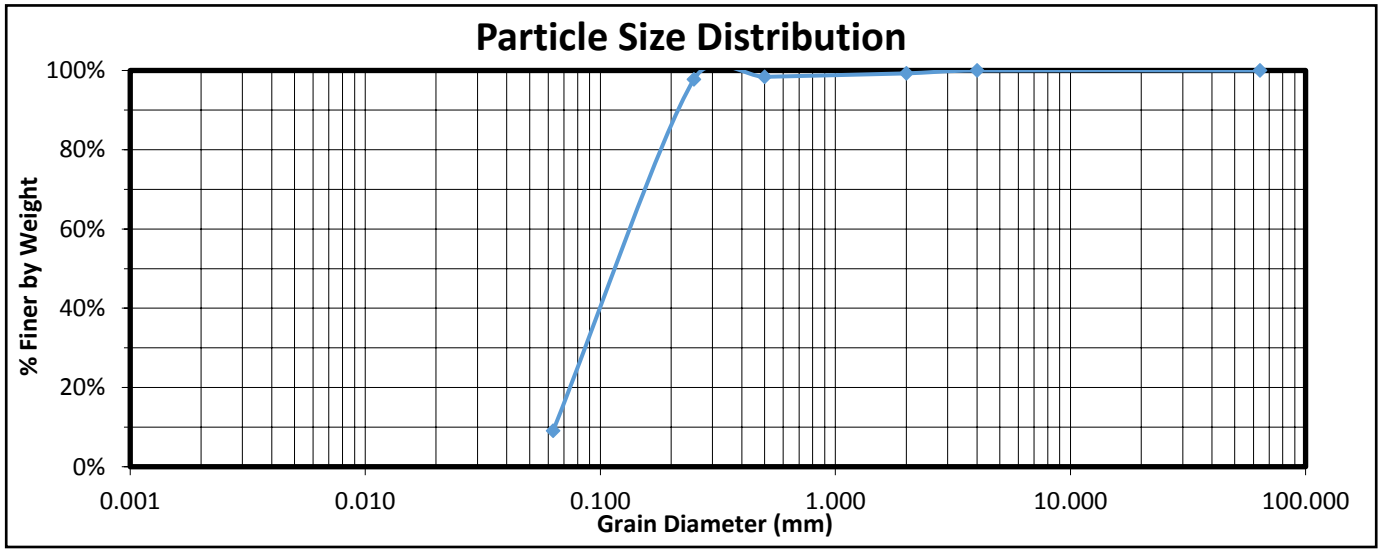
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER006	Total Dry Weight	43.78

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.78	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	43.78	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.32	43.46	99.27%	0.73%	Granule Gravel	Total Gravel	0.73%
35	0.0197	0.500	0.38	43.08	98.40%	0.87%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.28	42.8	97.76%	0.64%	Medium Sand		
230	0.0025	0.063	38.8	4	9.14%	88.62%	Very Fine & Fine Sand	Total Sand	90.13%
-	-	-	4	-	-	9.14%	Silt & Clay	Total Silt & Clay	9.14%



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1200 Veterans HWY
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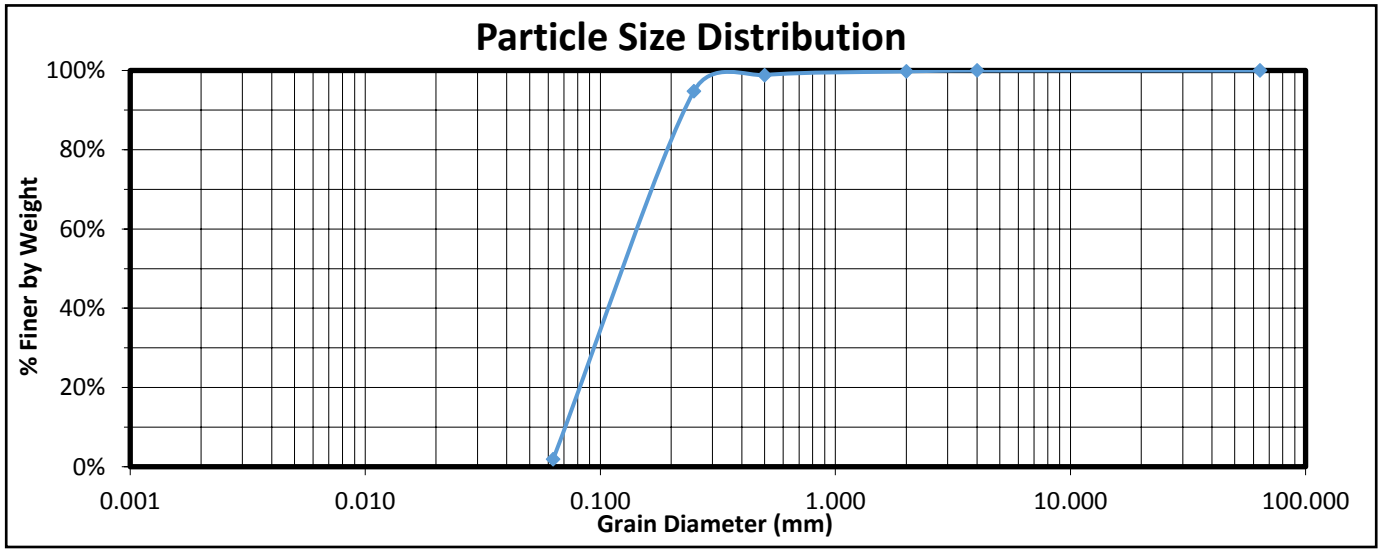
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER007	Total Dry Weight	25.99

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	25.99	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	25.99	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.06	25.93	99.77%	0.23%	Granule Gravel	Total Gravel	0.23%
35	0.0197	0.500	0.24	25.69	98.85%	0.92%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.06	24.63	94.77%	4.08%	Medium Sand		
230	0.0025	0.063	24.13	0.5	1.92%	92.84%	Very Fine & Fine Sand	Total Sand	97.85%
-	-	-	0.5	-	-	1.92%	Silt & Clay	Total Silt & Clay	1.92%



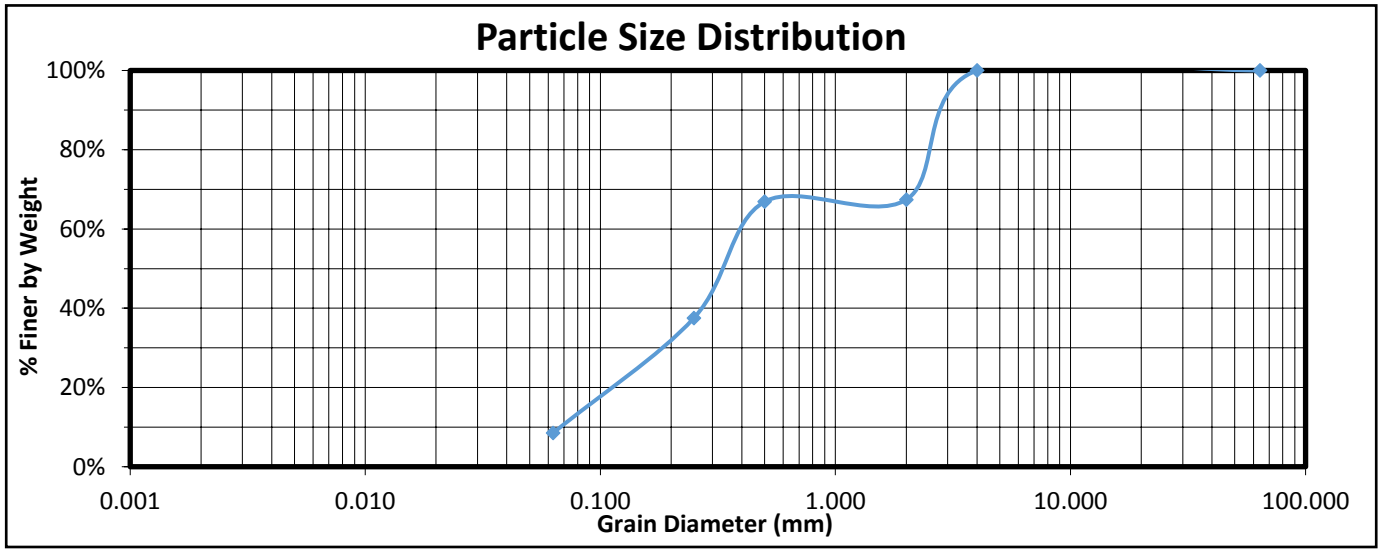
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER008	Total Dry Weight	35.15

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	35.15	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	35.15	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	11.46	23.69	67.40%	32.60%	Granule Gravel	Total Gravel	32.60%
35	0.0197	0.500	0.18	23.51	66.88%	0.51%	Very Coarse & Coarse Sand		
60	0.0098	0.25	10.32	13.19	37.52%	29.36%	Medium Sand		
230	0.0025	0.063	10.19	3	8.53%	28.99%	Very Fine & Fine Sand	Total Sand	58.86%
-	-	-	3	-	-	8.53%	Silt & Clay	Total Silt & Clay	8.53%



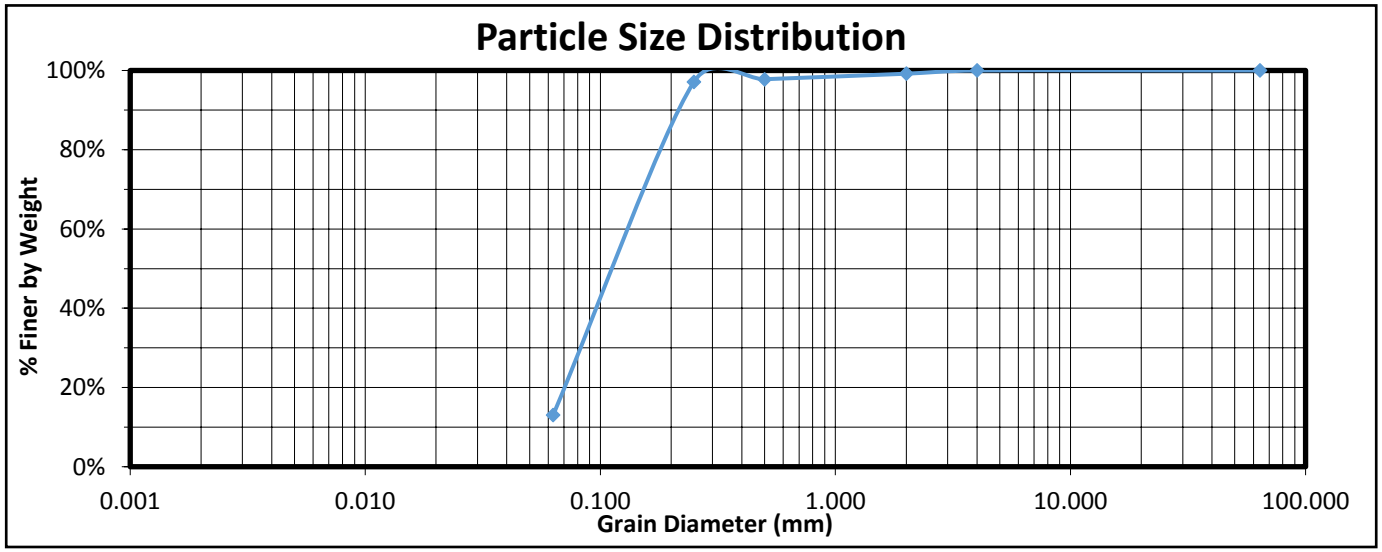
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER009	Total Dry Weight	38.24

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	38.24	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	38.24	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.31	37.93	99.19%	0.81%	Granule Gravel	Total Gravel	0.81%
35	0.0197	0.500	0.53	37.4	97.80%	1.39%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.26	37.14	97.12%	0.68%	Medium Sand		
230	0.0025	0.063	32.14	5	13.08%	84.05%	Very Fine & Fine Sand	Total Sand	86.11%
-	-	-	5	-	-	13.08%	Silt & Clay	Total Silt & Clay	13.08%



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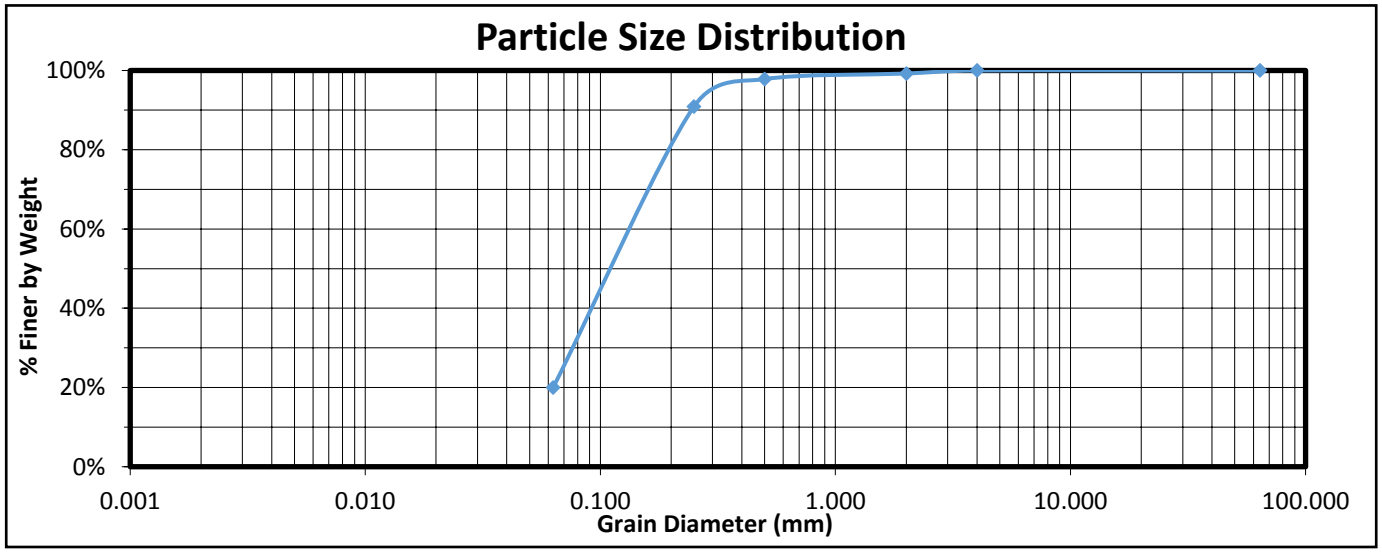
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER010	Total Dry Weight	39.99

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	39.99	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	39.99	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.31	39.68	99.22%	0.78%	Granule Gravel	Total Gravel	0.78%
35	0.0197	0.500	0.56	39.12	97.82%	1.40%	Very Coarse & Coarse Sand		
60	0.0098	0.25	2.78	36.34	90.87%	6.95%	Medium Sand		
230	0.0025	0.063	28.34	8	20.01%	70.87%	Very Fine & Fine Sand	Total Sand	79.22%
-	-	-	8	-	-	20.01%	Silt & Clay	Total Silt & Clay	20.01%



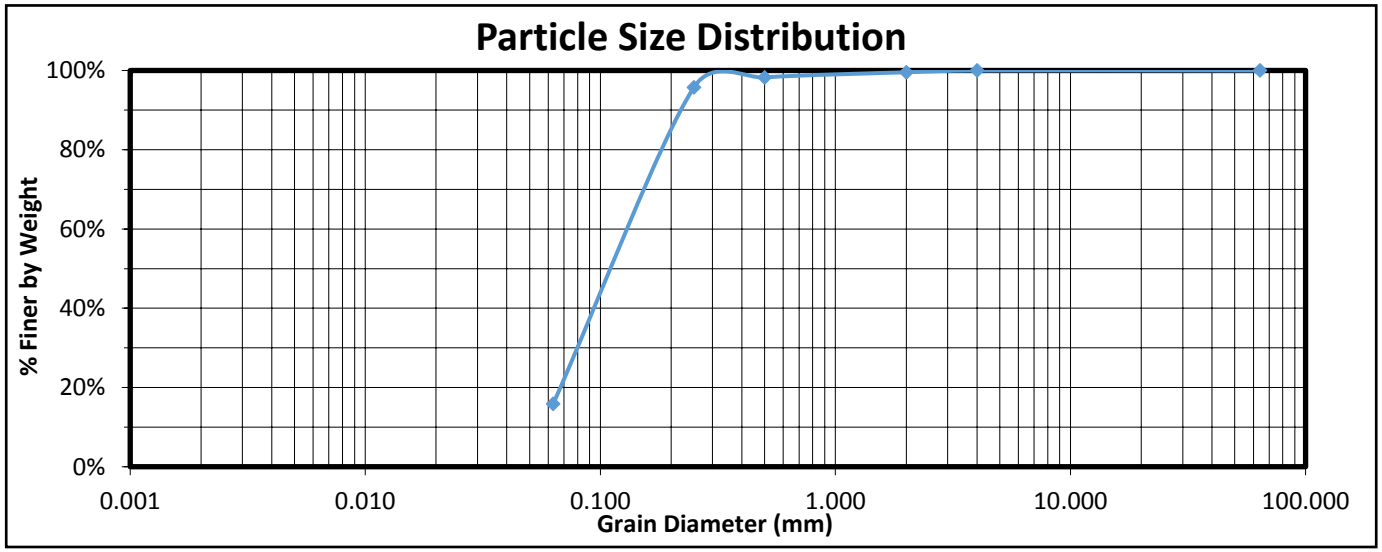
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER011	Total Dry Weight	37.82

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	37.82	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	37.82	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.17	37.65	99.55%	0.45%	Granule Gravel	Total Gravel	0.45%
35	0.0197	0.500	0.49	37.16	98.25%	1.30%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.95	36.21	95.74%	2.51%	Medium Sand		
230	0.0025	0.063	30.21	6	15.86%	79.88%	Very Fine & Fine Sand	Total Sand	83.69%
-	-	-	6	-	-	15.86%	Silt & Clay	Total Silt & Clay	15.86%



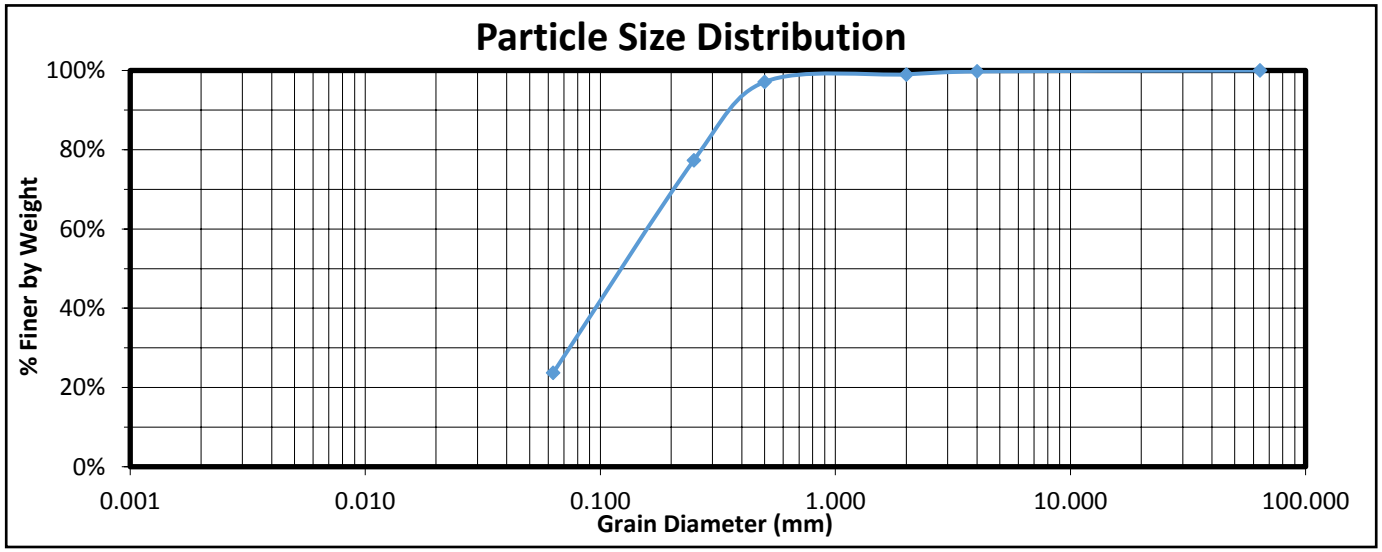
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER012	Total Dry Weight	33.76

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	33.76	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.08	33.68	99.76%	0.24%	Pebble Gravel		
10	0.7870	2.00	0.25	33.43	99.02%	0.74%	Granule Gravel	Total Gravel	0.98%
35	0.0197	0.500	0.64	32.79	97.13%	1.90%	Very Coarse & Coarse Sand		
60	0.0098	0.25	6.67	26.12	77.37%	19.76%	Medium Sand		
230	0.0025	0.063	18.12	8	23.70%	53.67%	Very Fine & Fine Sand	Total Sand	75.33%
-	-	-	8	-	-	23.70%	Silt & Clay	Total Silt & Clay	23.70%



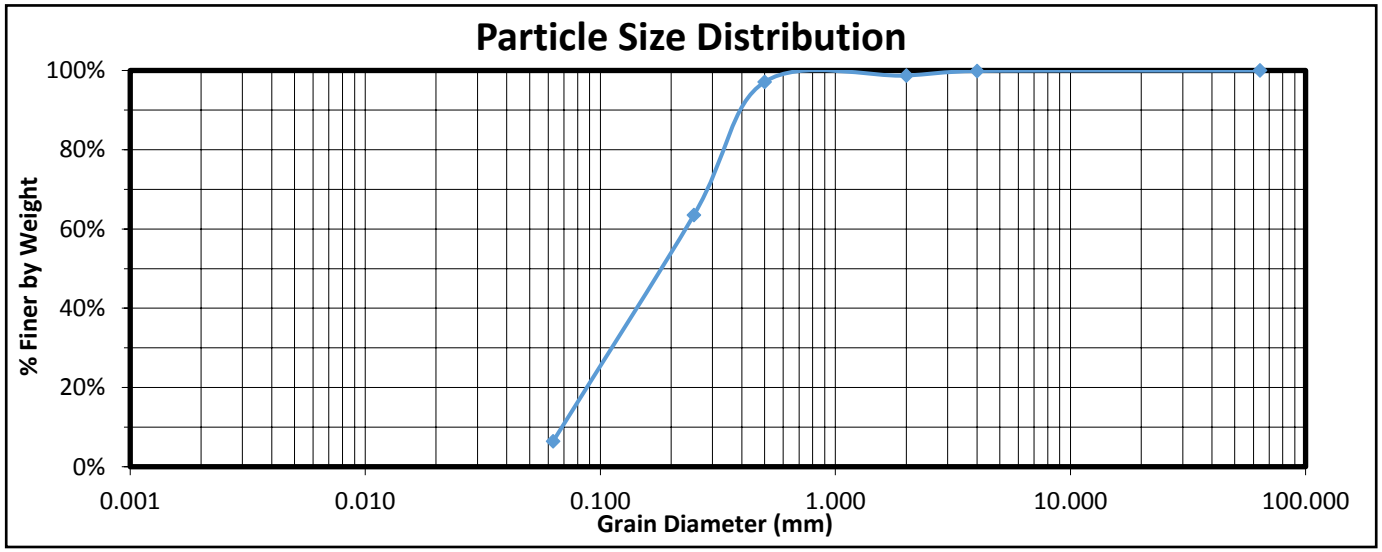
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER013	Total Dry Weight	30.96

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	30.96	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.04	30.92	99.87%	0.13%	Pebble Gravel		
10	0.7870	2.00	0.36	30.56	98.71%	1.16%	Granule Gravel	Total Gravel	1.29%
35	0.0197	0.500	0.49	30.07	97.13%	1.58%	Very Coarse & Coarse Sand		
60	0.0098	0.25	10.4	19.67	63.53%	33.59%	Medium Sand		
230	0.0025	0.063	17.67	2	6.46%	57.07%	Very Fine & Fine Sand	Total Sand	92.25%
-	-	-	2	-	-	6.46%	Silt & Clay	Total Silt & Clay	6.46%



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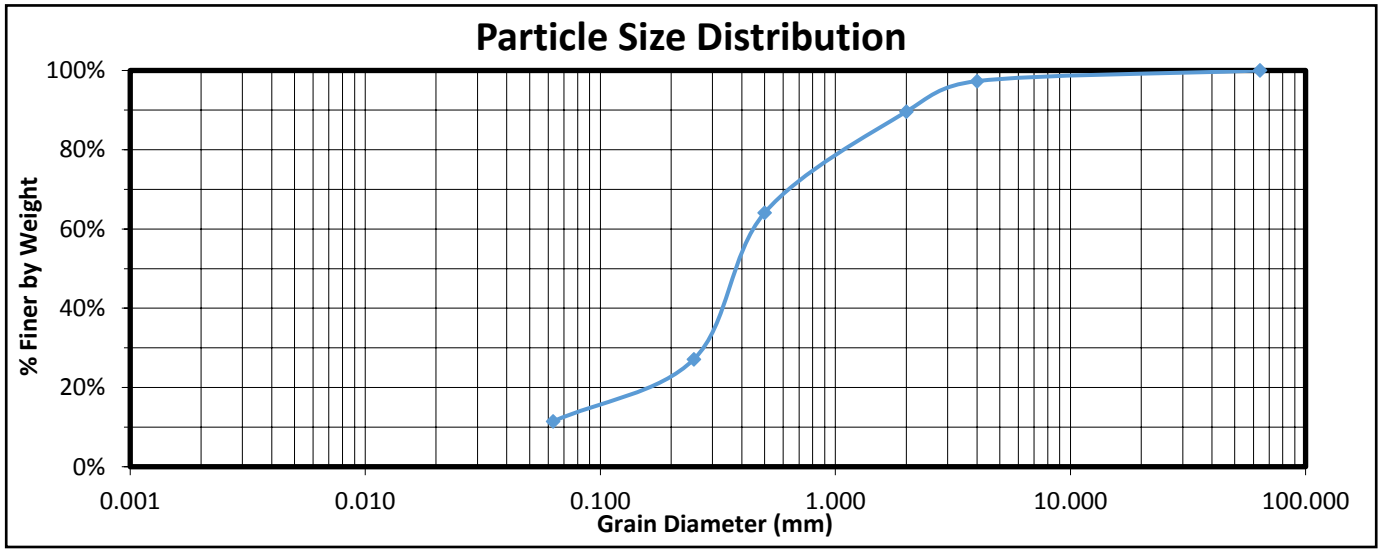
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER014	Total Dry Weight	43.63

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.63	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	1.17	42.46	97.32%	2.68%	Pebble Gravel		
10	0.7870	2.00	3.37	39.09	89.59%	7.72%	Granule Gravel	Total Gravel	10.41%
35	0.0197	0.500	11.12	27.97	64.11%	25.49%	Very Coarse & Coarse Sand		
60	0.0098	0.25	16.13	11.84	27.14%	36.97%	Medium Sand		
230	0.0025	0.063	6.84	5	11.46%	15.68%	Very Fine & Fine Sand	Total Sand	78.13%
-	-	-	5	-	-	11.46%	Silt & Clay	Total Silt & Clay	11.46%



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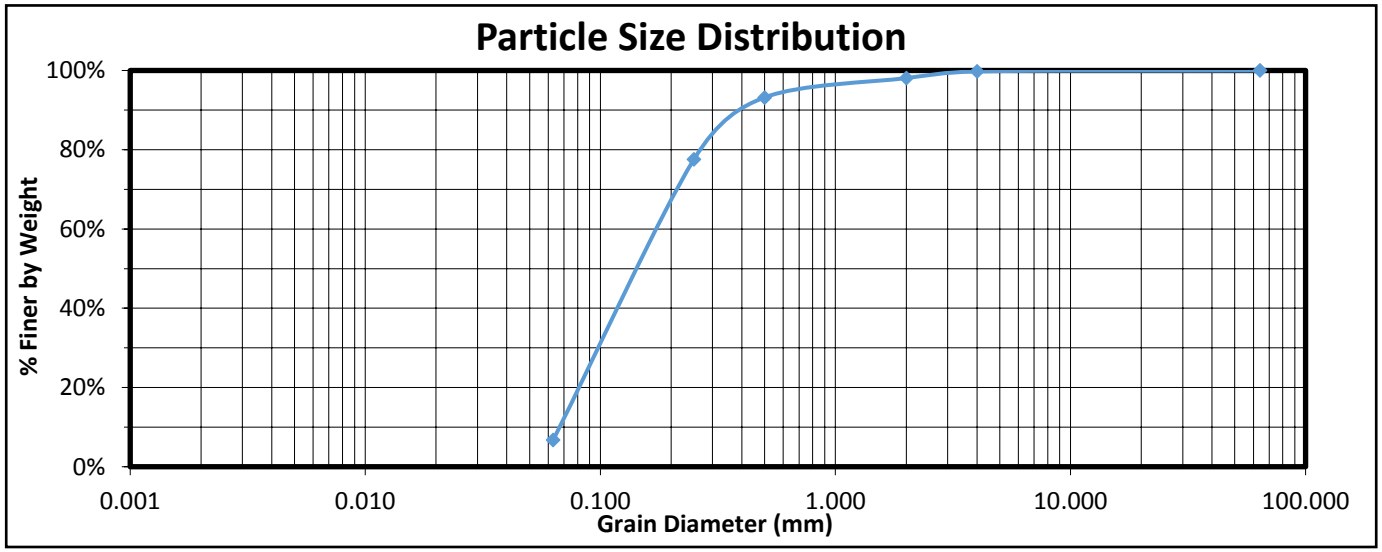
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER015	Total Dry Weight	29.6

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	29.6	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.07	29.53	99.76%	0.24%	Pebble Gravel		
10	0.7870	2.00	0.5	29.03	98.07%	1.69%	Granule Gravel	Total Gravel	1.93%
35	0.0197	0.500	1.44	27.59	93.21%	4.86%	Very Coarse & Coarse Sand		
60	0.0098	0.25	4.63	22.96	77.57%	15.64%	Medium Sand		
230	0.0025	0.063	20.96	2	6.76%	70.81%	Very Fine & Fine Sand	Total Sand	91.32%
-	-	-	2	-	-	6.76%	Silt & Clay	Total Silt & Clay	6.76%



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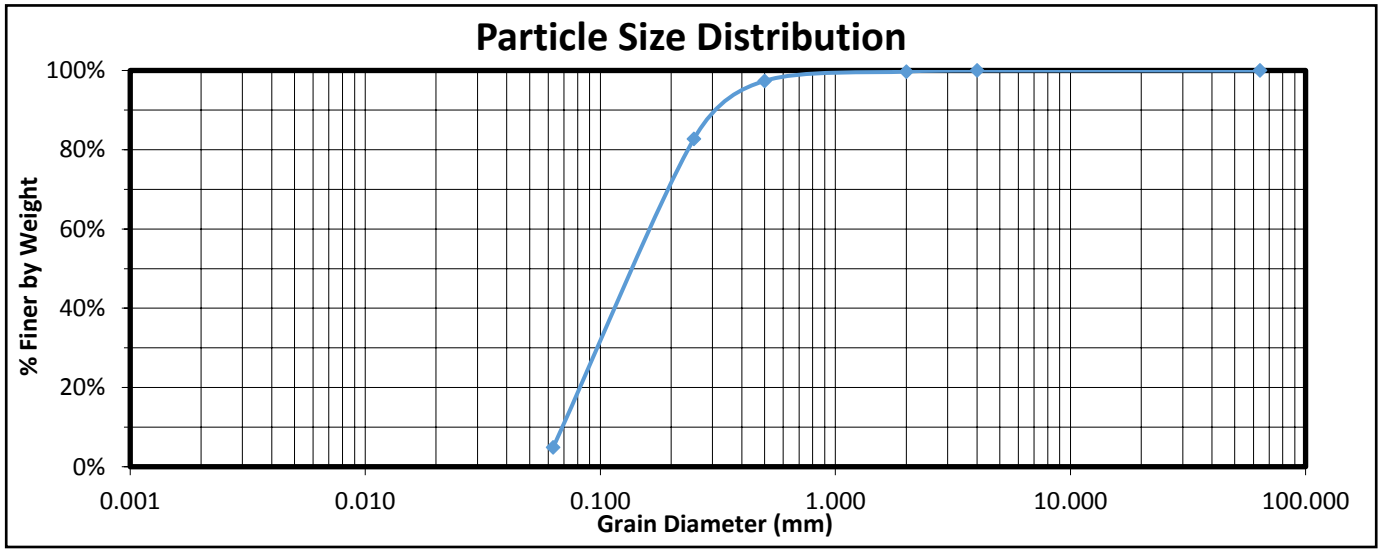
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER016	Total Dry Weight	40.87

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	40.87	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	40.87	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.11	40.76	99.73%	0.27%	Granule Gravel	Total Gravel	0.27%
35	0.0197	0.500	0.96	39.8	97.38%	2.35%	Very Coarse & Coarse Sand		
60	0.0098	0.25	5.99	33.81	82.73%	14.66%	Medium Sand		
230	0.0025	0.063	31.81	2	4.89%	77.83%	Very Fine & Fine Sand	Total Sand	94.84%
-	-	-	2	-	-	4.89%	Silt & Clay	Total Silt & Clay	4.89%



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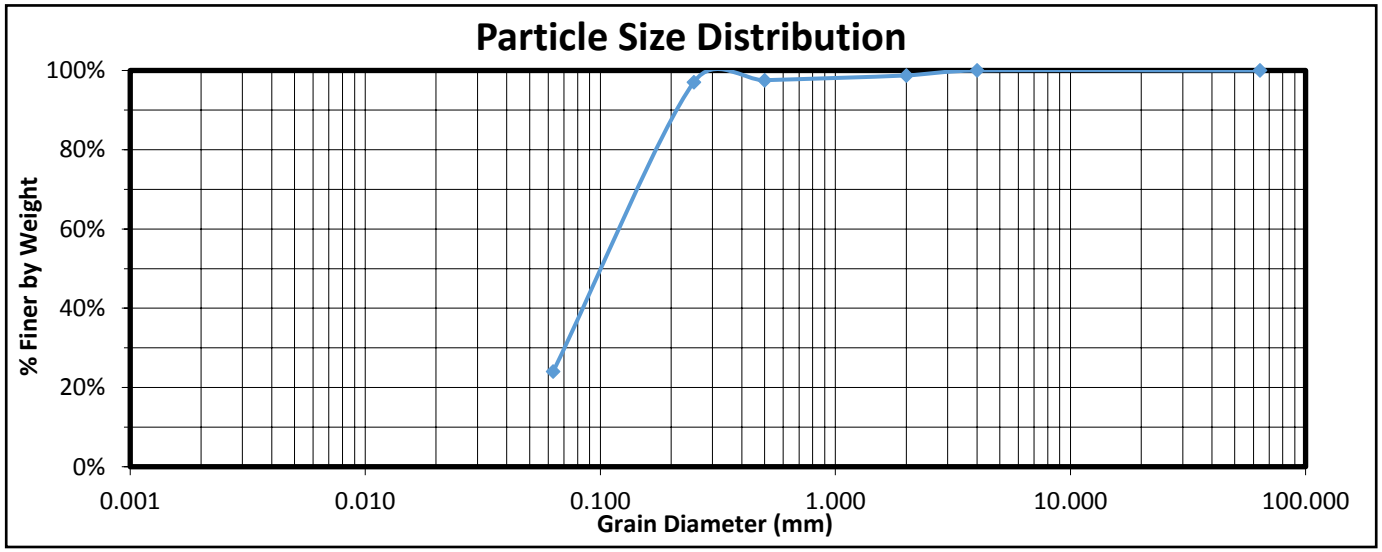
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER017	Total Dry Weight	20.81

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	20.81	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	20.81	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.26	20.55	98.75%	1.25%	Granule Gravel	Total Gravel	1.25%
35	0.0197	0.500	0.25	20.3	97.55%	1.20%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.1	20.2	97.07%	0.48%	Medium Sand		
230	0.0025	0.063	15.2	5	24.03%	73.04%	Very Fine & Fine Sand	Total Sand	74.72%
-	-	-	5	-	-	24.03%	Silt & Clay	Total Silt & Clay	24.03%



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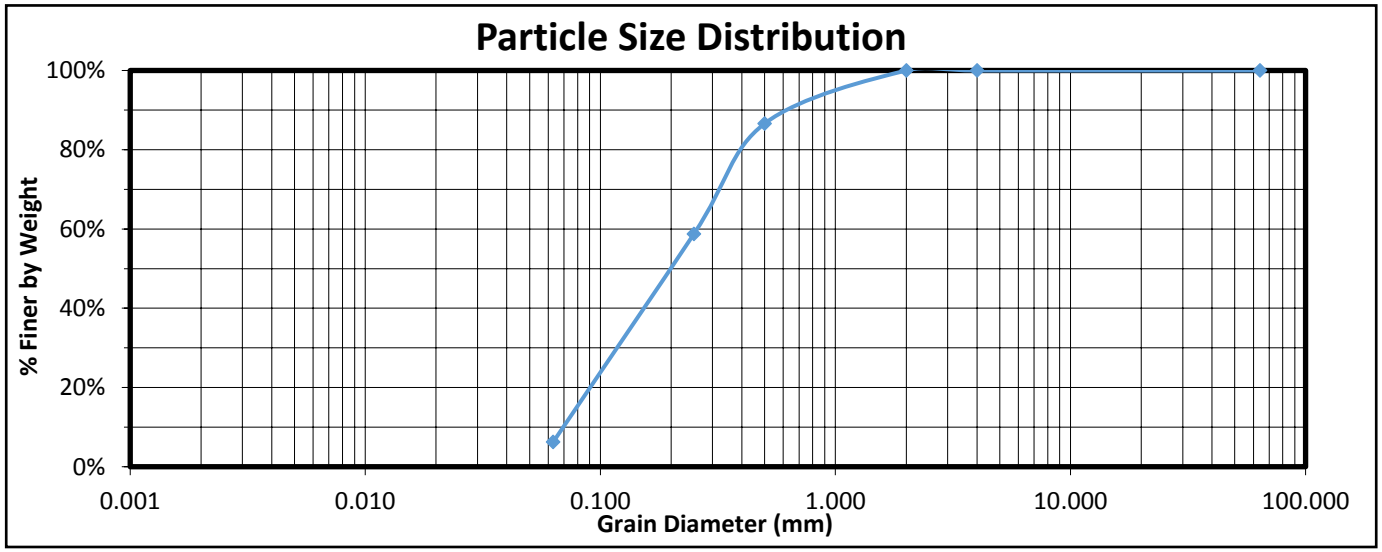
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER018	Total Dry Weight	31.98

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	31.98	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	31.98	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0	31.98	100.00%	0.00%	Granule Gravel	Total Gravel	0.00%
35	0.0197	0.500	4.28	27.7	86.62%	13.38%	Very Coarse & Coarse Sand		
60	0.0098	0.25	8.91	18.79	58.76%	27.86%	Medium Sand		
230	0.0025	0.063	16.79	2	6.25%	52.50%	Very Fine & Fine Sand	Total Sand	93.75%
-	-	-	2	-	-	6.25%	Silt & Clay	Total Silt & Clay	6.25%



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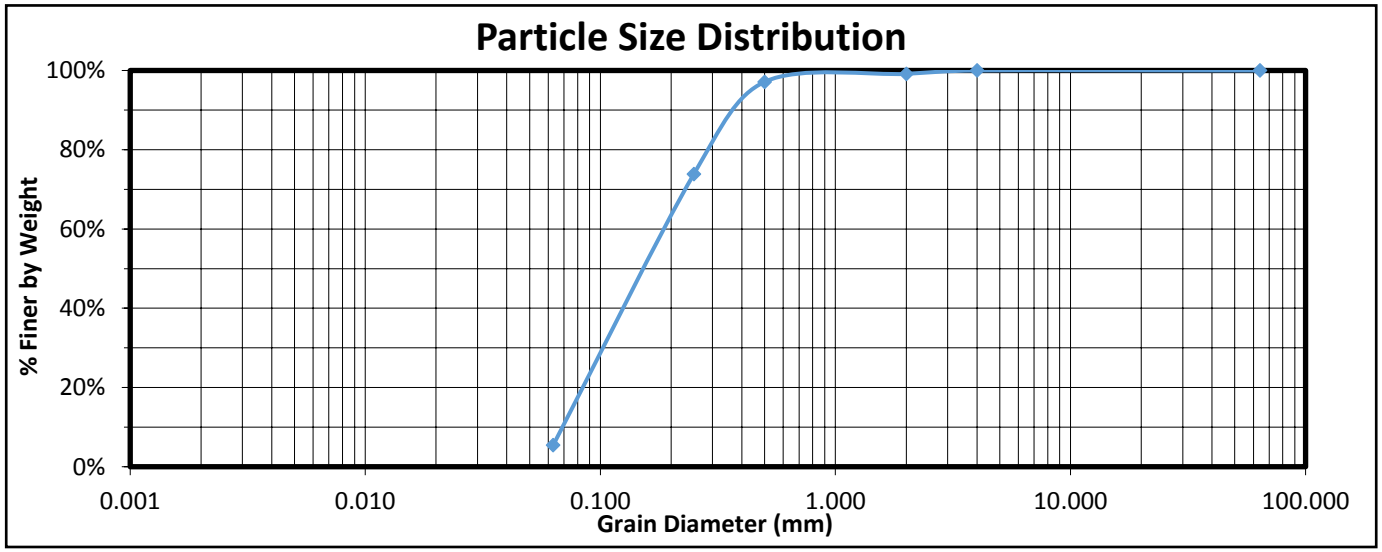
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER019	Total Dry Weight	36.72

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	36.72	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	36.72	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.31	36.41	99.16%	0.84%	Granule Gravel	Total Gravel	0.84%
35	0.0197	0.500	0.74	35.67	97.14%	2.02%	Very Coarse & Coarse Sand		
60	0.0098	0.25	8.54	27.13	73.88%	23.26%	Medium Sand		
230	0.0025	0.063	25.13	2	5.45%	68.44%	Very Fine & Fine Sand	Total Sand	93.71%
-	-	-	2	-	-	5.45%	Silt & Clay	Total Silt & Clay	5.45%



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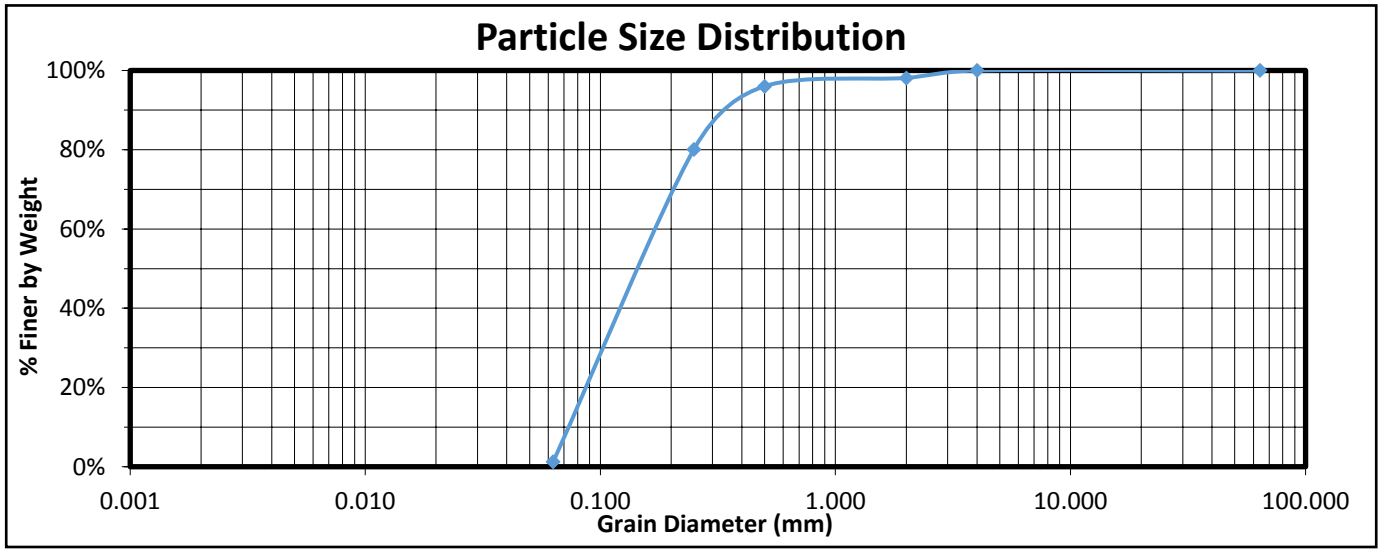
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER020	Total Dry Weight	40.09

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	40.09	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	40.09	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.75	39.34	98.13%	1.87%	Granule Gravel	Total Gravel	1.87%
35	0.0197	0.500	0.84	38.5	96.03%	2.10%	Very Coarse & Coarse Sand		
60	0.0098	0.25	6.39	32.11	80.09%	15.94%	Medium Sand		
230	0.0025	0.063	31.61	0.5	1.25%	78.85%	Very Fine & Fine Sand	Total Sand	96.88%
-	-	-	0.5	-	-	1.25%	Silt & Clay	Total Silt & Clay	1.25%



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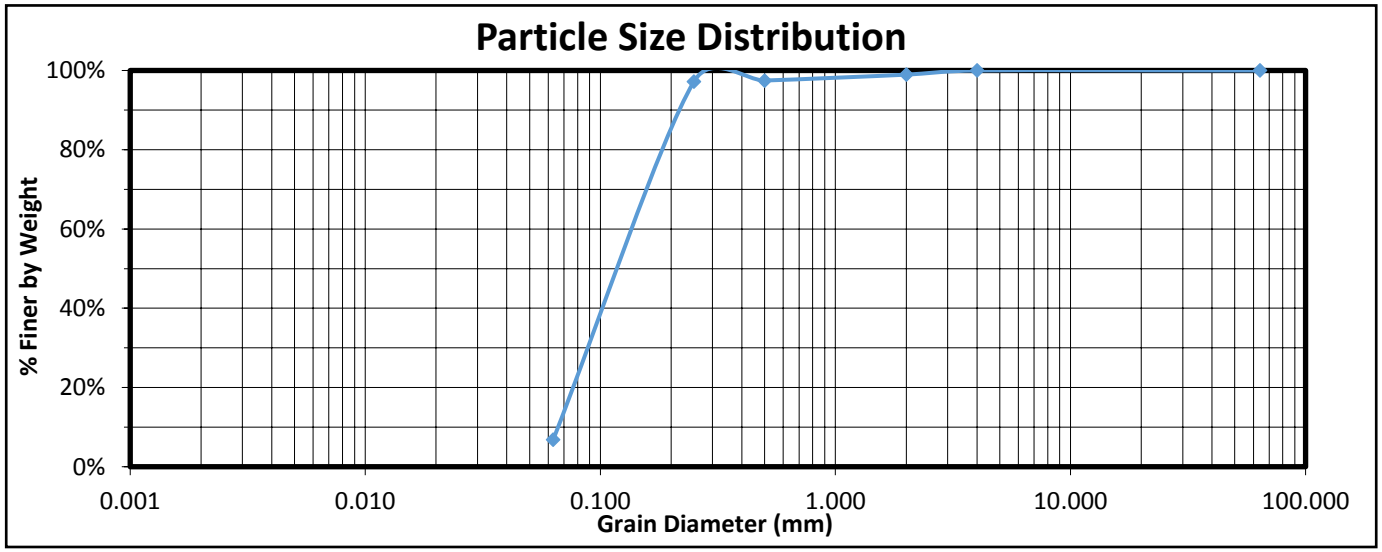
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER021	Total Dry Weight	43.88

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.88	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	43.88	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.46	43.42	98.95%	1.05%	Granule Gravel	Total Gravel	1.05%
35	0.0197	0.500	0.65	42.77	97.47%	1.48%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.12	42.65	97.20%	0.27%	Medium Sand		
230	0.0025	0.063	39.65	3	6.84%	90.36%	Very Fine & Fine Sand	Total Sand	92.11%
-	-	-	3	-	-	6.84%	Silt & Clay	Total Silt & Clay	6.84%



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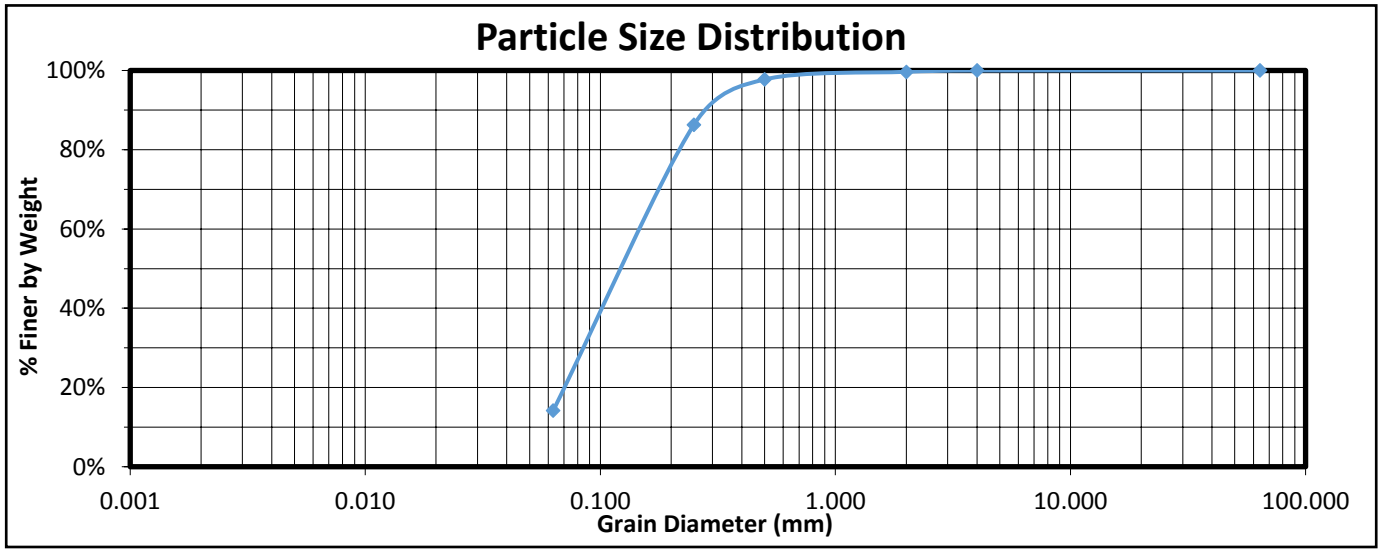
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER022	Total Dry Weight	42.38

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	42.38	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	42.38	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.14	42.24	99.67%	0.33%	Granule Gravel	Total Gravel	0.33%
35	0.0197	0.500	0.82	41.42	97.73%	1.93%	Very Coarse & Coarse Sand		
60	0.0098	0.25	4.85	36.57	86.29%	11.44%	Medium Sand		
230	0.0025	0.063	30.57	6	14.16%	72.13%	Very Fine & Fine Sand	Total Sand	85.51%
-	-	-	6	-	-	14.16%	Silt & Clay	Total Silt & Clay	14.16%



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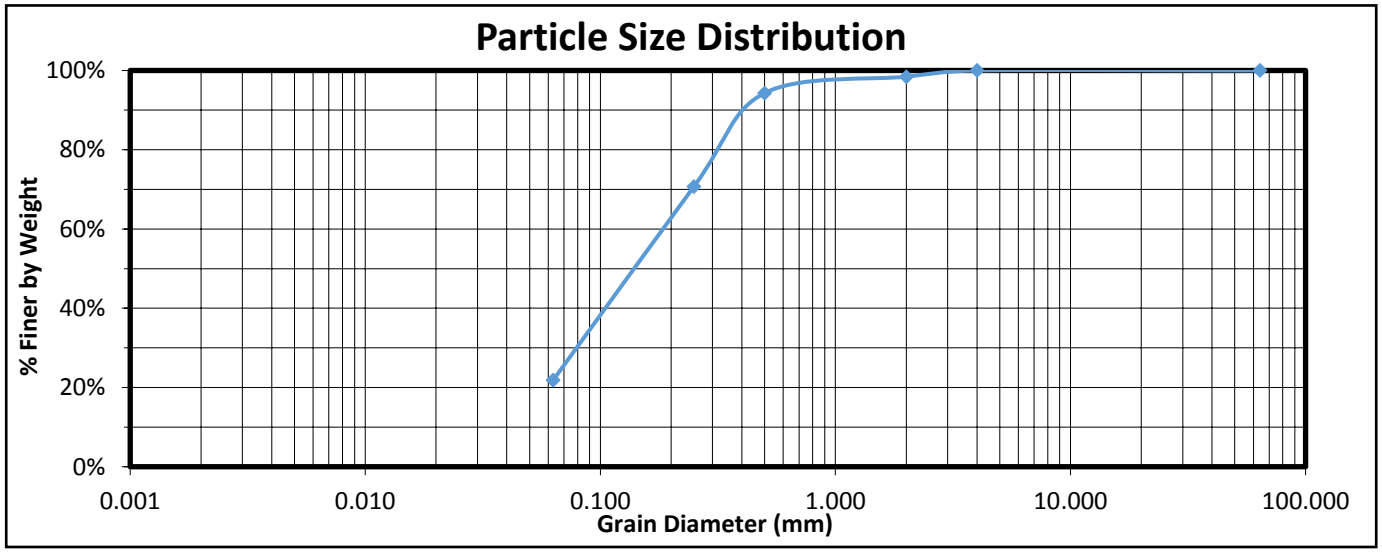
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER023	Total Dry Weight	41.16

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	41.16	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	41.16	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.64	40.52	98.45%	1.55%	Granule Gravel	Total Gravel	1.55%
35	0.0197	0.500	1.7	38.82	94.31%	4.13%	Very Coarse & Coarse Sand		
60	0.0098	0.25	9.72	29.1	70.70%	23.62%	Medium Sand		
230	0.0025	0.063	20.1	9	21.87%	48.83%	Very Fine & Fine Sand	Total Sand	76.58%
-	-	-	9	-	-	21.87%	Silt & Clay	Total Silt & Clay	21.87%



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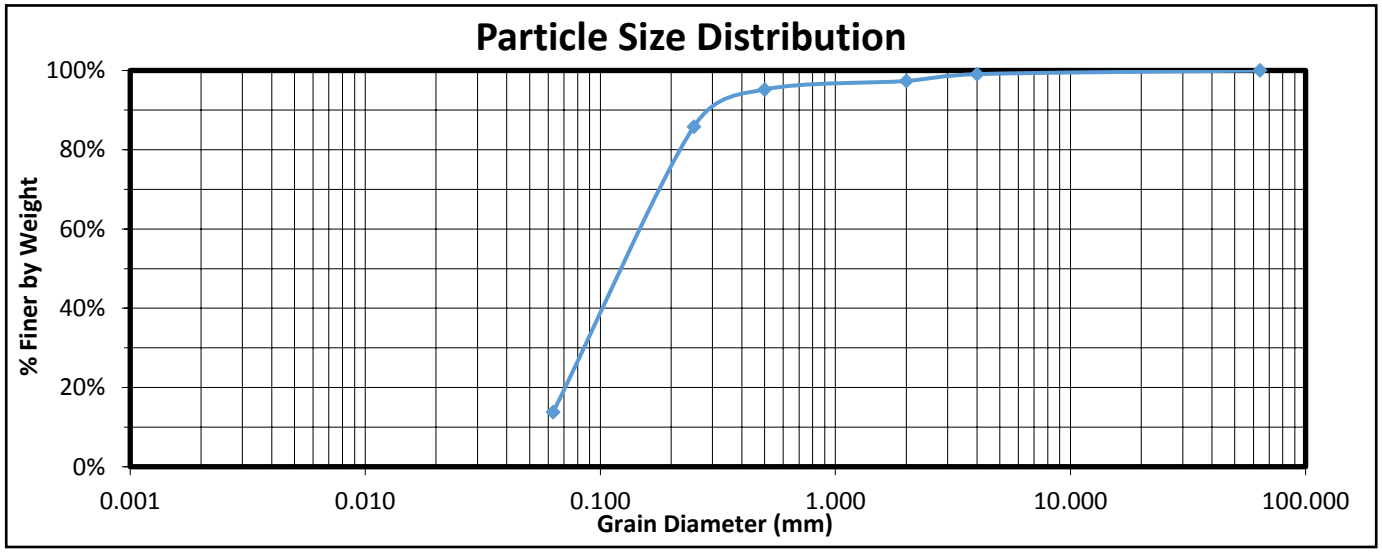
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER024	Total Dry Weight	43.5

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.5	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.4	43.1	99.08%	0.92%	Pebble Gravel		
10	0.7870	2.00	0.75	42.35	97.36%	1.72%	Granule Gravel	Total Gravel	2.64%
35	0.0197	0.500	0.93	41.42	95.22%	2.14%	Very Coarse & Coarse Sand		
60	0.0098	0.25	4.07	37.35	85.86%	9.36%	Medium Sand		
230	0.0025	0.063	31.35	6	13.79%	72.07%	Very Fine & Fine Sand	Total Sand	83.56%
-	-	-	6	-	-	13.79%	Silt & Clay	Total Silt & Clay	13.79%



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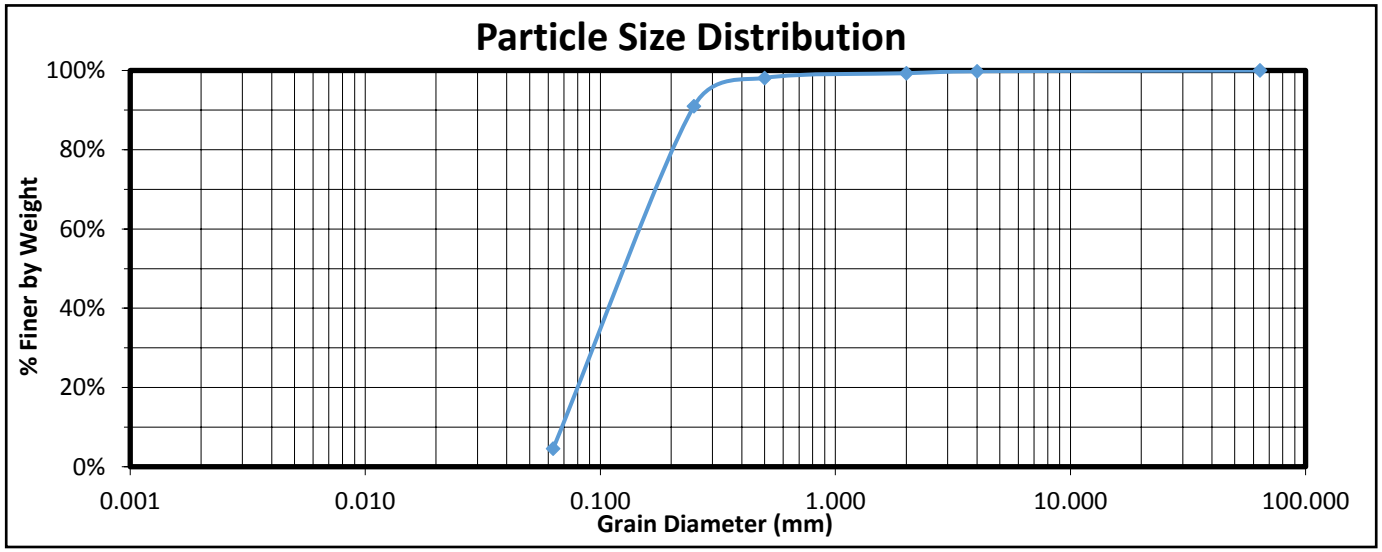
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER025	Total Dry Weight	43.55

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.55	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.08	43.47	99.82%	0.18%	Pebble Gravel		
10	0.7870	2.00	0.22	43.25	99.31%	0.51%	Granule Gravel	Total Gravel	0.69%
35	0.0197	0.500	0.52	42.73	98.12%	1.19%	Very Coarse & Coarse Sand		
60	0.0098	0.25	3.11	39.62	90.98%	7.14%	Medium Sand		
230	0.0025	0.063	37.62	2	4.59%	86.38%	Very Fine & Fine Sand	Total Sand	94.72%
-	-	-	2	-	-	4.59%	Silt & Clay	Total Silt & Clay	4.59%



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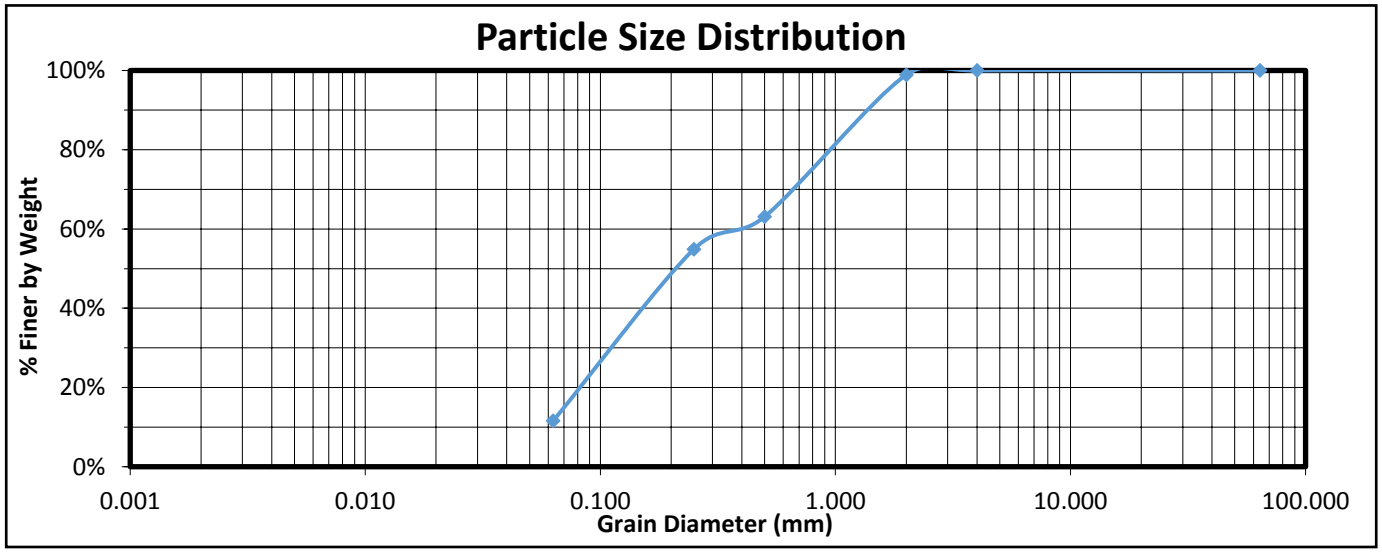
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER026	Total Dry Weight	17.27

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	17.27	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	17.27	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.19	17.08	98.90%	1.10%	Granule Gravel	Total Gravel	1.10%
35	0.0197	0.500	6.18	10.9	63.12%	35.78%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.42	9.48	54.89%	8.22%	Medium Sand		
230	0.0025	0.063	7.48	2	11.58%	43.31%	Very Fine & Fine Sand	Total Sand	87.32%
-	-	-	2	-	-	11.58%	Silt & Clay	Total Silt & Clay	11.58%



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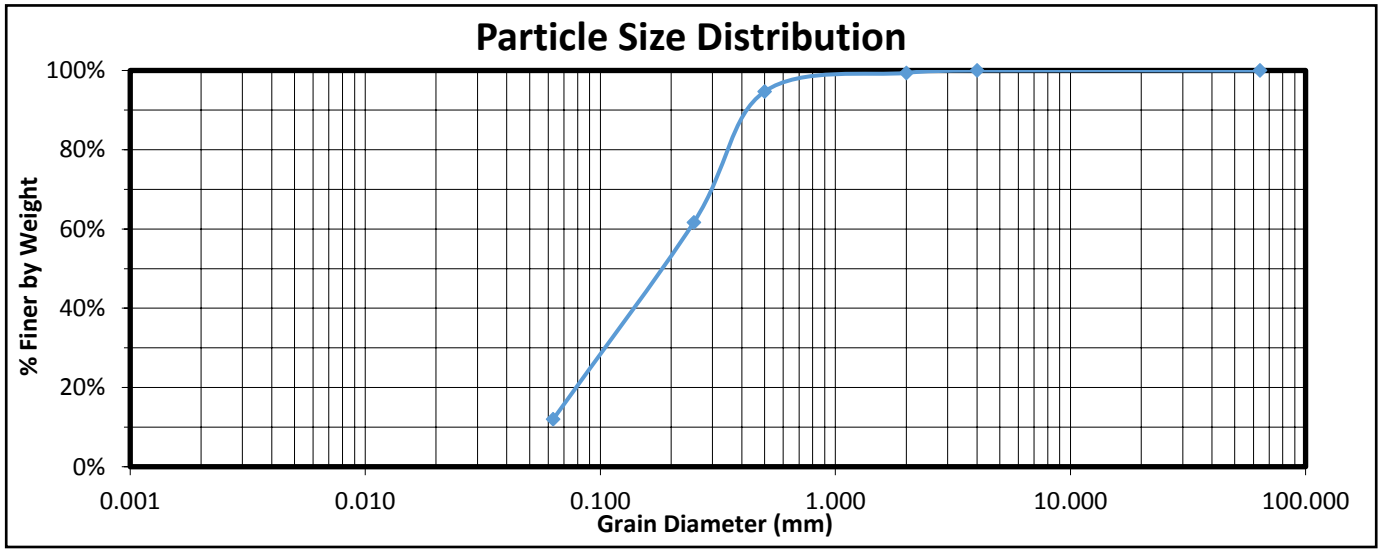
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER027	Total Dry Weight	49.99

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	49.99	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	49.99	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.3	49.69	99.40%	0.60%	Granule Gravel	Total Gravel	0.60%
35	0.0197	0.500	2.35	47.34	94.70%	4.70%	Very Coarse & Coarse Sand		
60	0.0098	0.25	16.49	30.85	61.71%	32.99%	Medium Sand		
230	0.0025	0.063	24.85	6	12.00%	49.71%	Very Fine & Fine Sand	Total Sand	87.40%
-	-	-	6	-	-	12.00%	Silt & Clay	Total Silt & Clay	12.00%



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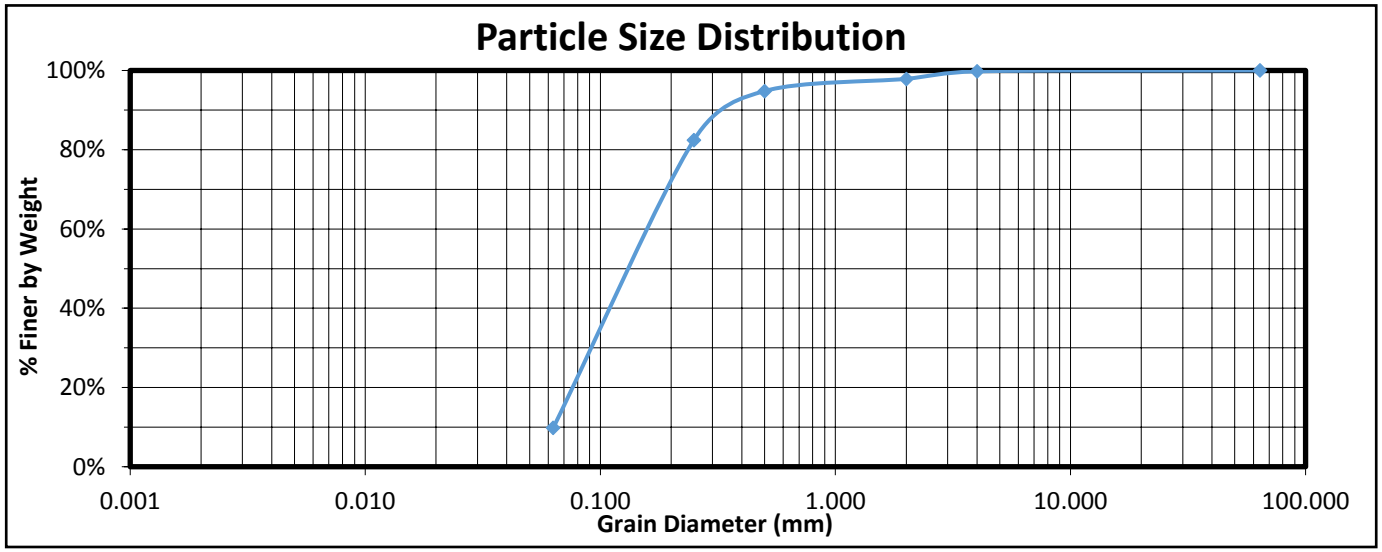
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER028	Total Dry Weight	40.86

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	40.86	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.09	40.77	99.78%	0.22%	Pebble Gravel		
10	0.7870	2.00	0.77	40	97.90%	1.88%	Granule Gravel	Total Gravel	2.10%
35	0.0197	0.500	1.26	38.74	94.81%	3.08%	Very Coarse & Coarse Sand		
60	0.0098	0.25	5.05	33.69	82.45%	12.36%	Medium Sand		
230	0.0025	0.063	29.69	4	9.79%	72.66%	Very Fine & Fine Sand	Total Sand	88.11%
-	-	-	4	-	-	9.79%	Silt & Clay	Total Silt & Clay	9.79%



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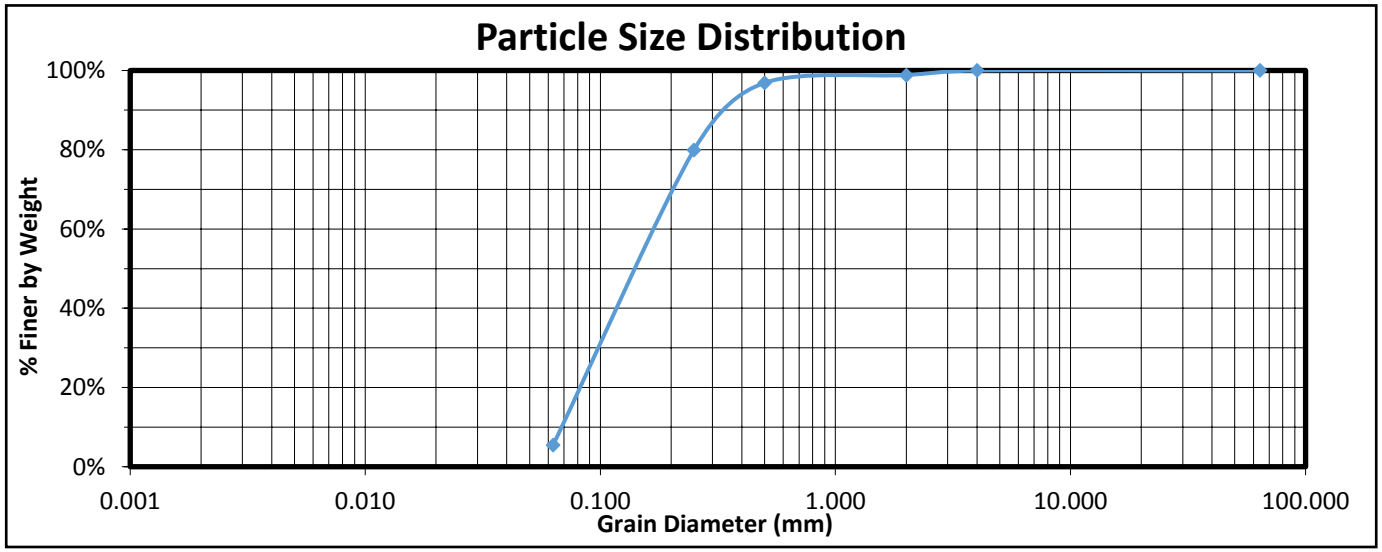
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER029	Total Dry Weight	36.38

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	36.38	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	36.38	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.42	35.96	98.85%	1.15%	Granule Gravel	Total Gravel	1.15%
35	0.0197	0.500	0.71	35.25	96.89%	1.95%	Very Coarse & Coarse Sand		
60	0.0098	0.25	6.18	29.07	79.91%	16.99%	Medium Sand		
230	0.0025	0.063	27.07	2	5.50%	74.41%	Very Fine & Fine Sand	Total Sand	93.35%
-	-	-	2	-	-	5.50%	Silt & Clay	Total Silt & Clay	5.50%



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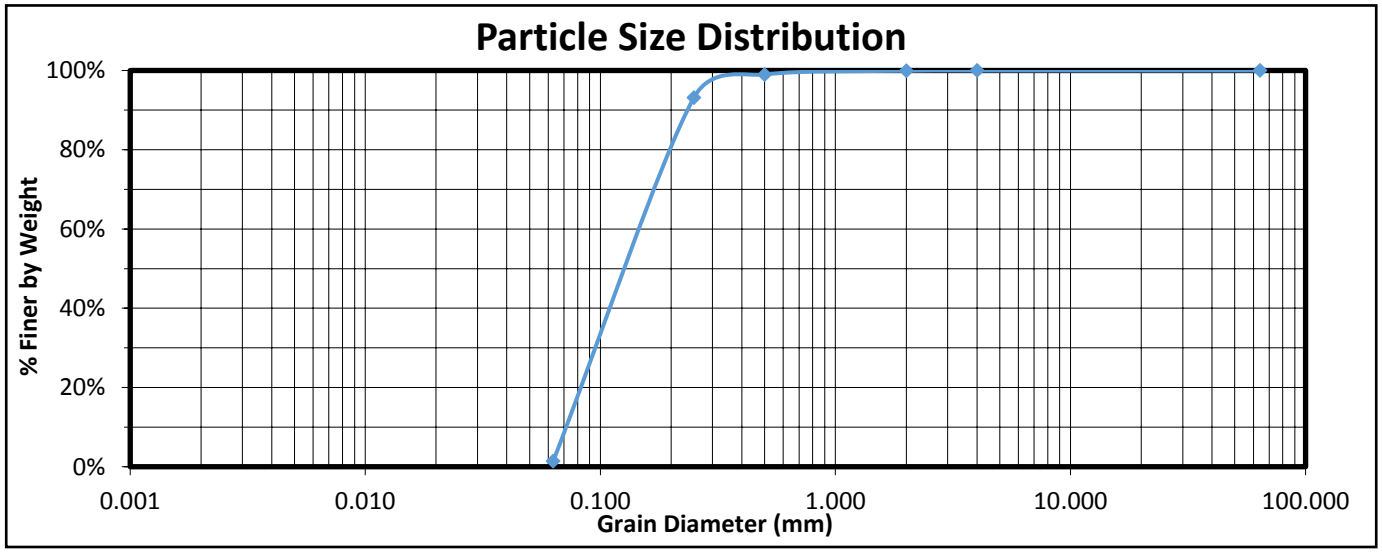
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER030	Total Dry Weight	35.61

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	35.61	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	35.61	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.02	35.59	99.94%	0.06%	Granule Gravel	Total Gravel	0.06%
35	0.0197	0.500	0.34	35.25	98.99%	0.95%	Very Coarse & Coarse Sand		
60	0.0098	0.25	2.08	33.17	93.15%	5.84%	Medium Sand		
230	0.0025	0.063	32.67	0.5	1.40%	91.74%	Very Fine & Fine Sand	Total Sand	98.54%
-	-	-	0.5	-	-	1.40%	Silt & Clay	Total Silt & Clay	1.40%



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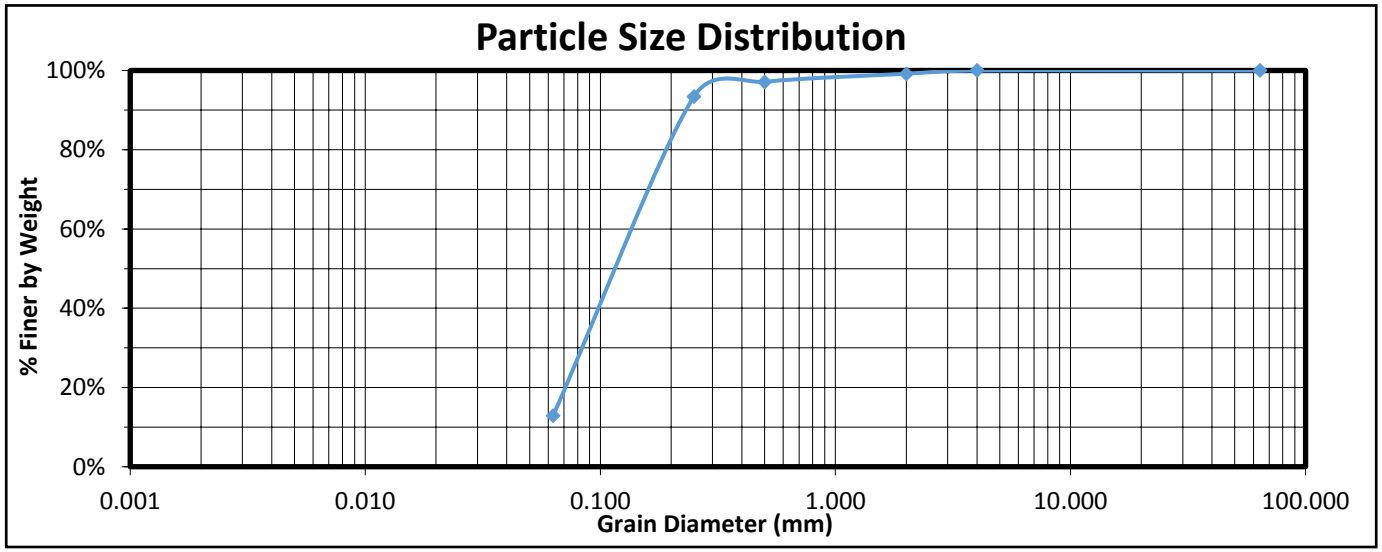
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER031	Total Dry Weight	46.46

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	46.46	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	46.46	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.38	46.08	99.18%	0.82%	Granule Gravel	Total Gravel	0.82%
35	0.0197	0.500	0.95	45.13	97.14%	2.04%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.73	43.4	93.41%	3.72%	Medium Sand		
230	0.0025	0.063	37.4	6	12.91%	80.50%	Very Fine & Fine Sand	Total Sand	86.27%
-	-	-	6	-	-	12.91%	Silt & Clay	Total Silt & Clay	12.91%



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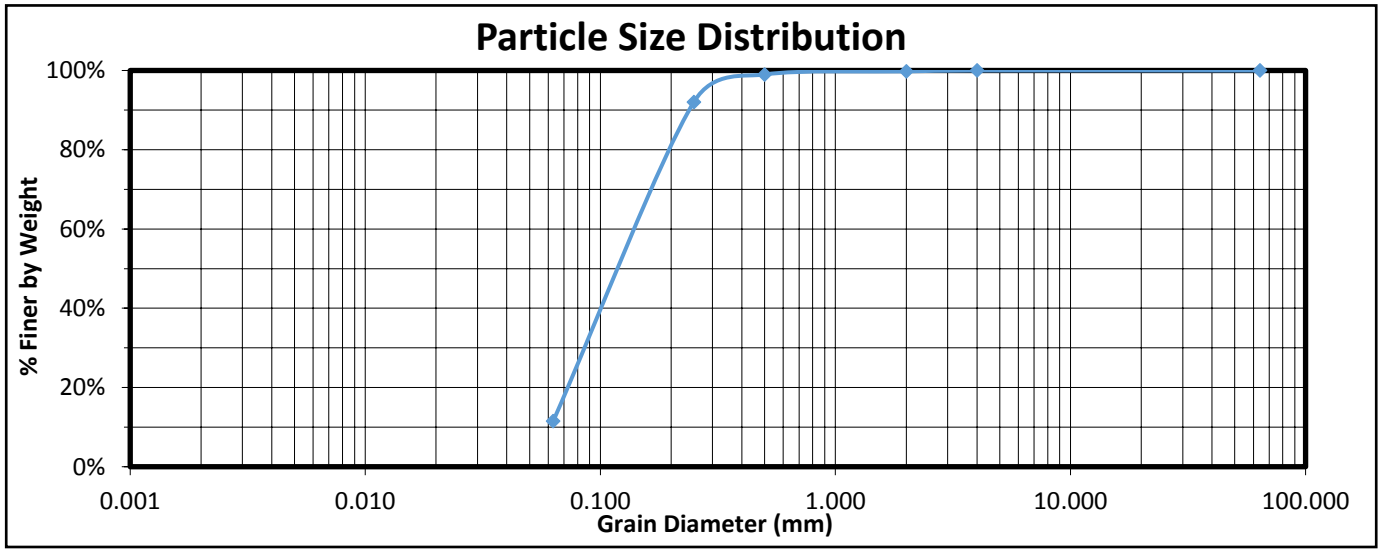
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER032	Total Dry Weight	34.76

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	34.76	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	34.76	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.08	34.68	99.77%	0.23%	Granule Gravel	Total Gravel	0.23%
35	0.0197	0.500	0.27	34.41	98.99%	0.78%	Very Coarse & Coarse Sand		
60	0.0098	0.25	2.41	32	92.06%	6.93%	Medium Sand		
230	0.0025	0.063	28	4	11.51%	80.55%	Very Fine & Fine Sand	Total Sand	88.26%
-	-	-	4	-	-	11.51%	Silt & Clay	Total Silt & Clay	11.51%



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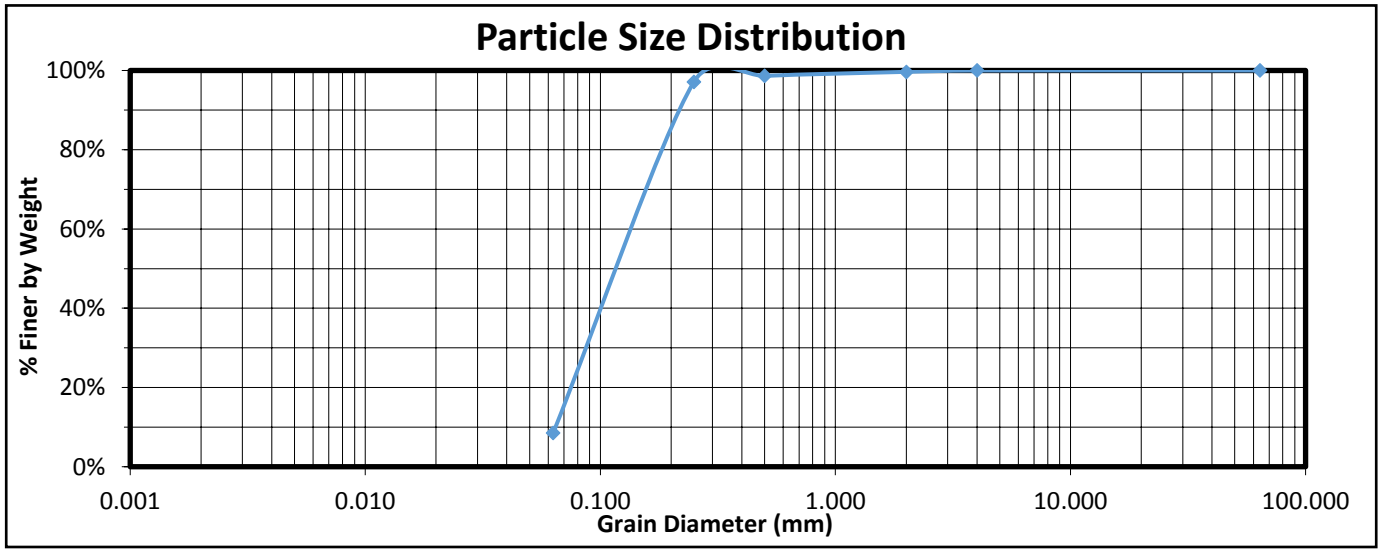
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER033	Total Dry Weight	35.15

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	35.15	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	35.15	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.12	35.03	99.66%	0.34%	Granule Gravel	Total Gravel	0.34%
35	0.0197	0.500	0.36	34.67	98.63%	1.02%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.53	34.14	97.13%	1.51%	Medium Sand		
230	0.0025	0.063	31.14	3	8.53%	88.59%	Very Fine & Fine Sand	Total Sand	91.12%
-	-	-	3	-	-	8.53%	Silt & Clay	Total Silt & Clay	8.53%



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1200 Veterans HWY
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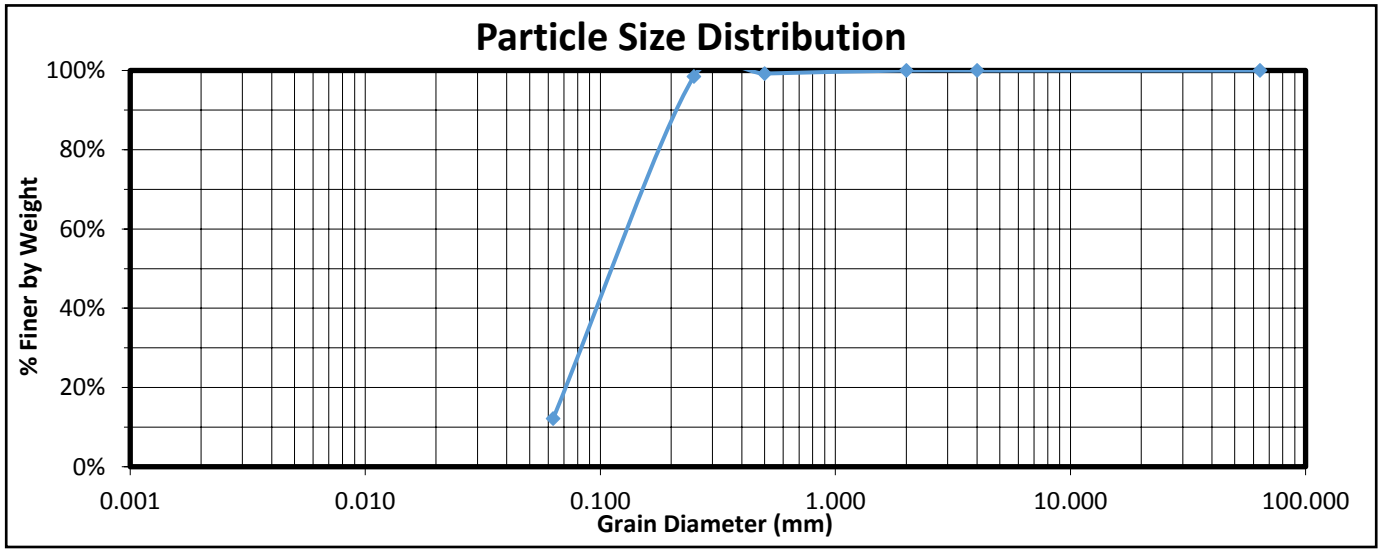
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER034	Total Dry Weight	24.61

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	24.61	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	24.61	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0	24.61	100.00%	0.00%	Granule Gravel	Total Gravel	0.00%
35	0.0197	0.500	0.19	24.42	99.23%	0.77%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.18	24.24	98.50%	0.73%	Medium Sand		
230	0.0025	0.063	21.24	3	12.19%	86.31%	Very Fine & Fine Sand	Total Sand	87.81%
-	-	-	3	-	-	12.19%	Silt & Clay	Total Silt & Clay	12.19%



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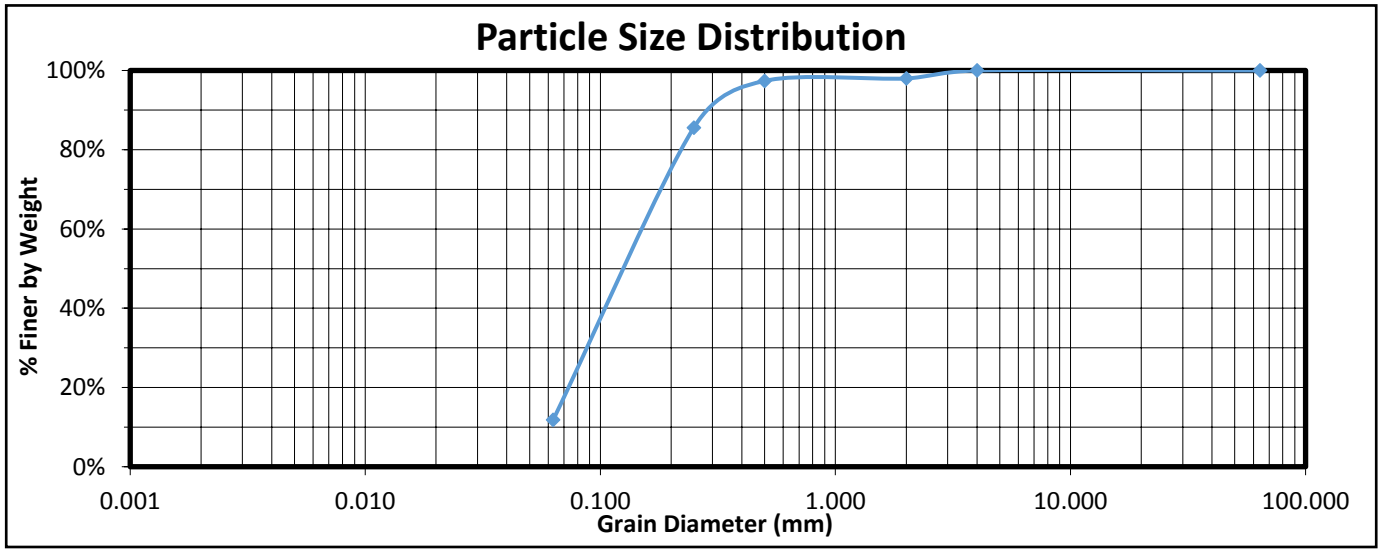
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER035	Total Dry Weight	42.24

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	42.24	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	42.24	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.85	41.39	97.99%	2.01%	Granule Gravel	Total Gravel	2.01%
35	0.0197	0.500	0.26	41.13	97.37%	0.62%	Very Coarse & Coarse Sand		
60	0.0098	0.25	4.97	36.16	85.61%	11.77%	Medium Sand		
230	0.0025	0.063	31.16	5	11.84%	73.77%	Very Fine & Fine Sand	Total Sand	86.15%
-	-	-	5	-	-	11.84%	Silt & Clay	Total Silt & Clay	11.84%



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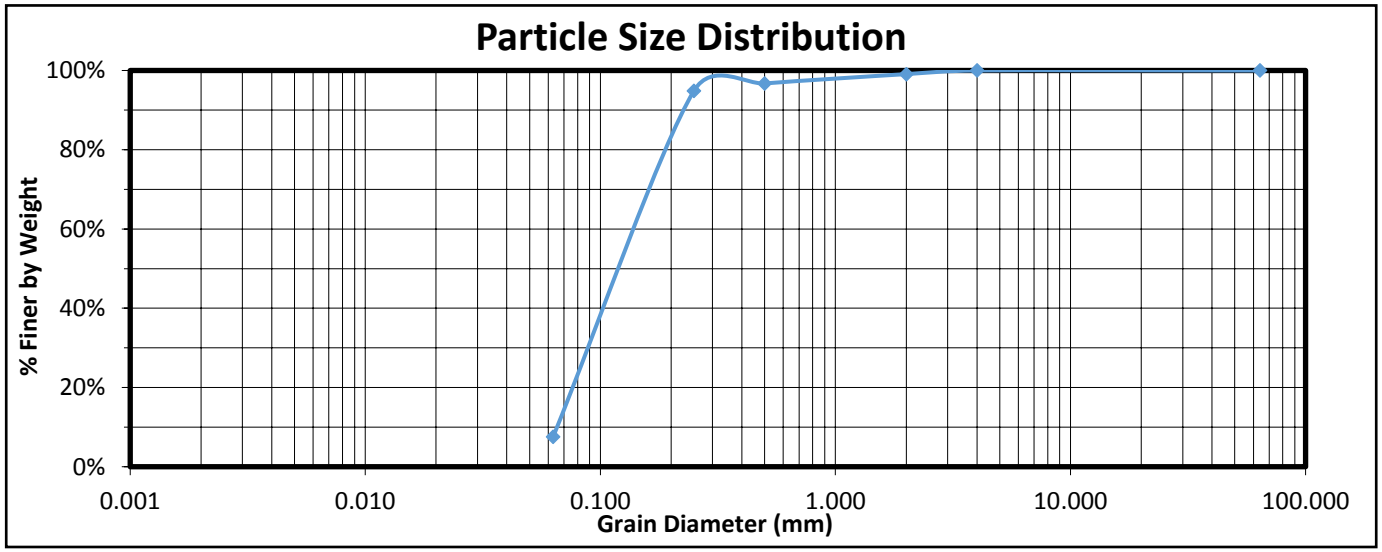
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER036	Total Dry Weight	39.46

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	39.46	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	39.46	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.36	39.1	99.09%	0.91%	Granule Gravel	Total Gravel	0.91%
35	0.0197	0.500	0.93	38.17	96.73%	2.36%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.74	37.43	94.86%	1.88%	Medium Sand		
230	0.0025	0.063	34.43	3	7.60%	87.25%	Very Fine & Fine Sand	Total Sand	91.49%
-	-	-	3	-	-	7.60%	Silt & Clay	Total Silt & Clay	7.60%



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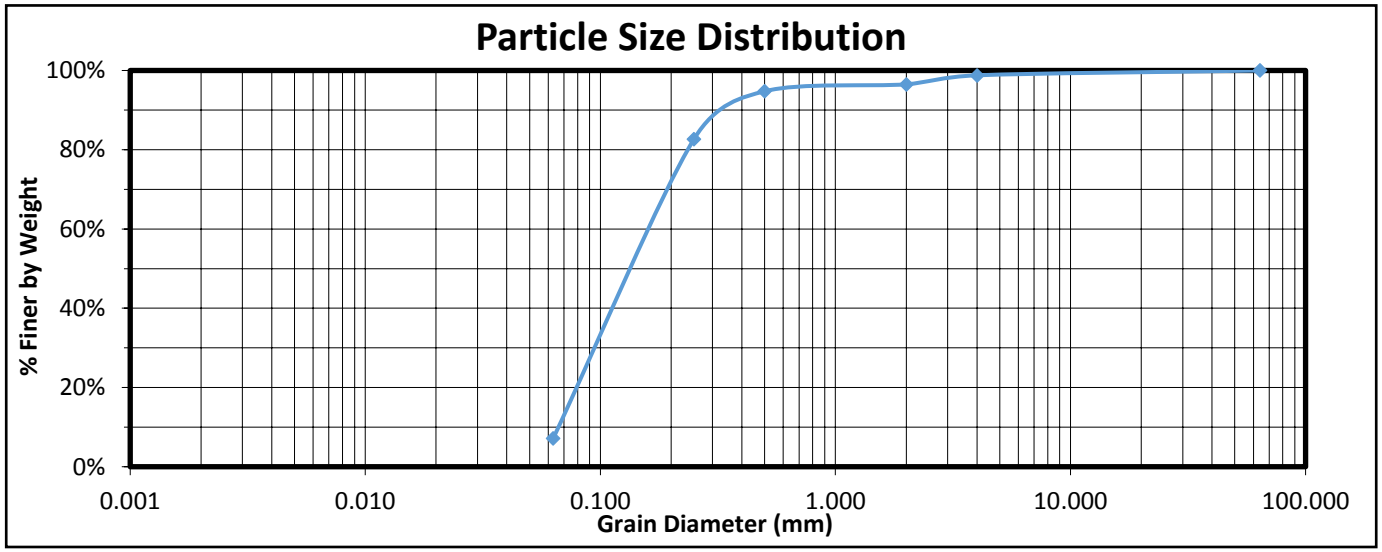
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER037	Total Dry Weight	41.93

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	41.93	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.51	41.42	98.78%	1.22%	Pebble Gravel		
10	0.7870	2.00	0.95	40.47	96.52%	2.27%	Granule Gravel	Total Gravel	3.48%
35	0.0197	0.500	0.74	39.73	94.75%	1.76%	Very Coarse & Coarse Sand		
60	0.0098	0.25	5.07	34.66	82.66%	12.09%	Medium Sand		
230	0.0025	0.063	31.66	3	7.15%	75.51%	Very Fine & Fine Sand	Total Sand	89.36%
-	-	-	3	-	-	7.15%	Silt & Clay	Total Silt & Clay	7.15%



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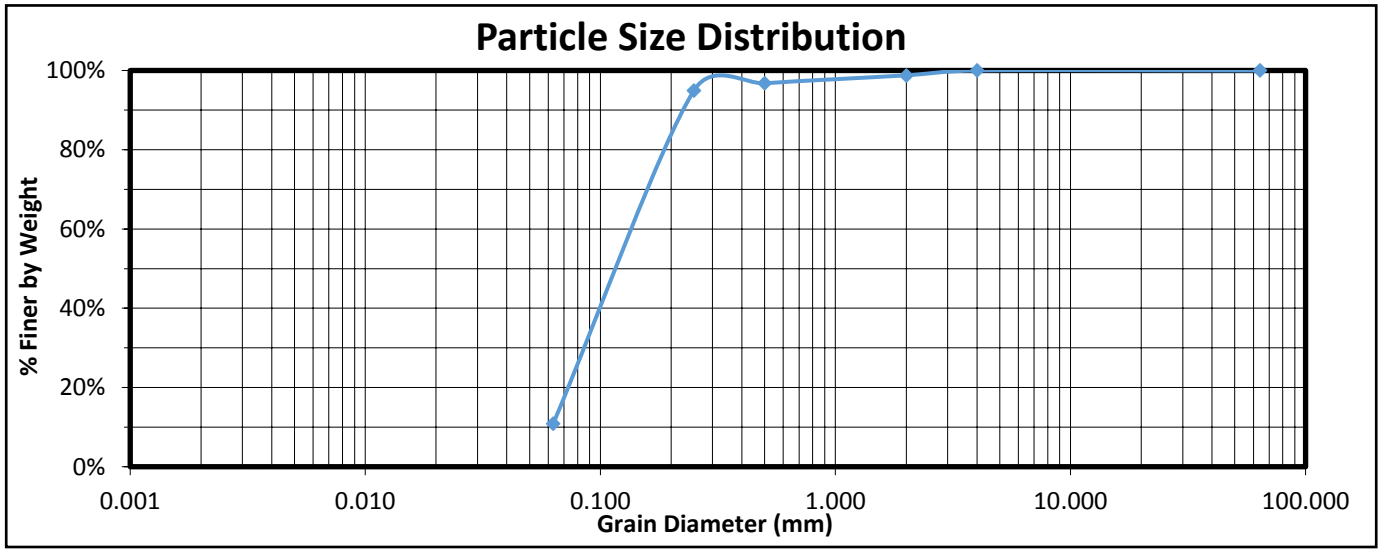
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER038	Total Dry Weight	36.85

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	36.85	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	36.85	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.45	36.4	98.78%	1.22%	Granule Gravel	Total Gravel	1.22%
35	0.0197	0.500	0.74	35.66	96.77%	2.01%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.68	34.98	94.93%	1.85%	Medium Sand		
230	0.0025	0.063	30.98	4	10.85%	84.07%	Very Fine & Fine Sand	Total Sand	87.92%
-	-	-	4	-	-	10.85%	Silt & Clay	Total Silt & Clay	10.85%



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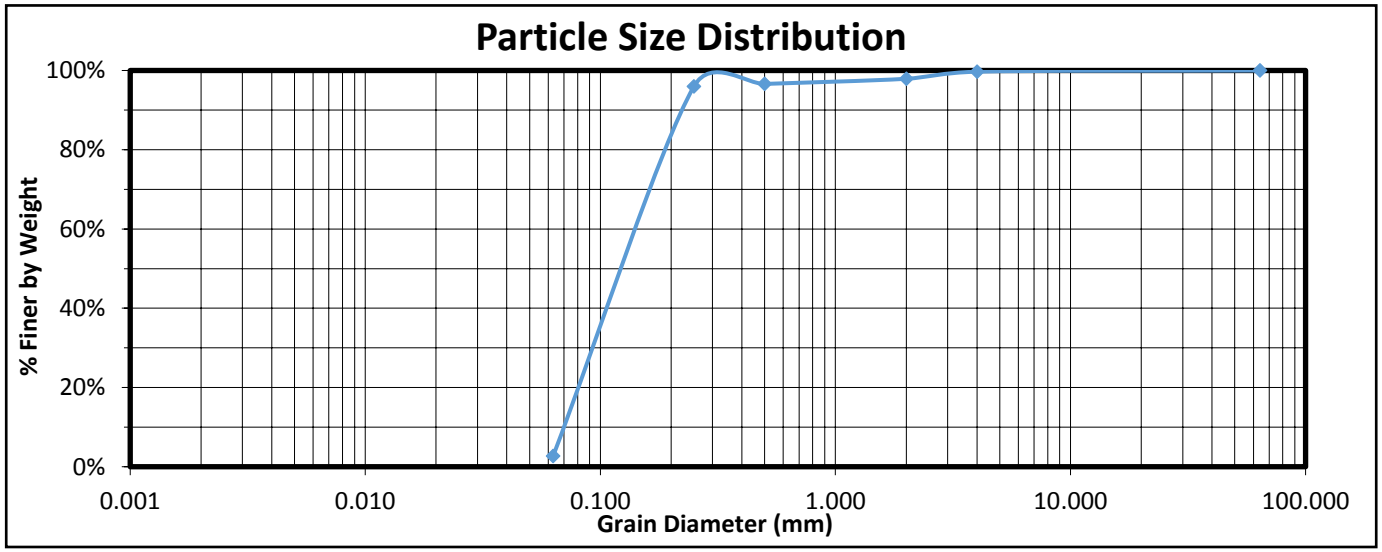
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER039	Total Dry Weight	36.3

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	36.3	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.11	36.19	99.70%	0.30%	Pebble Gravel		
10	0.7870	2.00	0.65	35.54	97.91%	1.79%	Granule Gravel	Total Gravel	2.09%
35	0.0197	0.500	0.47	35.07	96.61%	1.29%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.23	34.84	95.98%	0.63%	Medium Sand		
230	0.0025	0.063	33.84	1	2.75%	93.22%	Very Fine & Fine Sand	Total Sand	95.15%
-	-	-	1	-	-	2.75%	Silt & Clay	Total Silt & Clay	2.75%



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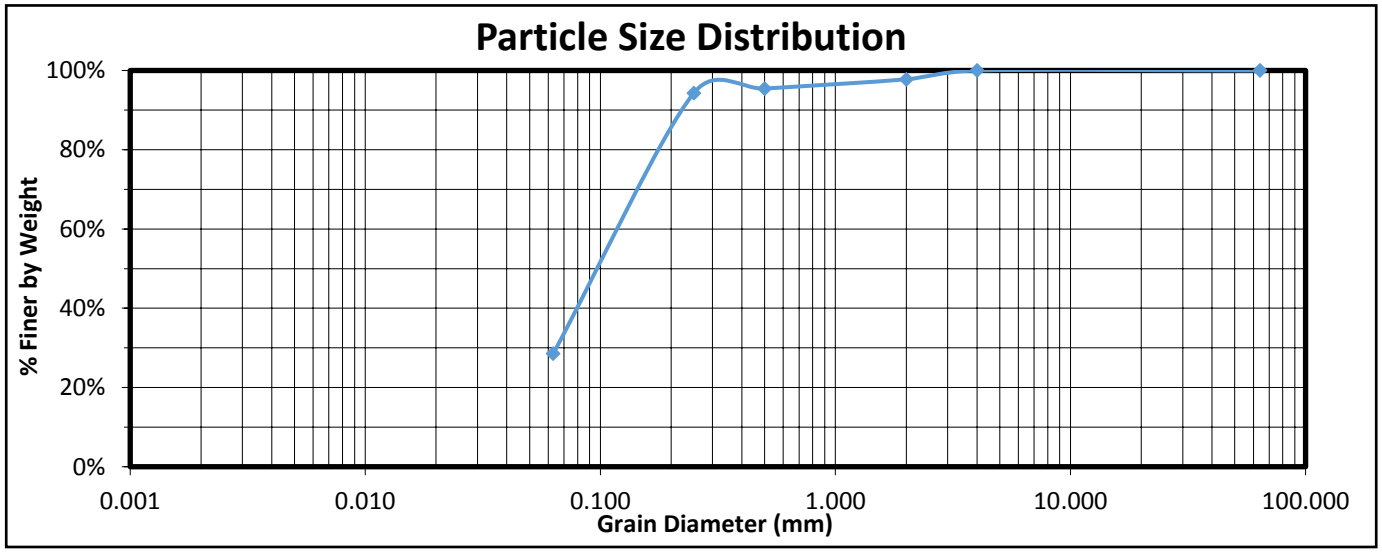
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER040	Total Dry Weight	31.55

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	31.55	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	31.55	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.7	30.85	97.78%	2.22%	Granule Gravel	Total Gravel	2.22%
35	0.0197	0.500	0.74	30.11	95.44%	2.35%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.35	29.76	94.33%	1.11%	Medium Sand		
230	0.0025	0.063	20.76	9	28.53%	65.80%	Very Fine & Fine Sand	Total Sand	69.26%
-	-	-	9	-	-	28.53%	Silt & Clay	Total Silt & Clay	28.53%



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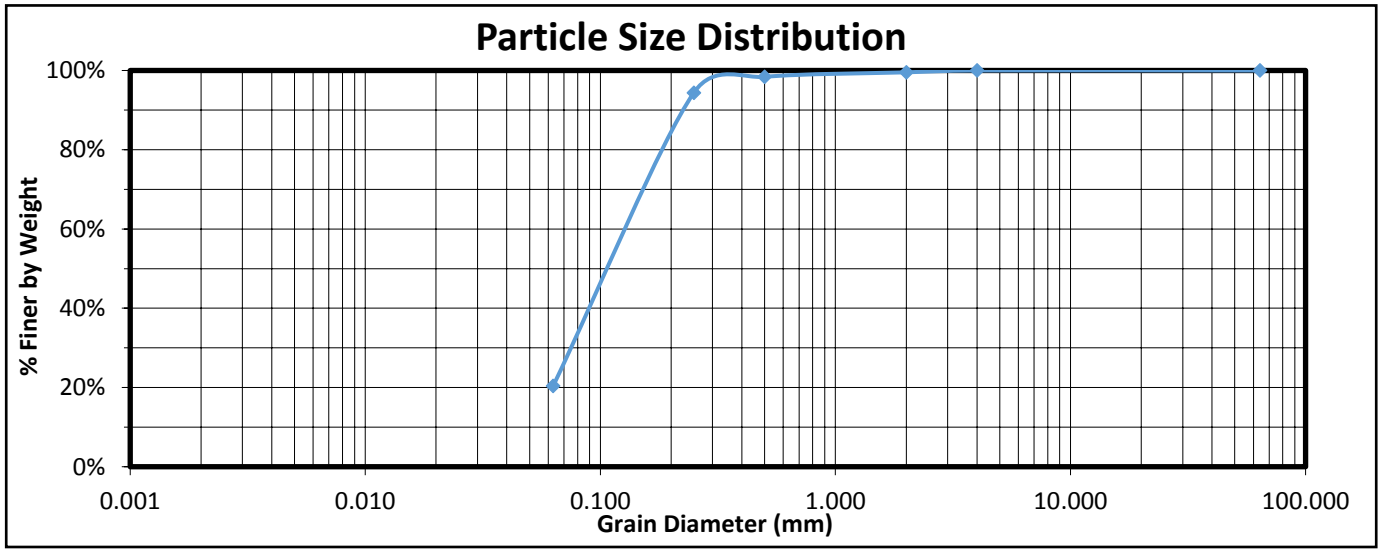
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER041	Total Dry Weight	53.9

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	53.9	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	53.9	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.25	53.65	99.54%	0.46%	Granule Gravel	Total Gravel	0.46%
35	0.0197	0.500	0.62	53.03	98.39%	1.15%	Very Coarse & Coarse Sand		
60	0.0098	0.25	2.14	50.89	94.42%	3.97%	Medium Sand		
230	0.0025	0.063	39.89	11	20.41%	74.01%	Very Fine & Fine Sand	Total Sand	79.13%
-	-	-	11	-	-	20.41%	Silt & Clay	Total Silt & Clay	20.41%



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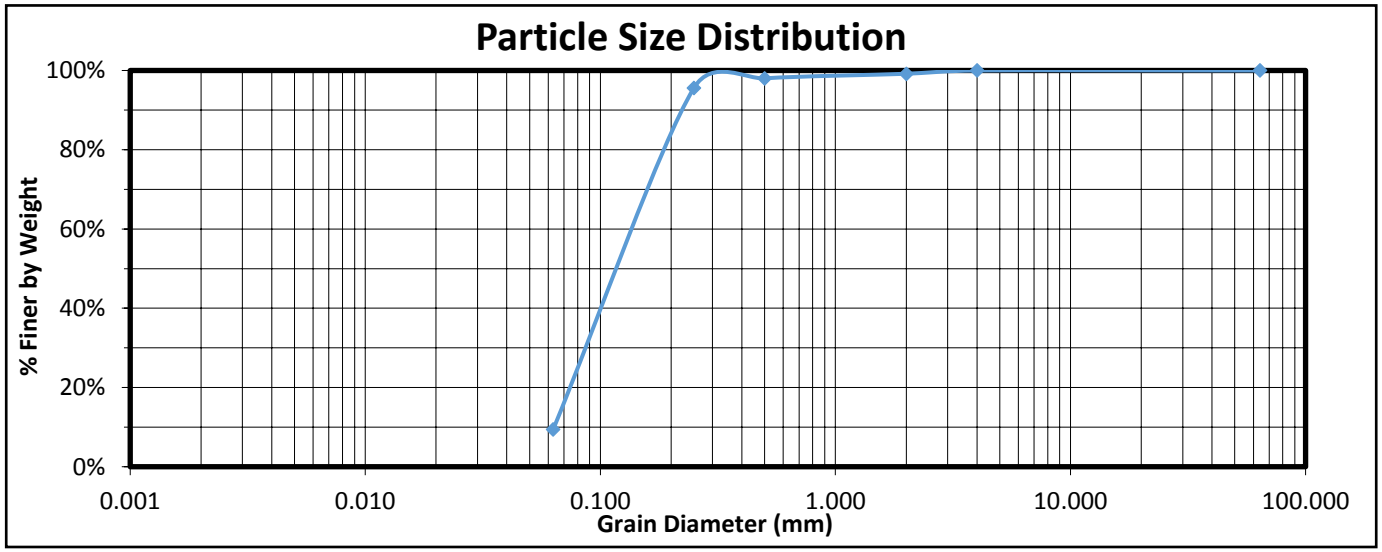
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER042	Total Dry Weight	42.4

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	42.4	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	42.4	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.35	42.05	99.17%	0.83%	Granule Gravel	Total Gravel	0.83%
35	0.0197	0.500	0.49	41.56	98.02%	1.16%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.03	40.53	95.59%	2.43%	Medium Sand		
230	0.0025	0.063	36.53	4	9.43%	86.16%	Very Fine & Fine Sand	Total Sand	89.74%
-	-	-	4	-	-	9.43%	Silt & Clay	Total Silt & Clay	9.43%



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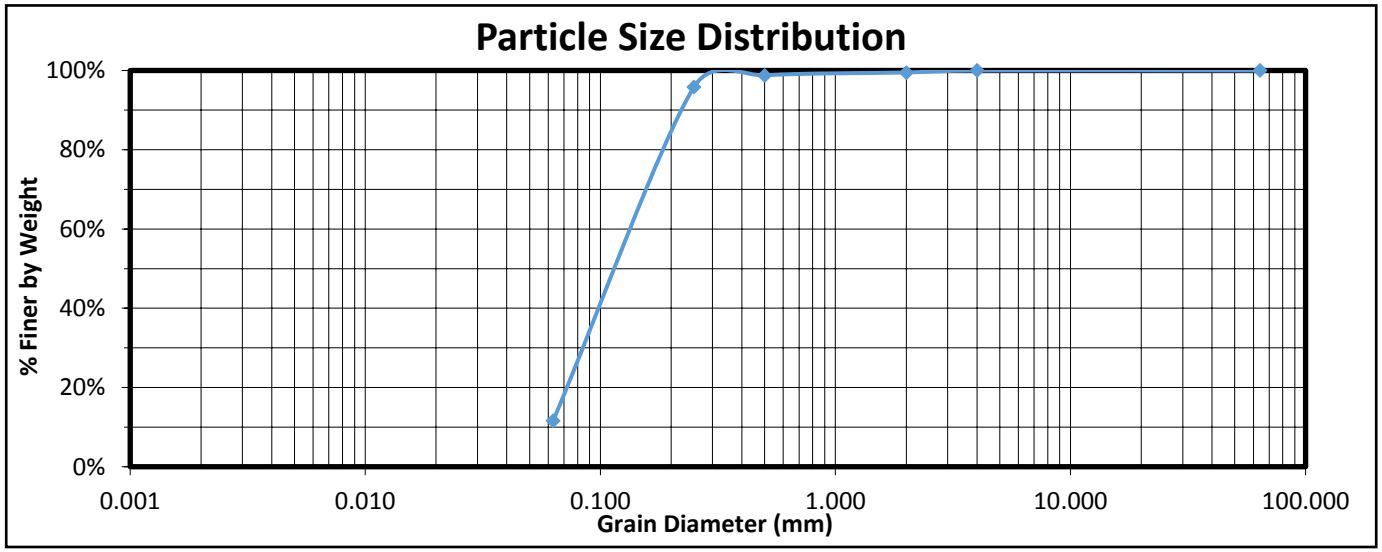
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER043	Total Dry Weight	34.37

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	34.37	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	34.37	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.17	34.2	99.51%	0.49%	Granule Gravel	Total Gravel	0.49%
35	0.0197	0.500	0.25	33.95	98.78%	0.73%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.02	32.93	95.81%	2.97%	Medium Sand		
230	0.0025	0.063	28.93	4	11.64%	84.17%	Very Fine & Fine Sand	Total Sand	87.87%
-	-	-	4	-	-	11.64%	Silt & Clay	Total Silt & Clay	11.64%



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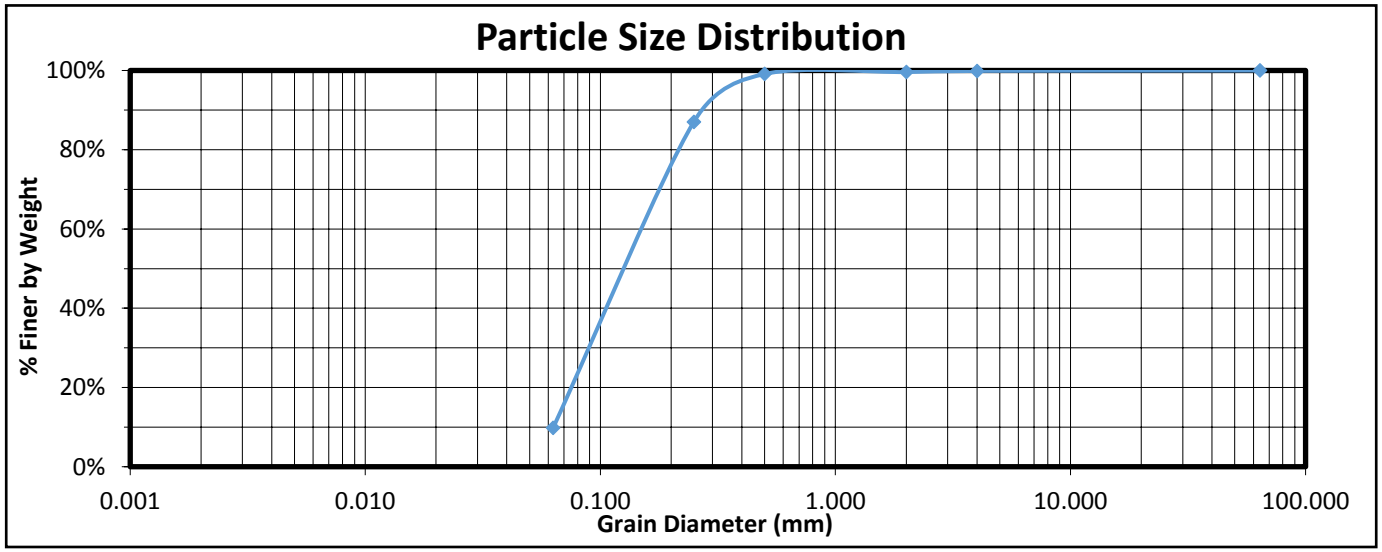
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	ER044	Total Dry Weight	30.45

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	30.45	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.03	30.42	99.90%	0.10%	Pebble Gravel		
10	0.7870	2.00	0.09	30.33	99.61%	0.30%	Granule Gravel	Total Gravel	0.39%
35	0.0197	0.500	0.15	30.18	99.11%	0.49%	Very Coarse & Coarse Sand		
60	0.0098	0.25	3.67	26.51	87.06%	12.05%	Medium Sand		
230	0.0025	0.063	23.51	3	9.85%	77.21%	Very Fine & Fine Sand	Total Sand	89.75%
-	-	-	3	-	-	9.85%	Silt & Clay	Total Silt & Clay	9.85%



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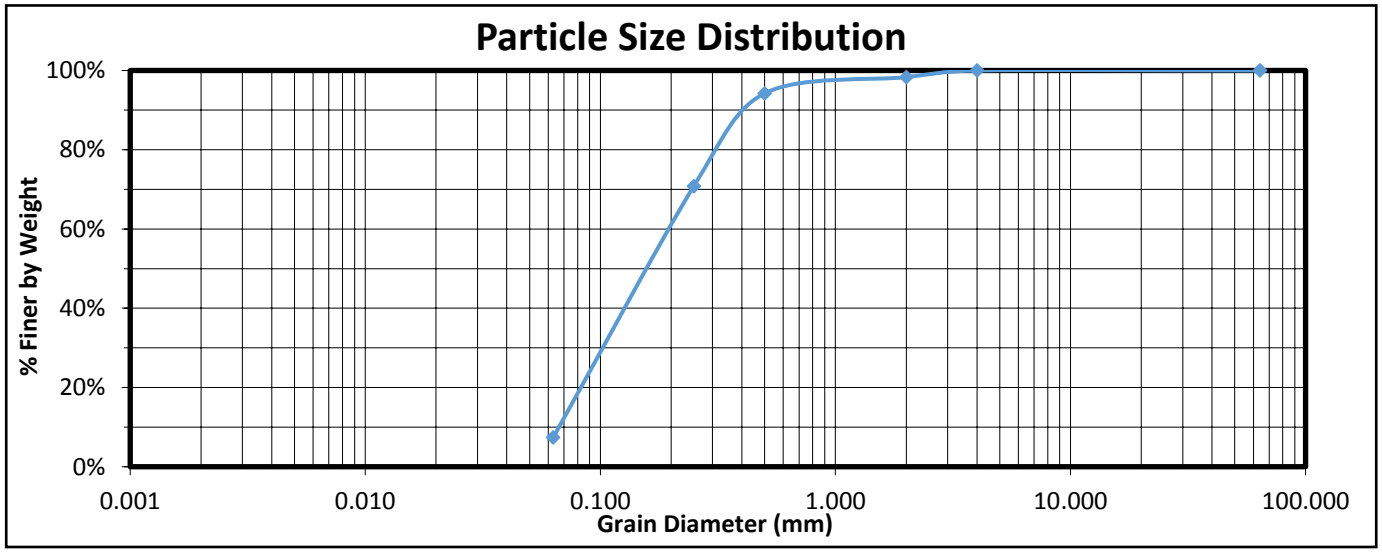
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	RS001	Total Dry Weight	40.57

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	40.57	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	40.57	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.68	39.89	98.32%	1.68%	Granule Gravel	Total Gravel	1.68%
35	0.0197	0.500	1.66	38.23	94.23%	4.09%	Very Coarse & Coarse Sand		
60	0.0098	0.25	9.49	28.74	70.84%	23.39%	Medium Sand		
230	0.0025	0.063	25.74	3	7.39%	63.45%	Very Fine & Fine Sand	Total Sand	90.93%
-	-	-	3	-	-	7.39%	Silt & Clay	Total Silt & Clay	7.39%



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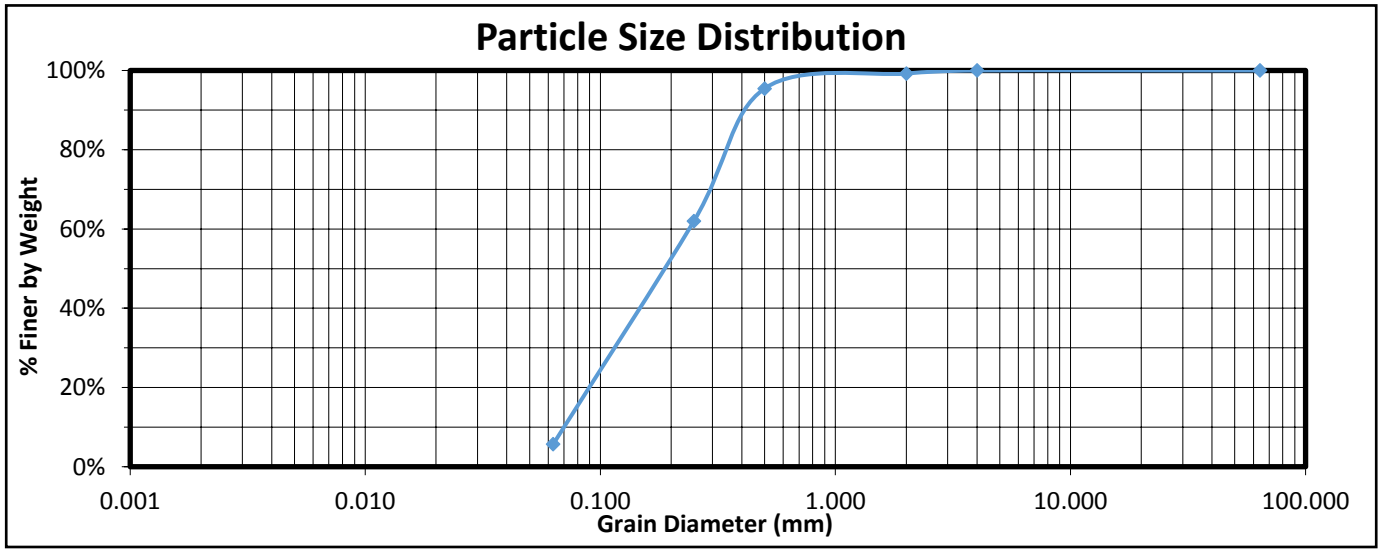
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	RS002	Total Dry Weight	35.07

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	35.07	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	35.07	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.27	34.8	99.23%	0.77%	Granule Gravel	Total Gravel	0.77%
35	0.0197	0.500	1.32	33.48	95.47%	3.76%	Very Coarse & Coarse Sand		
60	0.0098	0.25	11.74	21.74	61.99%	33.48%	Medium Sand		
230	0.0025	0.063	19.74	2	5.70%	56.29%	Very Fine & Fine Sand	Total Sand	93.53%
-	-	-	2	-	-	5.70%	Silt & Clay	Total Silt & Clay	5.70%



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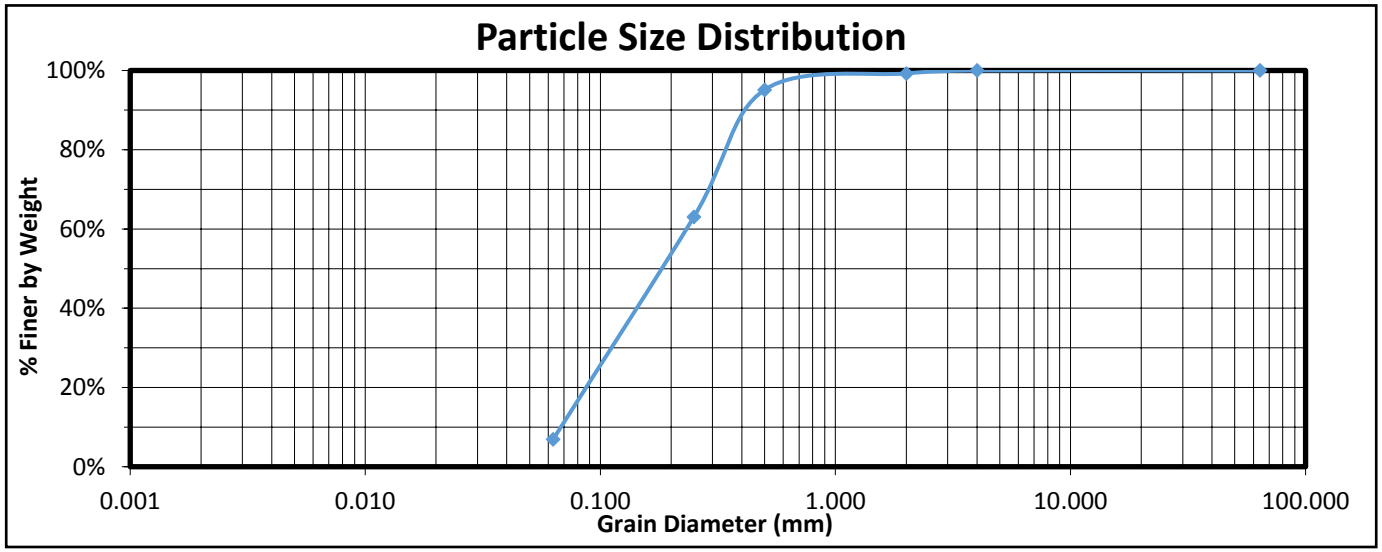
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	RS003	Total Dry Weight	43.17

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	43.17	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	43.17	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.32	42.85	99.26%	0.74%	Granule Gravel	Total Gravel	0.74%
35	0.0197	0.500	1.78	41.07	95.14%	4.12%	Very Coarse & Coarse Sand		
60	0.0098	0.25	13.85	27.22	63.05%	32.08%	Medium Sand		
230	0.0025	0.063	24.22	3	6.95%	56.10%	Very Fine & Fine Sand	Total Sand	92.31%
-	-	-	3	-	-	6.95%	Silt & Clay	Total Silt & Clay	6.95%



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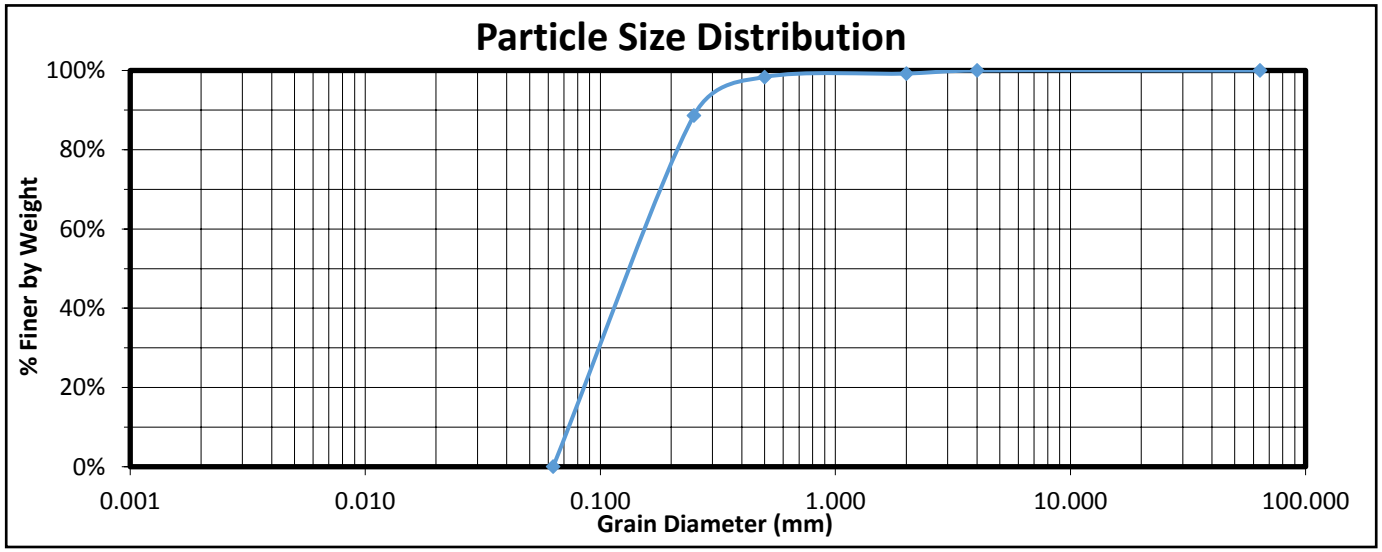
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	RS004	Total Dry Weight	33.29

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	33.29	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	33.29	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.26	33.03	99.22%	0.78%	Granule Gravel	Total Gravel	0.78%
35	0.0197	0.500	0.29	32.74	98.35%	0.87%	Very Coarse & Coarse Sand		
60	0.0098	0.25	3.23	29.51	88.65%	9.70%	Medium Sand		
230	0.0025	0.063	29.5	0.01	0.03%	88.62%	Very Fine & Fine Sand	Total Sand	99.19%
-	-	-	0.01	-	-	0.03%	Silt & Clay	Total Silt & Clay	0.03%



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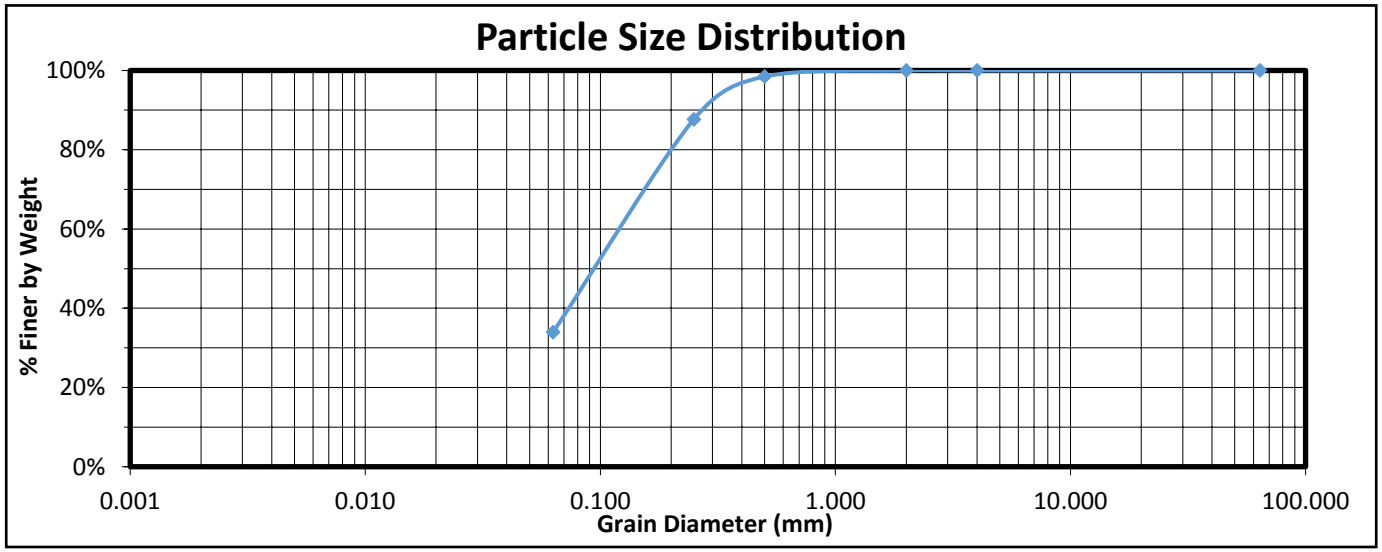
Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	RS005	Total Dry Weight	29.42

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	29.42	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	29.42	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0	29.42	100.00%	0.00%	Granule Gravel	Total Gravel	0.00%
35	0.0197	0.500	0.45	28.97	98.47%	1.53%	Very Coarse & Coarse Sand		
60	0.0098	0.25	3.17	25.8	87.70%	10.77%	Medium Sand		
230	0.0025	0.063	15.8	10	33.99%	53.70%	Very Fine & Fine Sand	Total Sand	66.01%
-	-	-	10	-	-	33.99%	Silt & Clay	Total Silt & Clay	33.99%



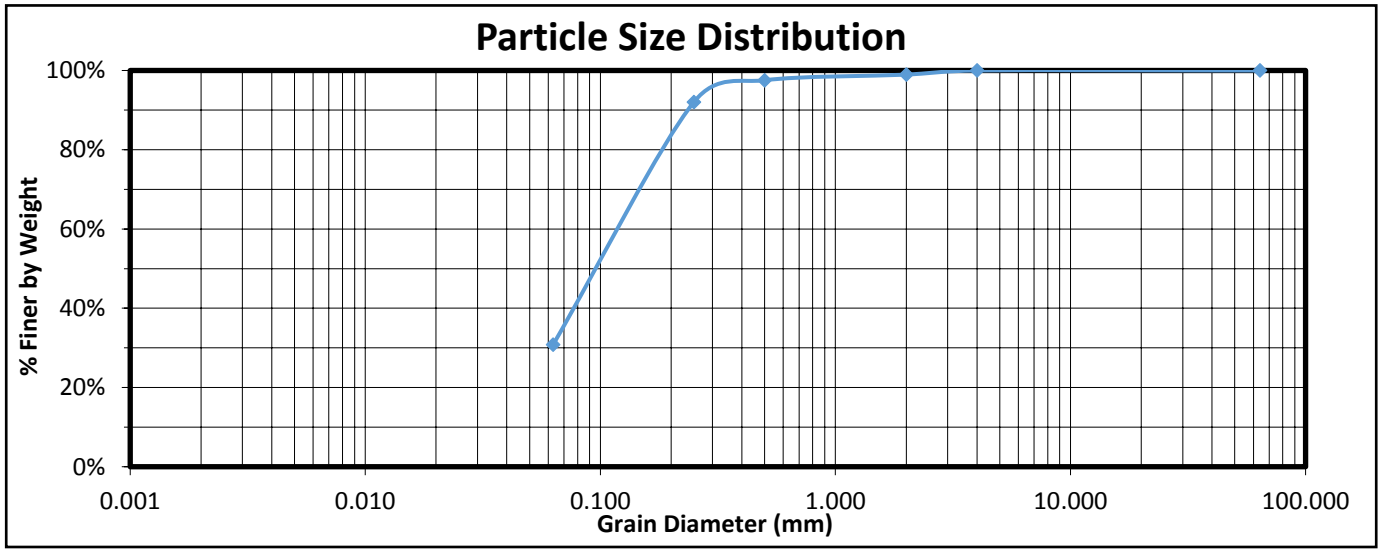
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 8/2/2014
Analyst: K. Thyberg

Sample ID	RS006	Total Dry Weight	16.21

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	16.21	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	16.21	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.17	16.04	98.95%	1.05%	Granule Gravel	Total Gravel	1.05%
35	0.0197	0.500	0.23	15.81	97.53%	1.42%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.89	14.92	92.04%	5.49%	Medium Sand		
230	0.0025	0.063	9.92	5	30.85%	61.20%	Very Fine & Fine Sand	Total Sand	68.11%
-	-	-	5	-	-	30.85%	Silt & Clay	Total Silt & Clay	30.85%



Grain Size Analysis Report

Submitted To: Tetra Tech

Prepared By: Cashin Associates, P.C.
1200 Veterans Memorial Highway
Hauppauge, New York 11788

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November 2014

Grain Size Analysis Summary

Sample ID	% Total Gravel	% Total Sand	% Silt & Clay
ER001	0.00%	99.54%	0.46%
ER002	1.66%	98.34%	0.00%
ER003	6.76%	93.24%	0.00%
ER004	10.21%	89.79%	0.00%
ER005	2.60%	97.40%	0.00%
ER006	1.83%	98.17%	0.00%
ER007	4.15%	95.85%	0.00%
ER008	2.03%	97.97%	0.00%
ER009	9.09%	90.91%	0.00%
ER010	6.15%	93.85%	0.00%
ER011	4.10%	95.90%	0.00%
ER012	4.55%	95.45%	0.00%
ER013	2.05%	97.95%	0.00%
ER014	3.18%	96.82%	0.00%
NoName	1.62%	98.29%	0.10%
ER016	6.02%	93.98%	0.00%
ER017	3.32%	96.68%	0.00%
ER018	2.60%	97.40%	0.00%
ER019	2.72%	97.19%	0.09%
ER020	1.64%	98.31%	0.06%
ER021	1.59%	98.41%	0.00%
ER022	2.41%	97.54%	0.05%
ER023	1.62%	98.34%	0.04%
ER024	1.11%	98.84%	0.05%
ER025	2.62%	97.19%	0.19%

Sample ID	% Total Gravel	% Total Sand	% Silt & Clay
ER026	0.46%	99.41%	0.13%
ER027	1.29%	98.68%	0.03%
ER028	2.08%	97.89%	0.03%
ER029	7.97%	90.23%	1.80%
ER030	7.65%	90.31%	2.04%
ER031	2.17%	96.87%	0.96%
ER032	18.11%	79.42%	2.47%
ER033	12.32%	86.59%	1.09%
ER034	1.32%	98.63%	0.04%
ER035	1.96%	98.00%	0.04%
ER036	0.97%	99.00%	0.03%
ER037	5.90%	94.01%	0.09%
ER038	0.03%	99.90%	0.07%
ER039	4.31%	95.66%	0.04%
ER040	0.90%	99.06%	0.04%
ER041	8.16%	90.09%	1.76%
ER042	1.85%	98.09%	0.06%
ER043	4.68%	95.08%	0.24%
ER044	3.17%	96.67%	0.17%
ER045	1.15%	98.82%	0.03%
ER046	0.48%	99.44%	0.08%
ER047	1.58%	98.42%	0.00%
ER048	8.93%	91.04%	0.03%
ER049	0.00%	99.64%	0.36%
ER050	1.01%	98.94%	0.05%

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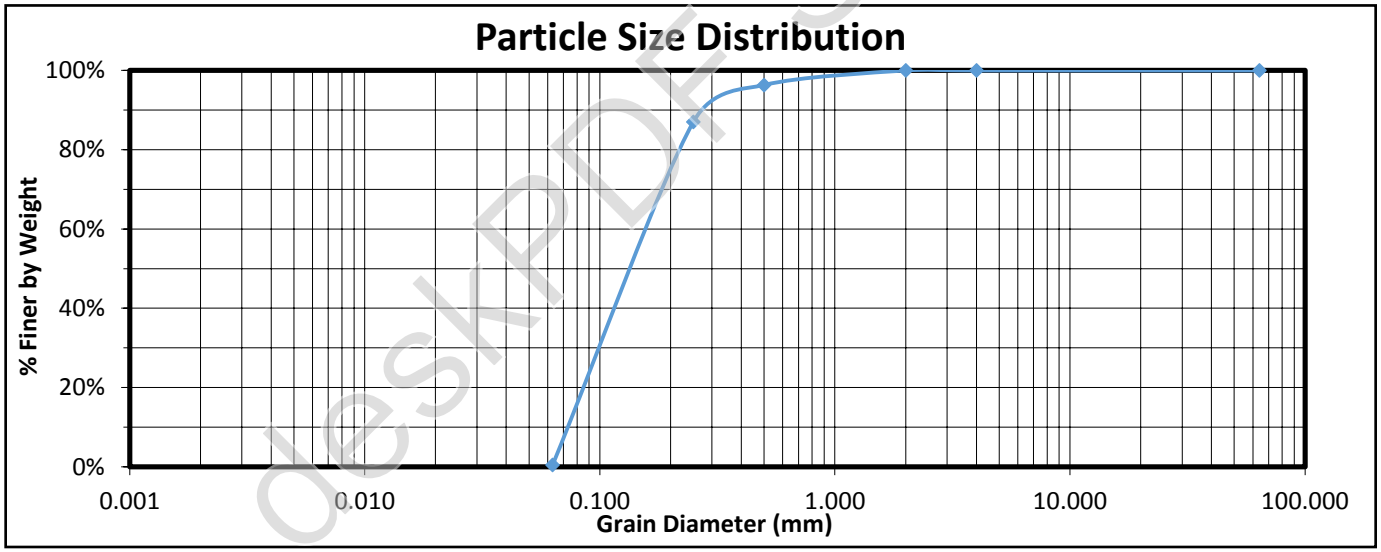
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er1	Total Dry Weight	17.49

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	17.49	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	17.49	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0	17.49	100.00%	0.00%	Granule Gravel	Total Gravel	0.00%
35	0.0197	0.500	0.64	16.85	96.34%	3.66%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.63	15.22	87.02%	9.32%	Medium Sand		
230	0.0025	0.063	15.14	0.08	0.46%	86.56%	Very Fine & Fine Sand	Total Sand	99.54%
-	-	-	0.08	-	-	0.46%	Silt & Clay	Total Silt & Clay	0.46%



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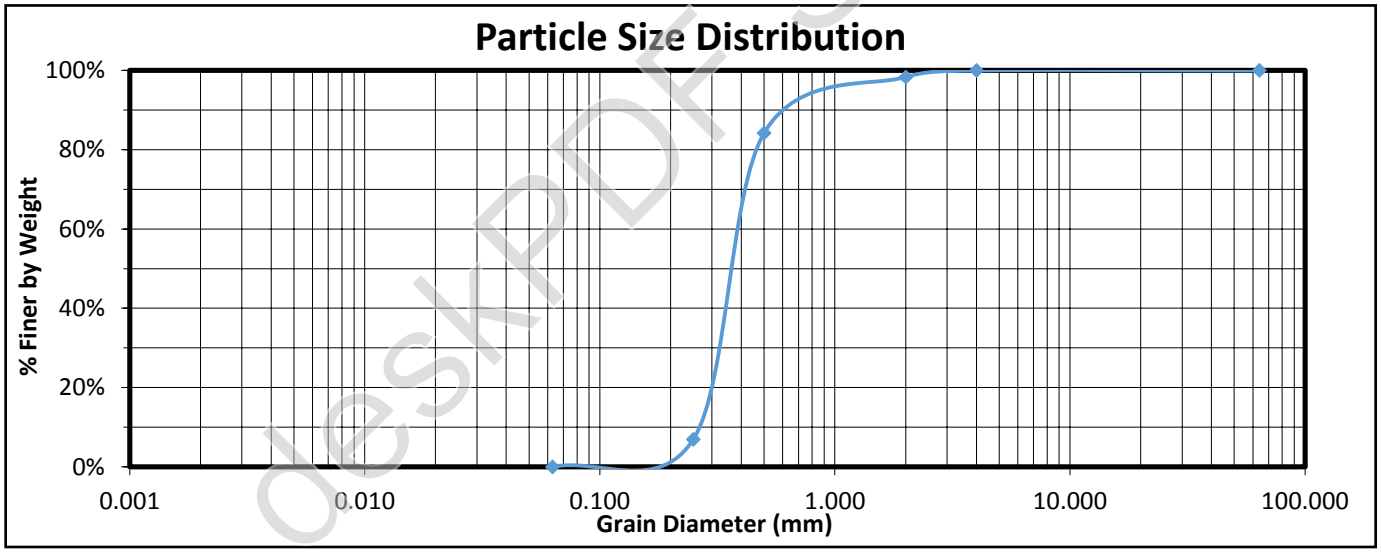
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er2	Total Dry Weight	28.26

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	28.26	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	28.26	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.47	27.79	98.34%	1.66%	Granule Gravel	Total Gravel	1.66%
35	0.0197	0.500	3.99	23.8	84.22%	14.12%	Very Coarse & Coarse Sand		
60	0.0098	0.25	21.84	1.96	6.94%	77.28%	Medium Sand		
230	0.0025	0.063	1.96	4.22E-15	0.00%	6.94%	Very Fine & Fine Sand	Total Sand	98.34%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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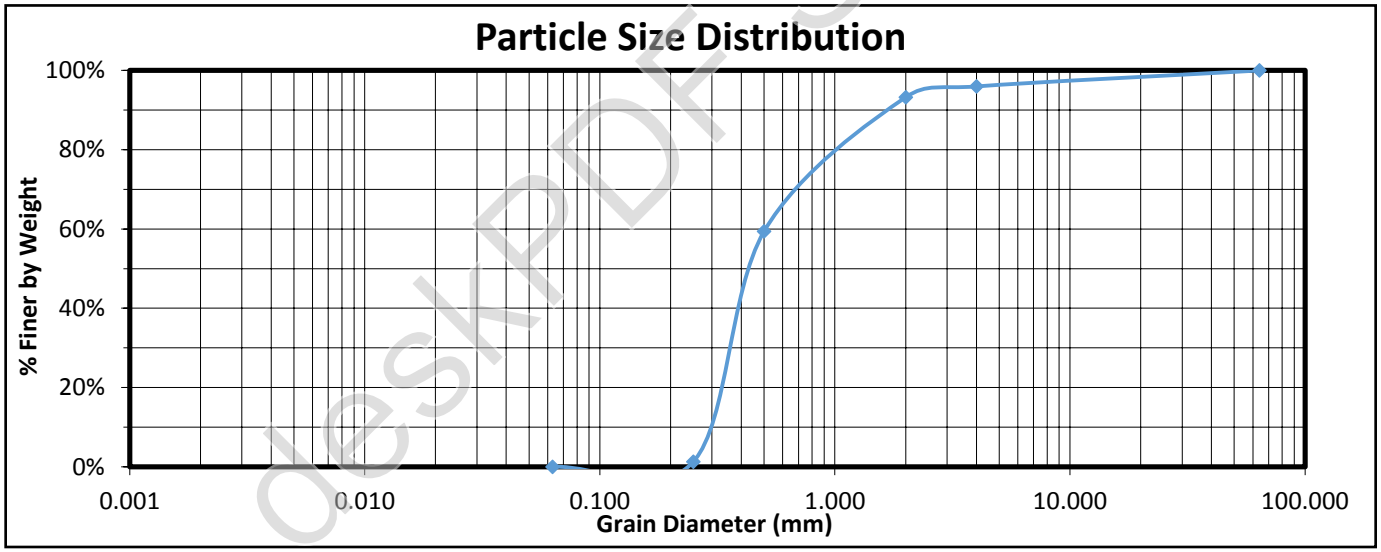
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er3	Total Dry Weight	5.47

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	5.47	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.22	5.25	95.98%	4.02%	Pebble Gravel		
10	0.7870	2.00	0.15	5.1	93.24%	2.74%	Granule Gravel	Total Gravel	6.76%
35	0.0197	0.500	1.85	3.25	59.41%	33.82%	Very Coarse & Coarse Sand		
60	0.0098	0.25	3.18	0.07	1.28%	58.14%	Medium Sand		
230	0.0025	0.063	0.07	2.22E-16	0.00%	1.28%	Very Fine & Fine Sand	Total Sand	93.24%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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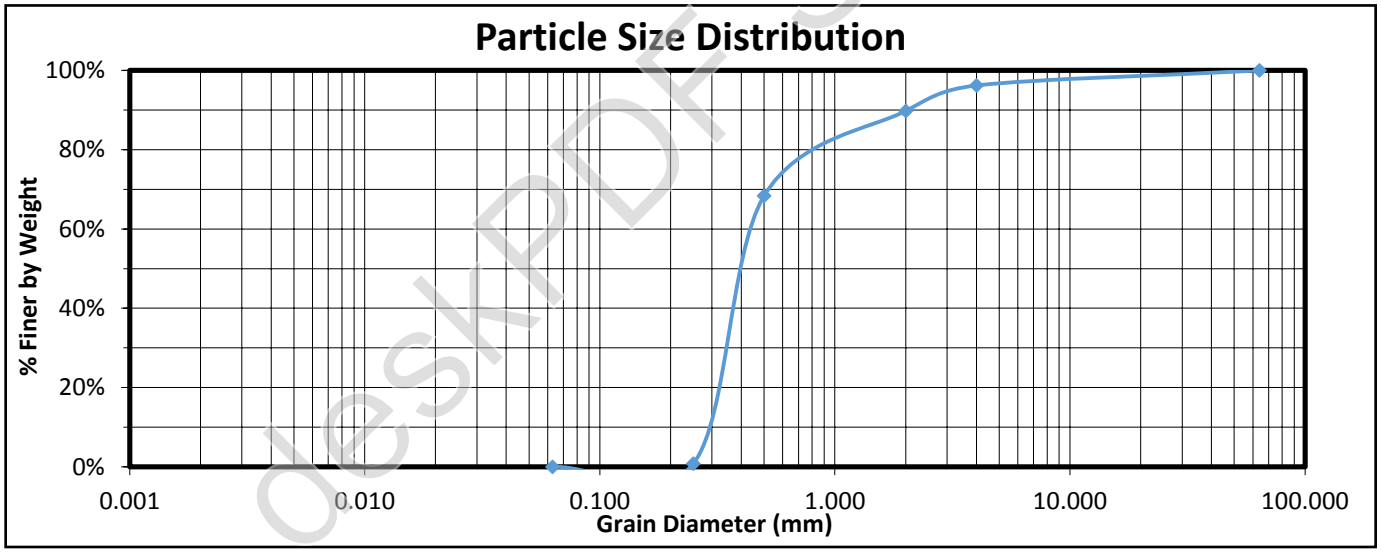
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er4	Total Dry Weight	15.08

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	15.08	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.57	14.51	96.22%	3.78%	Pebble Gravel		
10	0.7870	2.00	0.97	13.54	89.79%	6.43%	Granule Gravel	Total Gravel	10.21%
35	0.0197	0.500	3.23	10.31	68.37%	21.42%	Very Coarse & Coarse Sand		
60	0.0098	0.25	10.19	0.12	0.80%	67.57%	Medium Sand		
230	0.0025	0.063	0.12	8.88E-16	0.00%	0.80%	Very Fine & Fine Sand	Total Sand	89.79%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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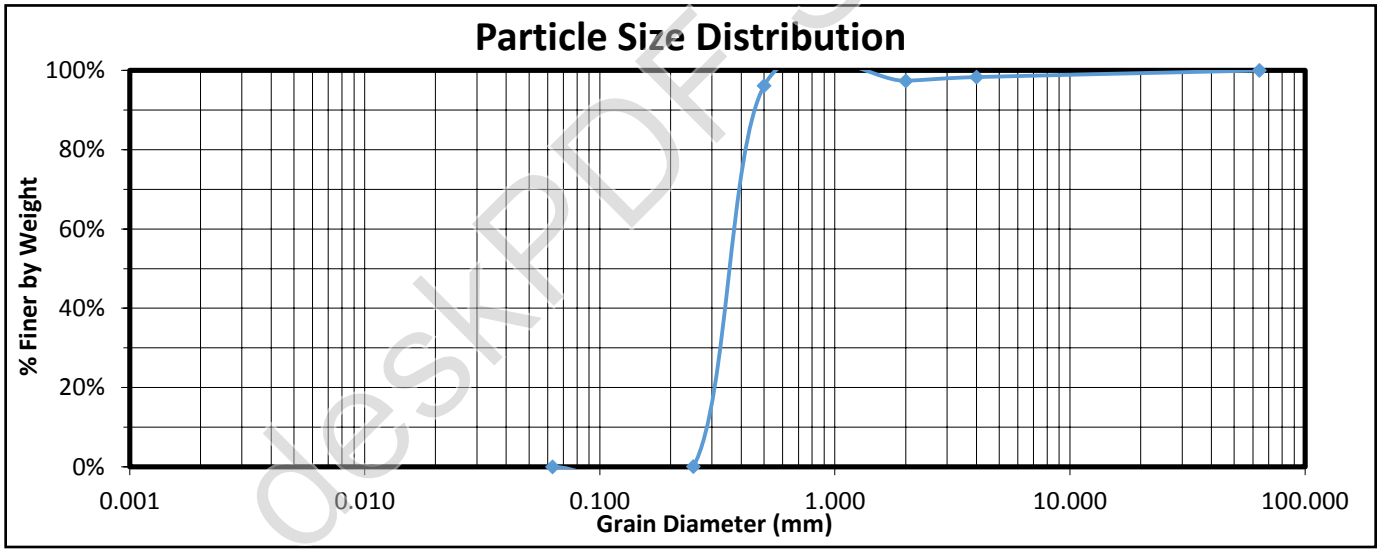
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er5	Total Dry Weight	28.89

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	28.89	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.48	28.41	98.34%	1.66%	Pebble Gravel		
10	0.7870	2.00	0.27	28.14	97.40%	0.93%	Granule Gravel	Total Gravel	2.60%
35	0.0197	0.500	0.36	27.78	96.16%	1.25%	Very Coarse & Coarse Sand		
60	0.0098	0.25	27.77	0.01	0.03%	96.12%	Medium Sand		
230	0.0025	0.063	0.01	1.55E-15	0.00%	0.03%	Very Fine & Fine Sand	Total Sand	97.40%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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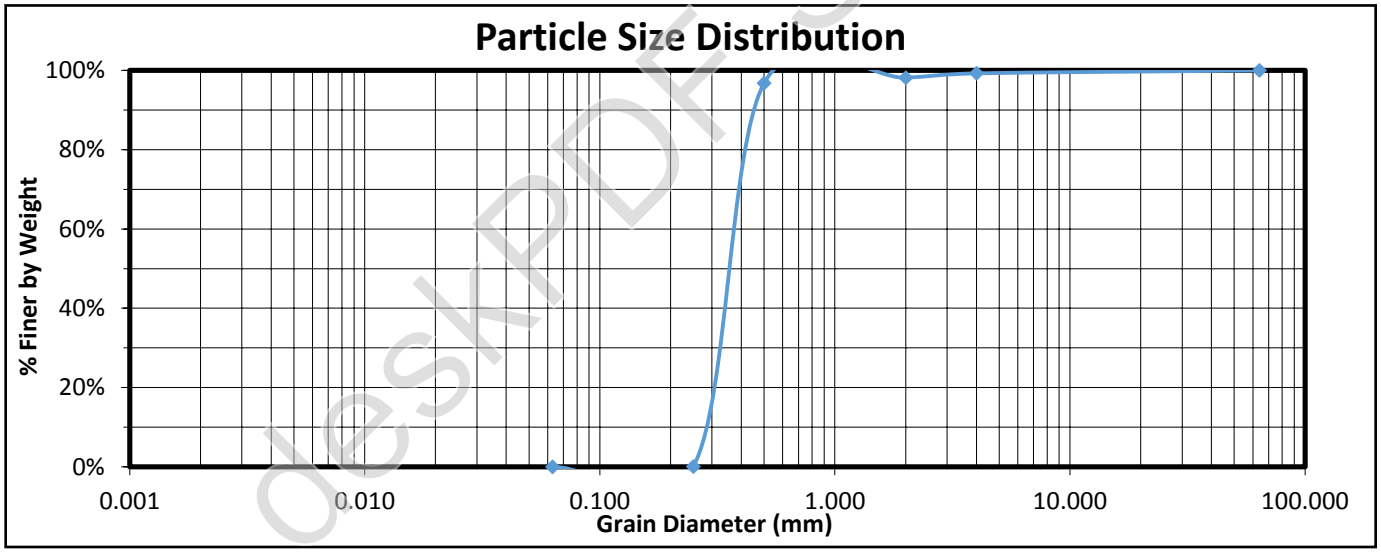
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er6	Total Dry Weight	26.25

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	26.25	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.19	26.06	99.28%	0.72%	Pebble Gravel		
10	0.7870	2.00	0.29	25.77	98.17%	1.10%	Granule Gravel	Total Gravel	1.83%
35	0.0197	0.500	0.36	25.41	96.80%	1.37%	Very Coarse & Coarse Sand		
60	0.0098	0.25	25.39	0.02	0.08%	96.72%	Medium Sand		
230	0.0025	0.063	0.02	-4.44E-16	0.00%	0.08%	Very Fine & Fine Sand	Total Sand	98.17%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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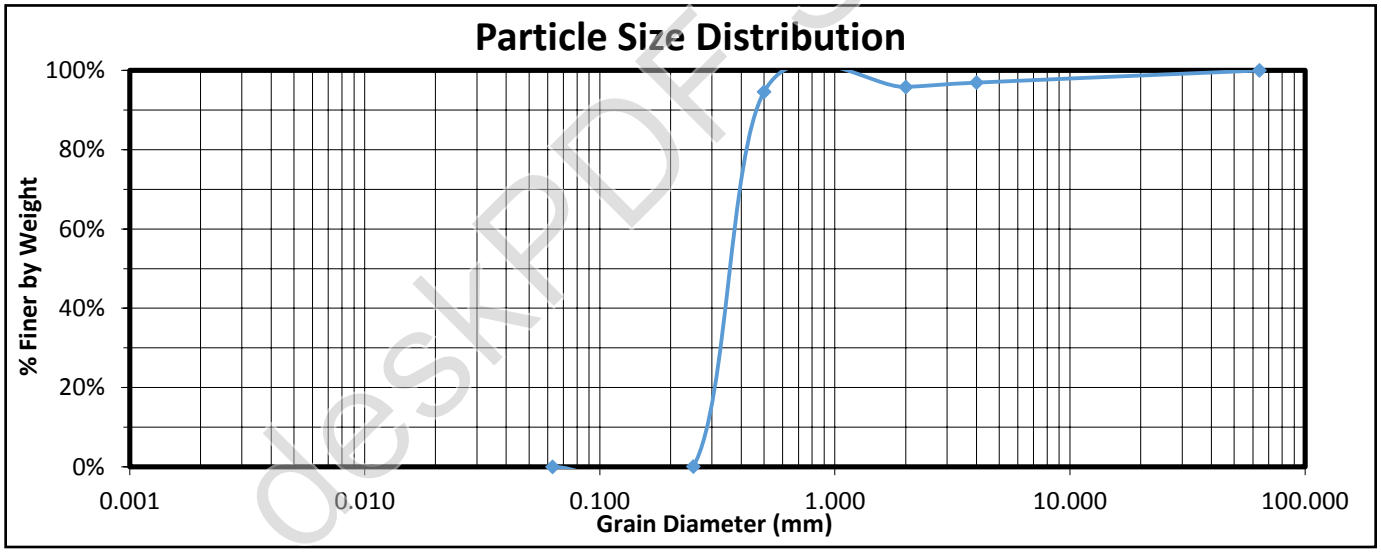
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er7	Total Dry Weight	22.89

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	22.89	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.7	22.19	96.94%	3.06%	Pebble Gravel		
10	0.7870	2.00	0.25	21.94	95.85%	1.09%	Granule Gravel	Total Gravel	4.15%
35	0.0197	0.500	0.28	21.66	94.63%	1.22%	Very Coarse & Coarse Sand		
60	0.0098	0.25	21.65	0.01	0.04%	94.58%	Medium Sand		
230	0.0025	0.063	0.01	1.56E-15	0.00%	0.04%	Very Fine & Fine Sand	Total Sand	95.85%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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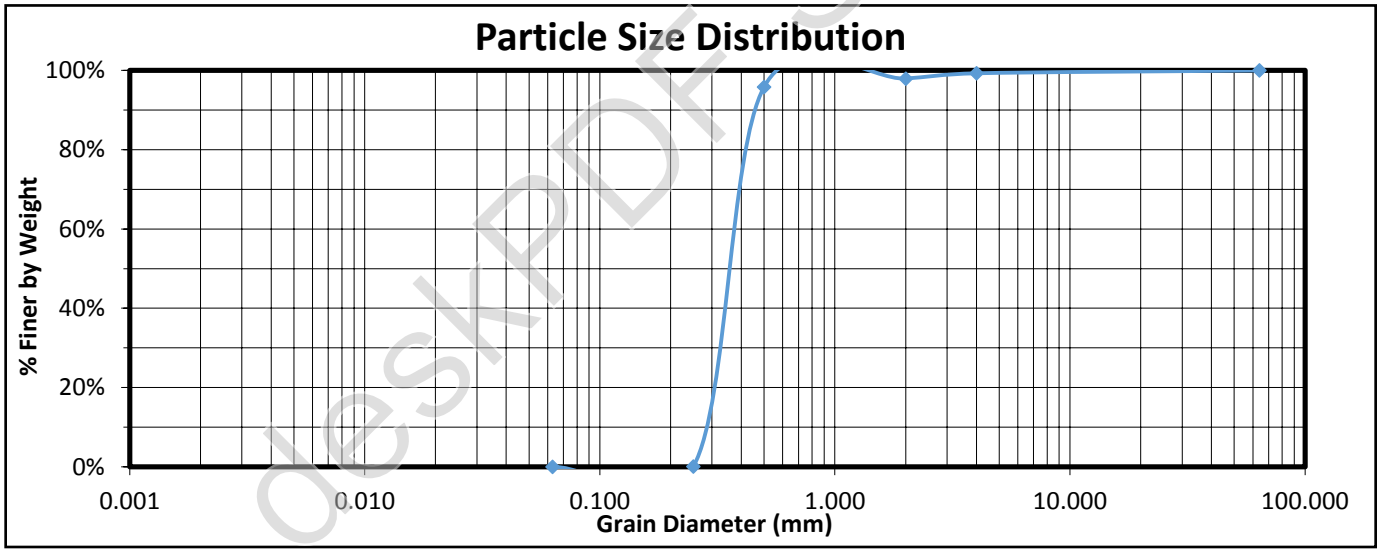
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er8	Total Dry Weight	28.52

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	28.52	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.2	28.32	99.30%	0.70%	Pebble Gravel		
10	0.7870	2.00	0.38	27.94	97.97%	1.33%	Granule Gravel	Total Gravel	2.03%
35	0.0197	0.500	0.6	27.34	95.86%	2.10%	Very Coarse & Coarse Sand		
60	0.0098	0.25	27.33	0.01	0.04%	95.83%	Medium Sand		
230	0.0025	0.063	0.01	1.55E-15	0.00%	0.04%	Very Fine & Fine Sand	Total Sand	97.97%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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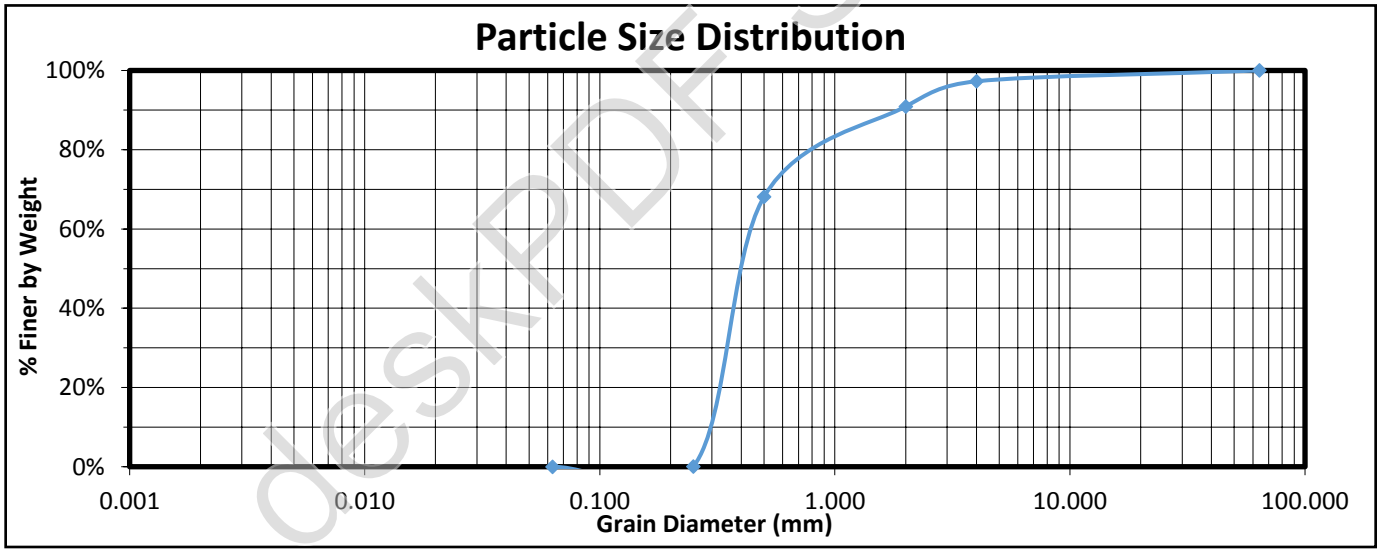
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er9	Total Dry Weight	23.43

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	23.43	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.64	22.79	97.27%	2.73%	Pebble Gravel		
10	0.7870	2.00	1.49	21.3	90.91%	6.36%	Granule Gravel	Total Gravel	9.09%
35	0.0197	0.500	5.33	15.97	68.16%	22.75%	Very Coarse & Coarse Sand		
60	0.0098	0.25	15.96	0.01	0.04%	68.12%	Medium Sand		
230	0.0025	0.063	0.01	5.12E-15	0.00%	0.04%	Very Fine & Fine Sand	Total Sand	90.91%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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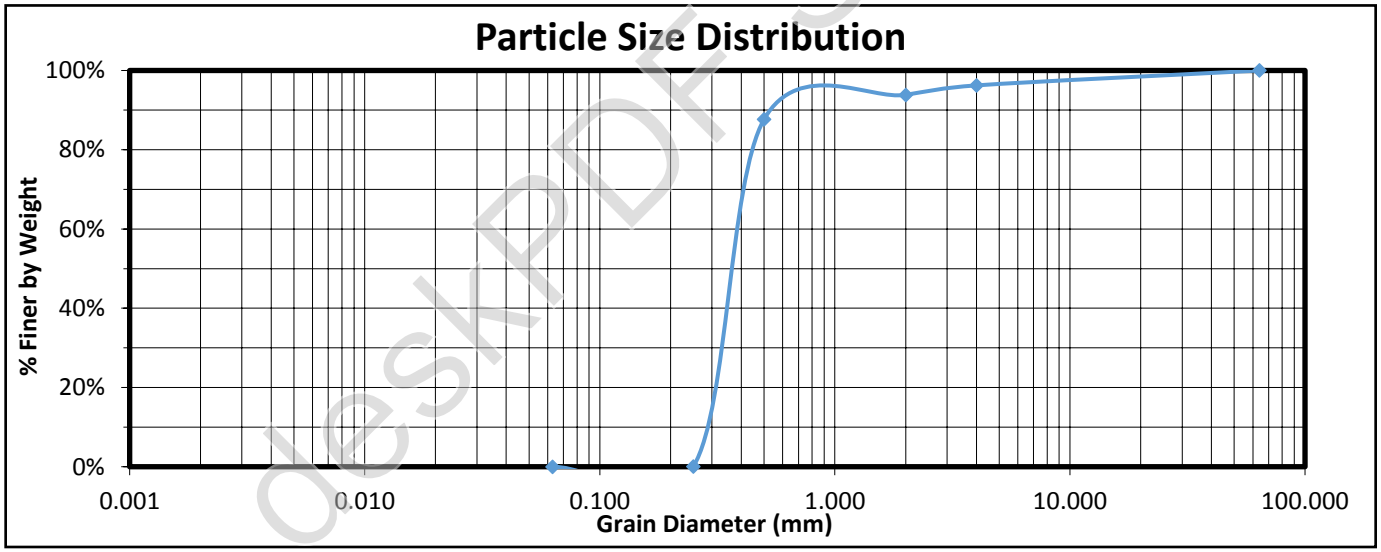
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er10	Total Dry Weight	19.68

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	19.68	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.74	18.94	96.24%	3.76%	Pebble Gravel		
10	0.7870	2.00	0.47	18.47	93.85%	2.39%	Granule Gravel	Total Gravel	6.15%
35	0.0197	0.500	1.21	17.26	87.70%	6.15%	Very Coarse & Coarse Sand		
60	0.0098	0.25	17.25	0.01	0.05%	87.65%	Medium Sand		
230	0.0025	0.063	0.01	5.11E-15	0.00%	0.05%	Very Fine & Fine Sand	Total Sand	93.85%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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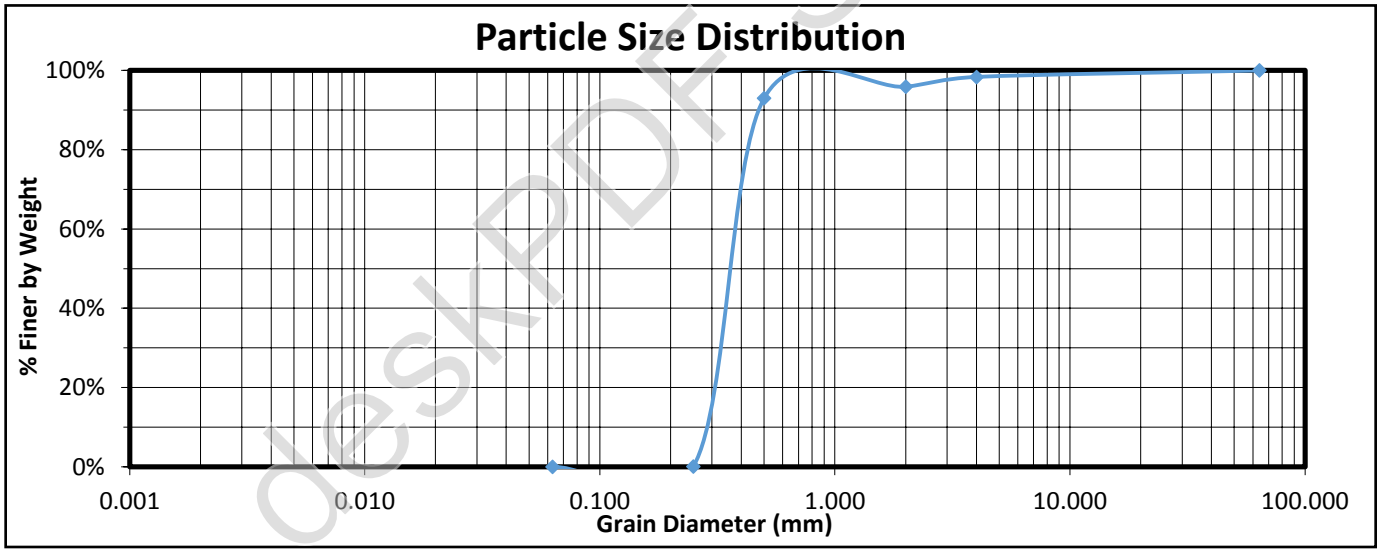
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er11	Total Dry Weight	20.98

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	20.98	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.34	20.64	98.38%	1.62%	Pebble Gravel		
10	0.7870	2.00	0.52	20.12	95.90%	2.48%	Granule Gravel	Total Gravel	4.10%
35	0.0197	0.500	0.61	19.51	92.99%	2.91%	Very Coarse & Coarse Sand		
60	0.0098	0.25	19.5	0.01	0.05%	92.95%	Medium Sand		
230	0.0025	0.063	0.01	1.55E-15	0.00%	0.05%	Very Fine & Fine Sand	Total Sand	95.90%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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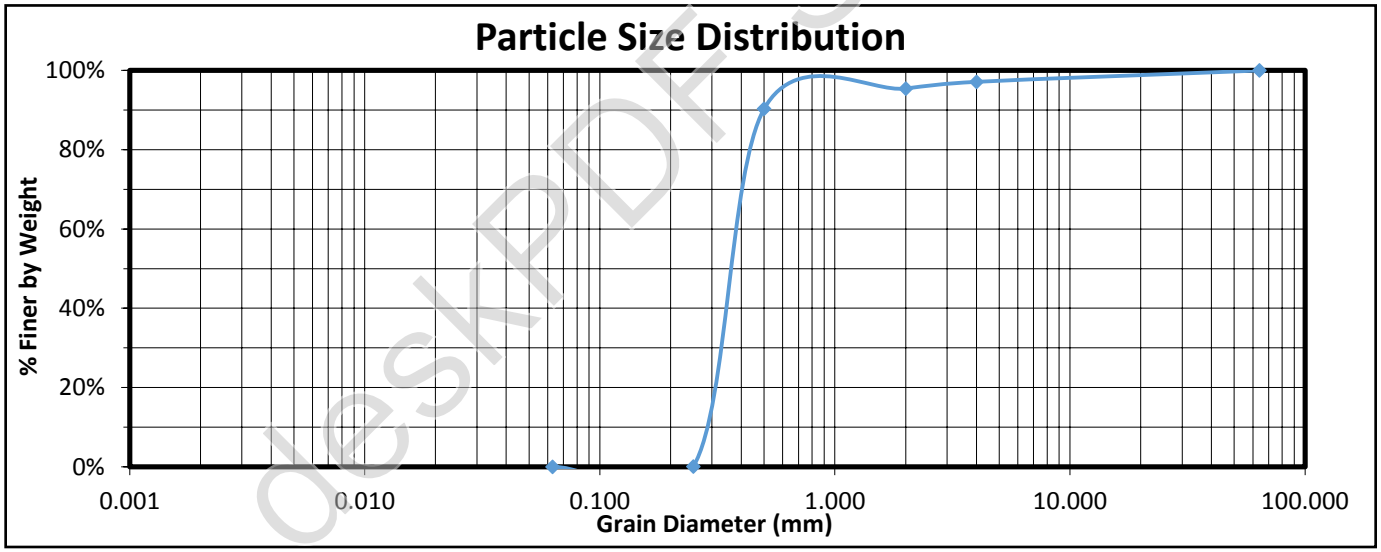
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er12	Total Dry Weight	19.54

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	19.54	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.56	18.98	97.13%	2.87%	Pebble Gravel		
10	0.7870	2.00	0.33	18.65	95.45%	1.69%	Granule Gravel	Total Gravel	4.55%
35	0.0197	0.500	1	17.65	90.33%	5.12%	Very Coarse & Coarse Sand		
60	0.0098	0.25	17.64	0.01	0.05%	90.28%	Medium Sand		
230	0.0025	0.063	0.01	5.11E-15	0.00%	0.05%	Very Fine & Fine Sand	Total Sand	95.45%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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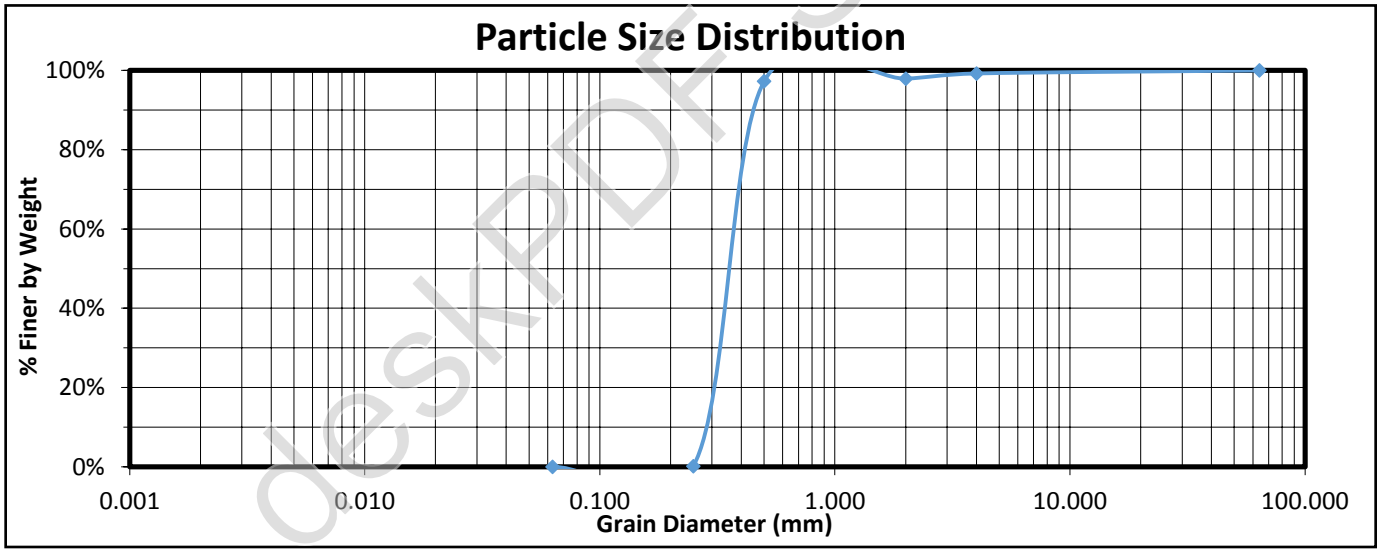
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er13	Total Dry Weight	20.01

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	20.01	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.15	19.86	99.25%	0.75%	Pebble Gravel		
10	0.7870	2.00	0.26	19.6	97.95%	1.30%	Granule Gravel	Total Gravel	2.05%
35	0.0197	0.500	0.14	19.46	97.25%	0.70%	Very Coarse & Coarse Sand		
60	0.0098	0.25	19.43	0.03	0.15%	97.10%	Medium Sand		
230	0.0025	0.063	0.03	1.11E-15	0.00%	0.15%	Very Fine & Fine Sand	Total Sand	97.95%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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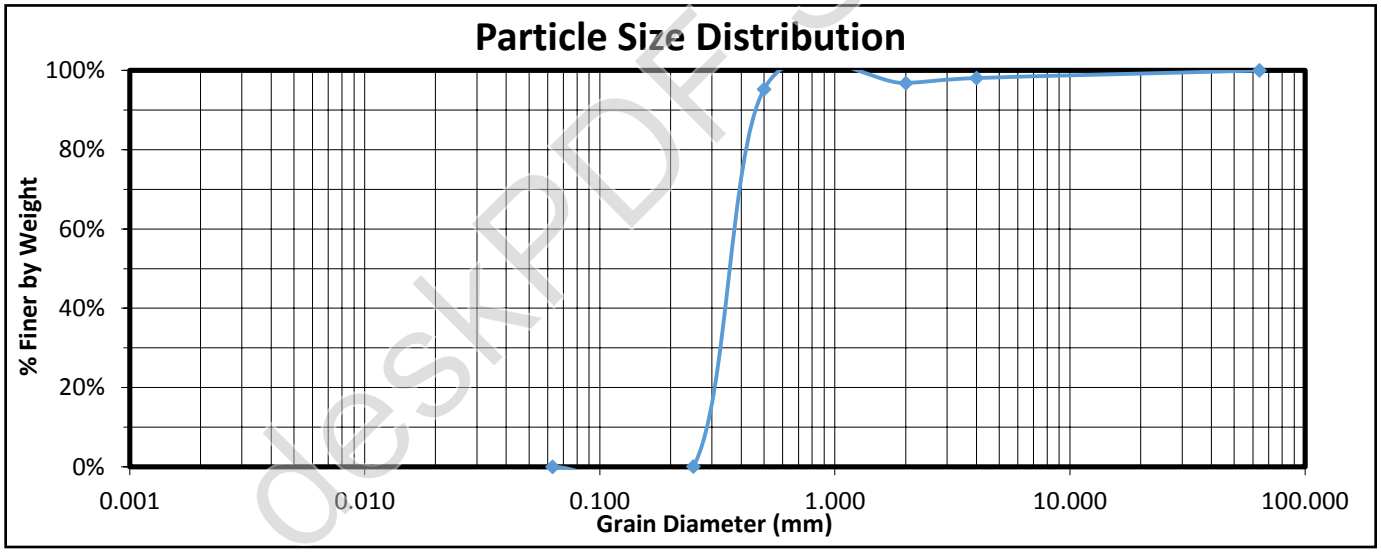
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er14	Total Dry Weight	20.45

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	20.45	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.39	20.06	98.09%	1.91%	Pebble Gravel		
10	0.7870	2.00	0.26	19.8	96.82%	1.27%	Granule Gravel	Total Gravel	3.18%
35	0.0197	0.500	0.31	19.49	95.31%	1.52%	Very Coarse & Coarse Sand		
60	0.0098	0.25	19.48	0.01	0.05%	95.26%	Medium Sand		
230	0.0025	0.063	0.01	1.55E-15	0.00%	0.05%	Very Fine & Fine Sand	Total Sand	96.82%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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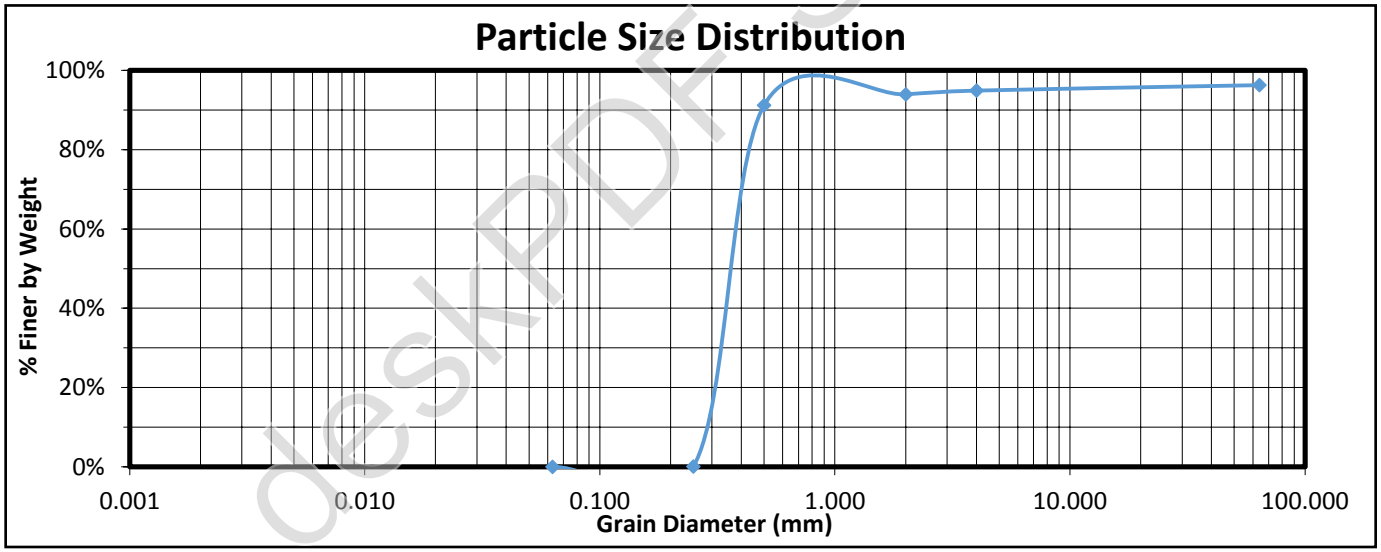
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er16	Total Dry Weight	25.42

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0.94	24.48	96.30%	3.70%	Cobble Gravel		
5	0.1570	4.00	0.35	24.13	94.93%	1.38%	Pebble Gravel		
10	0.7870	2.00	0.24	23.89	93.98%	0.94%	Granule Gravel	Total Gravel	6.02%
35	0.0197	0.500	0.7	23.19	91.23%	2.75%	Very Coarse & Coarse Sand		
60	0.0098	0.25	23.18	0.01	0.04%	91.19%	Medium Sand		
230	0.0025	0.063	0.01	1.56E-15	0.00%	0.04%	Very Fine & Fine Sand	Total Sand	93.98%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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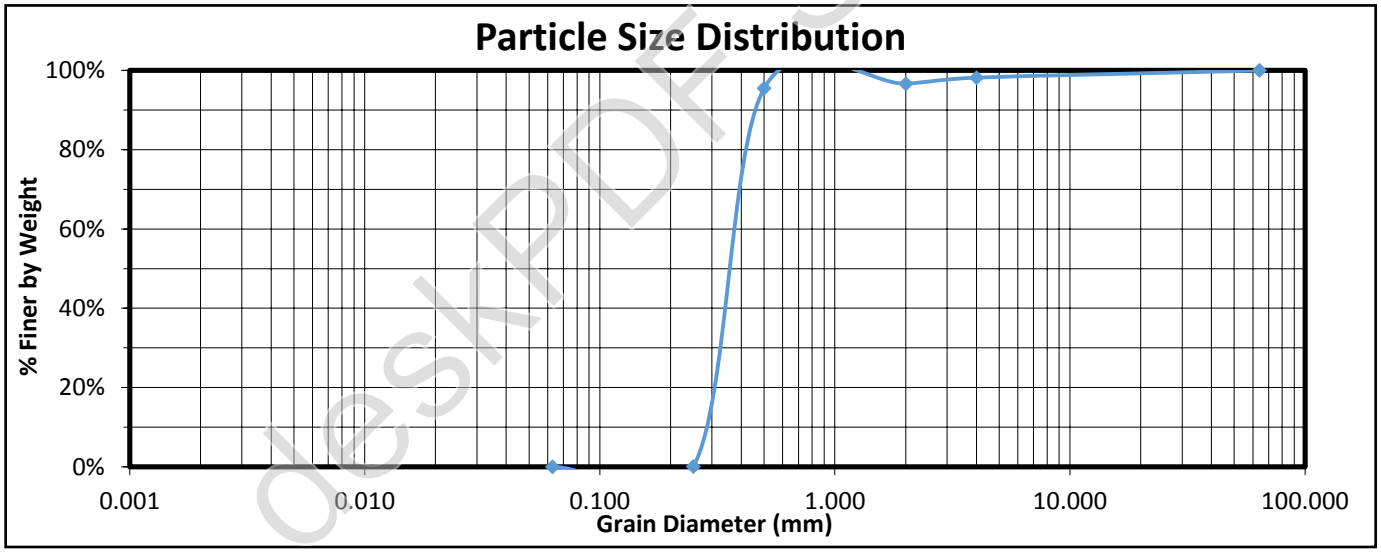
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er17	Total Dry Weight	17.75

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	17.75	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.32	17.43	98.20%	1.80%	Pebble Gravel		
10	0.7870	2.00	0.27	17.16	96.68%	1.52%	Granule Gravel	Total Gravel	3.32%
35	0.0197	0.500	0.21	16.95	95.49%	1.18%	Very Coarse & Coarse Sand		
60	0.0098	0.25	16.94	0.01	0.06%	95.44%	Medium Sand		
230	0.0025	0.063	0.01	1.56E-15	0.00%	0.06%	Very Fine & Fine Sand	Total Sand	96.68%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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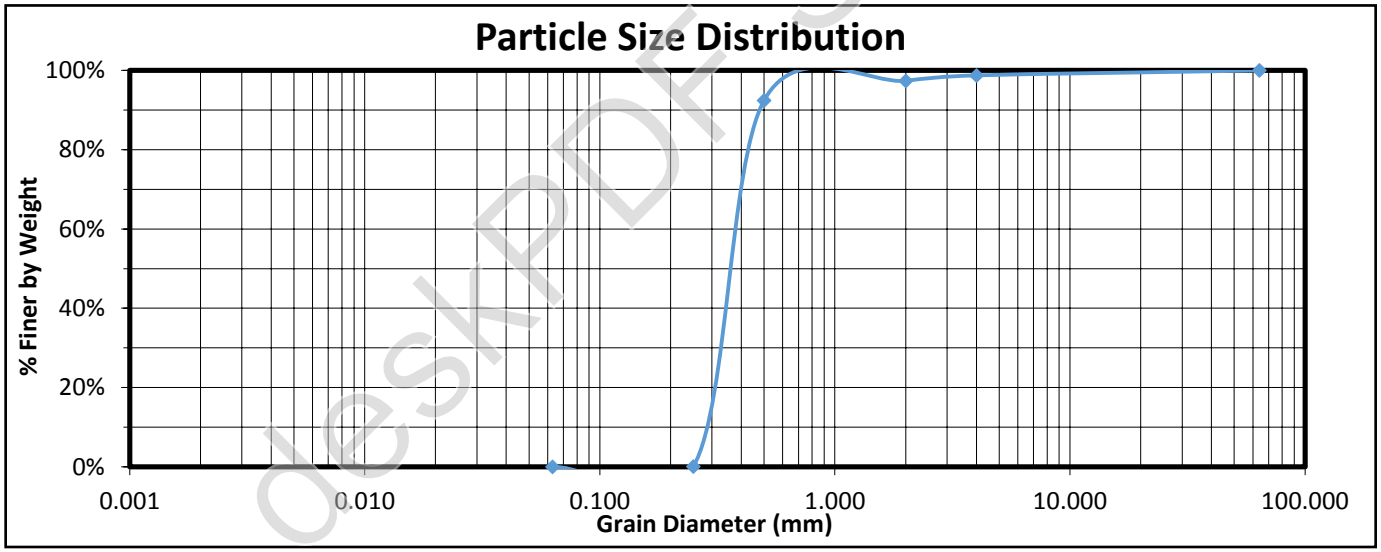
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er18	Total Dry Weight	21.94

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	21.94	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.27	21.67	98.77%	1.23%	Pebble Gravel		
10	0.7870	2.00	0.3	21.37	97.40%	1.37%	Granule Gravel	Total Gravel	2.60%
35	0.0197	0.500	1.08	20.29	92.48%	4.92%	Very Coarse & Coarse Sand		
60	0.0098	0.25	20.28	0.01	0.05%	92.43%	Medium Sand		
230	0.0025	0.063	0.01	-1.99E-15	0.00%	0.05%	Very Fine & Fine Sand	Total Sand	97.40%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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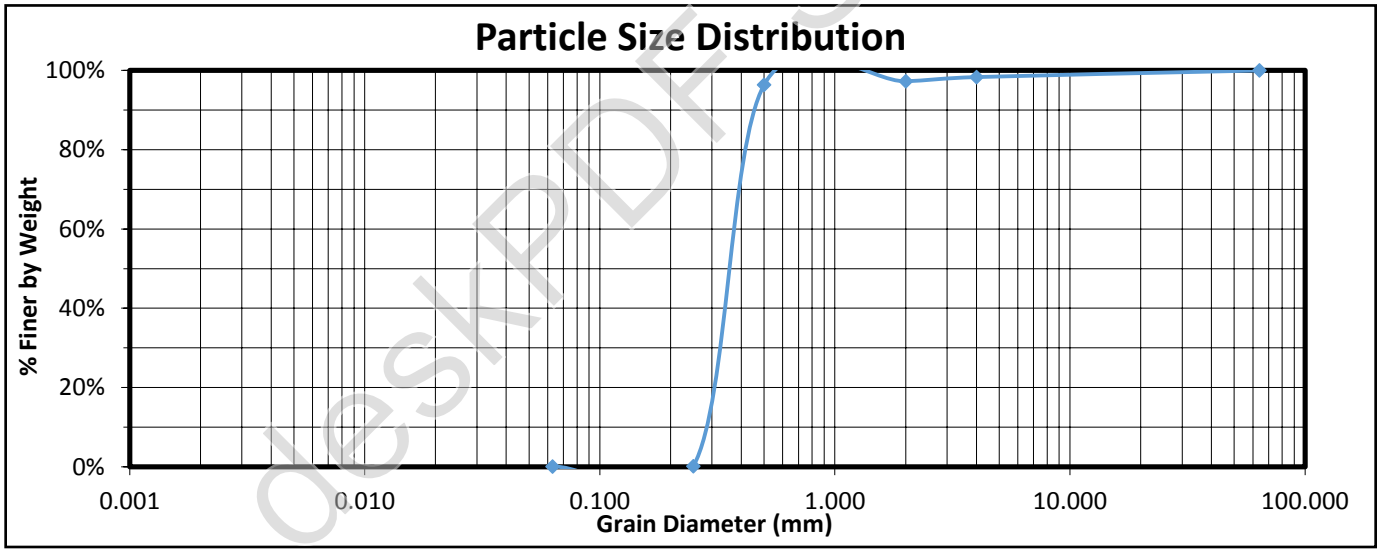
Client: Tetra Tech

Date Analyzed:
Analyst: K. Thyberg

Sample ID	er19	Total Dry Weight	23.51

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	23.51	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.39	23.12	98.34%	1.66%	Pebble Gravel		
10	0.7870	2.00	0.25	22.87	97.28%	1.06%	Granule Gravel	Total Gravel	2.72%
35	0.0197	0.500	0.21	22.66	96.38%	0.89%	Very Coarse & Coarse Sand		
60	0.0098	0.25	22.63	0.03	0.13%	96.26%	Medium Sand		
230	0.0025	0.063	0.01	0.02	0.09%	0.04%	Very Fine & Fine Sand	Total Sand	97.19%
-	-	-	0.02	-	-	0.09%	Silt & Clay	Total Silt & Clay	0.09%



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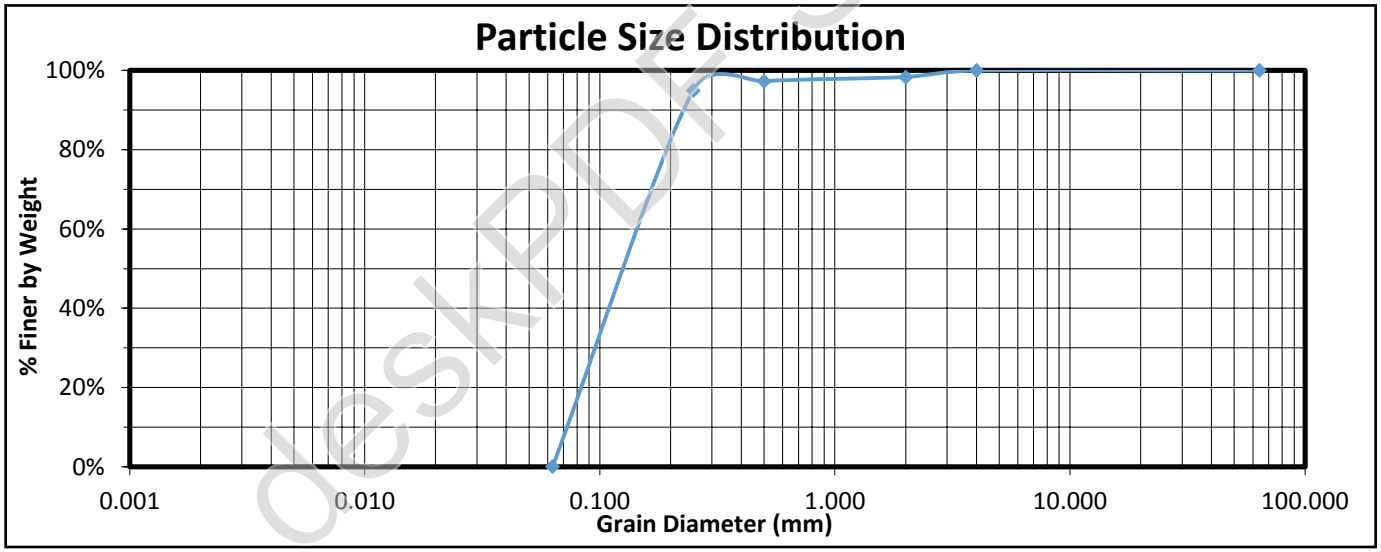
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er20	Total Dry Weight	17.12

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	17.12	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	17.12	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.28	16.84	98.36%	1.64%	Granule Gravel	Total Gravel	1.64%
35	0.0197	0.500	0.18	16.66	97.31%	1.05%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.4	16.26	94.98%	2.34%	Medium Sand		
230	0.0025	0.063	16.25	0.01	0.06%	94.92%	Very Fine & Fine Sand	Total Sand	98.31%
-	-	-	0.01	-	-	0.06%	Silt & Clay	Total Silt & Clay	0.06%



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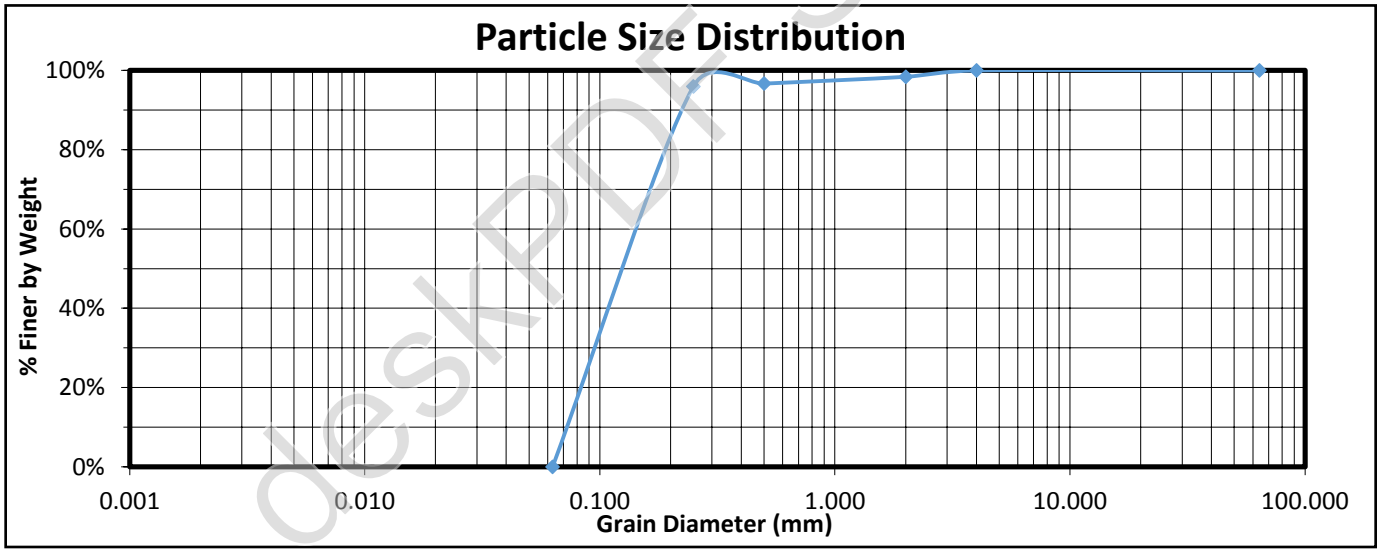
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er21	Total Dry Weight	23.29

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	23.29	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	23.29	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.37	22.92	98.41%	1.59%	Granule Gravel	Total Gravel	1.59%
35	0.0197	0.500	0.4	22.52	96.69%	1.72%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.17	22.35	95.96%	0.73%	Medium Sand		
230	0.0025	0.063	22.35	0	0.00%	95.96%	Very Fine & Fine Sand	Total Sand	98.41%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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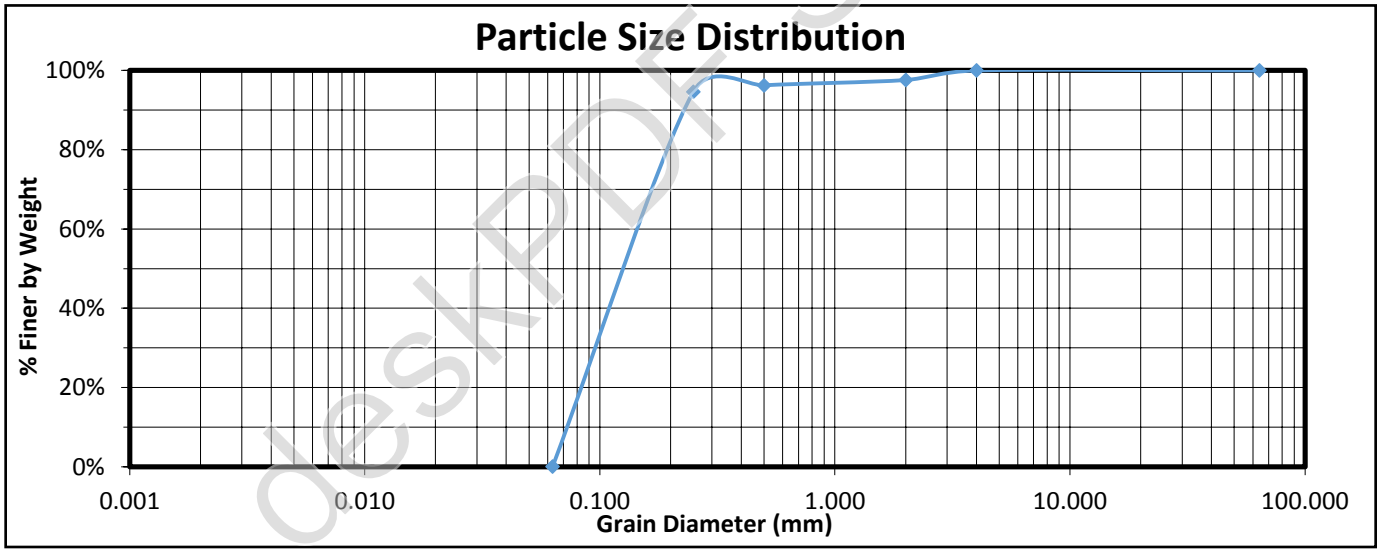
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er22	Total Dry Weight	19.54

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	19.54	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	19.54	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.47	19.07	97.59%	2.41%	Granule Gravel	Total Gravel	2.41%
35	0.0197	0.500	0.26	18.81	96.26%	1.33%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.32	18.49	94.63%	1.64%	Medium Sand		
230	0.0025	0.063	18.48	0.01	0.05%	94.58%	Very Fine & Fine Sand	Total Sand	97.54%
-	-	-	0.01	-	-	0.05%	Silt & Clay	Total Silt & Clay	0.05%



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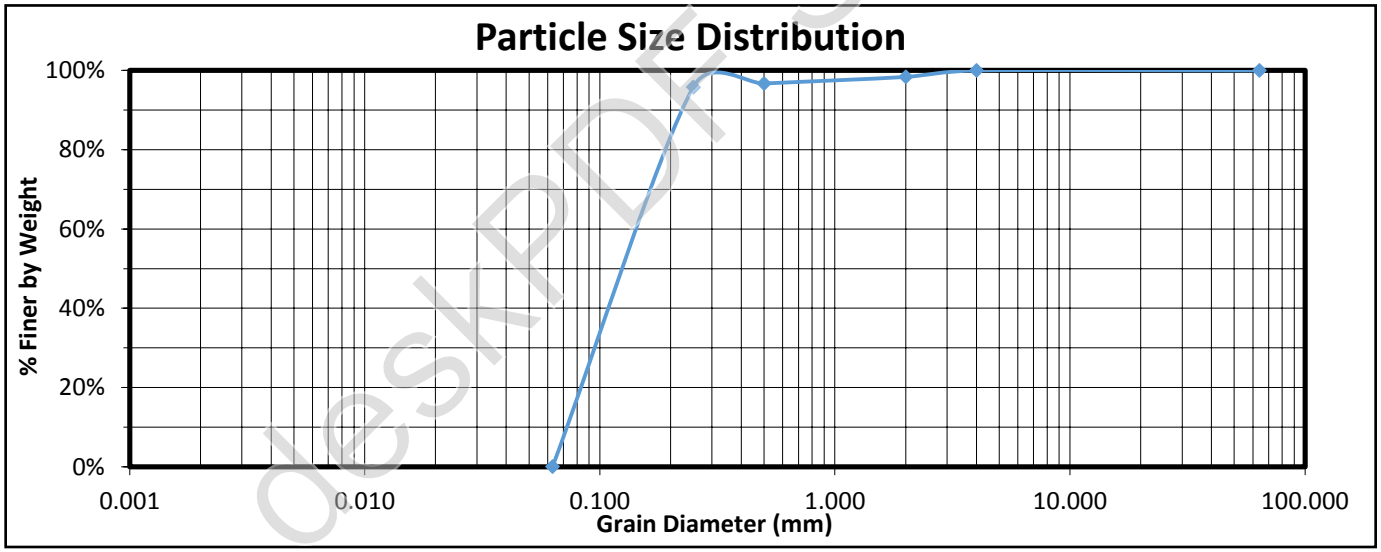
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er23	Total Dry Weight	22.88

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	22.88	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	22.88	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.37	22.51	98.38%	1.62%	Granule Gravel	Total Gravel	1.62%
35	0.0197	0.500	0.38	22.13	96.72%	1.66%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.2	21.93	95.85%	0.87%	Medium Sand		
230	0.0025	0.063	21.92	0.01	0.04%	95.80%	Very Fine & Fine Sand	Total Sand	98.34%
-	-	-	0.01	-	-	0.04%	Silt & Clay	Total Silt & Clay	0.04%



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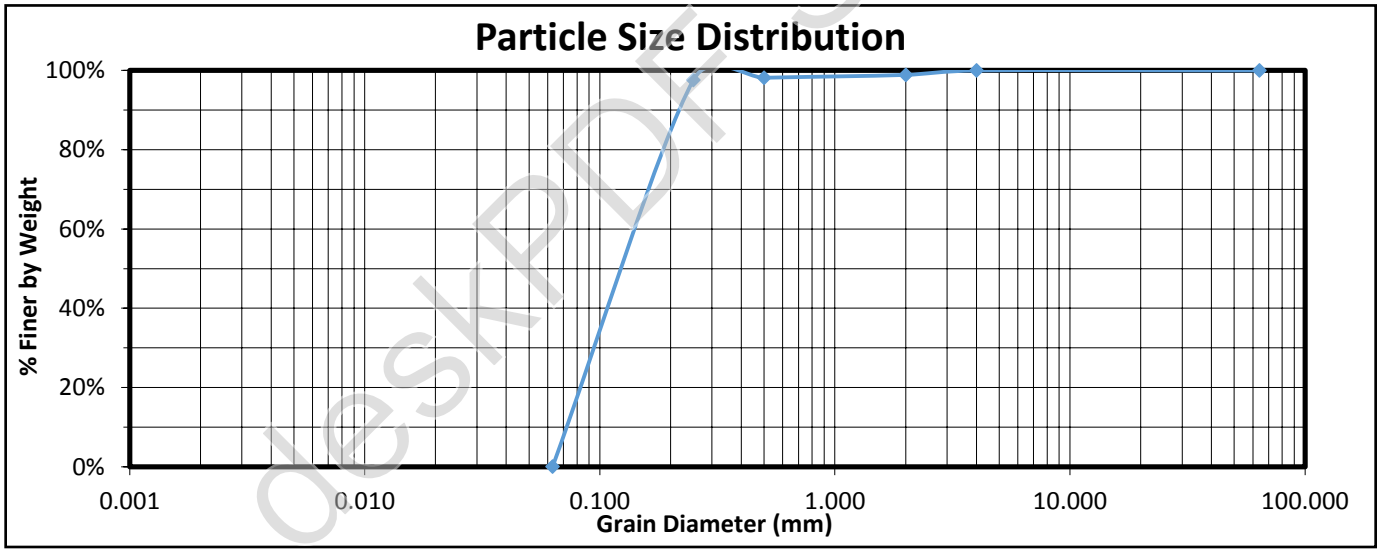
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er24	Total Dry Weight	20.73

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	20.73	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	20.73	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.23	20.5	98.89%	1.11%	Granule Gravel	Total Gravel	1.11%
35	0.0197	0.500	0.15	20.35	98.17%	0.72%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.12	20.23	97.59%	0.58%	Medium Sand		
230	0.0025	0.063	20.22	0.01	0.05%	97.54%	Very Fine & Fine Sand	Total Sand	98.84%
-	-	-	0.01	-	-	0.05%	Silt & Clay	Total Silt & Clay	0.05%



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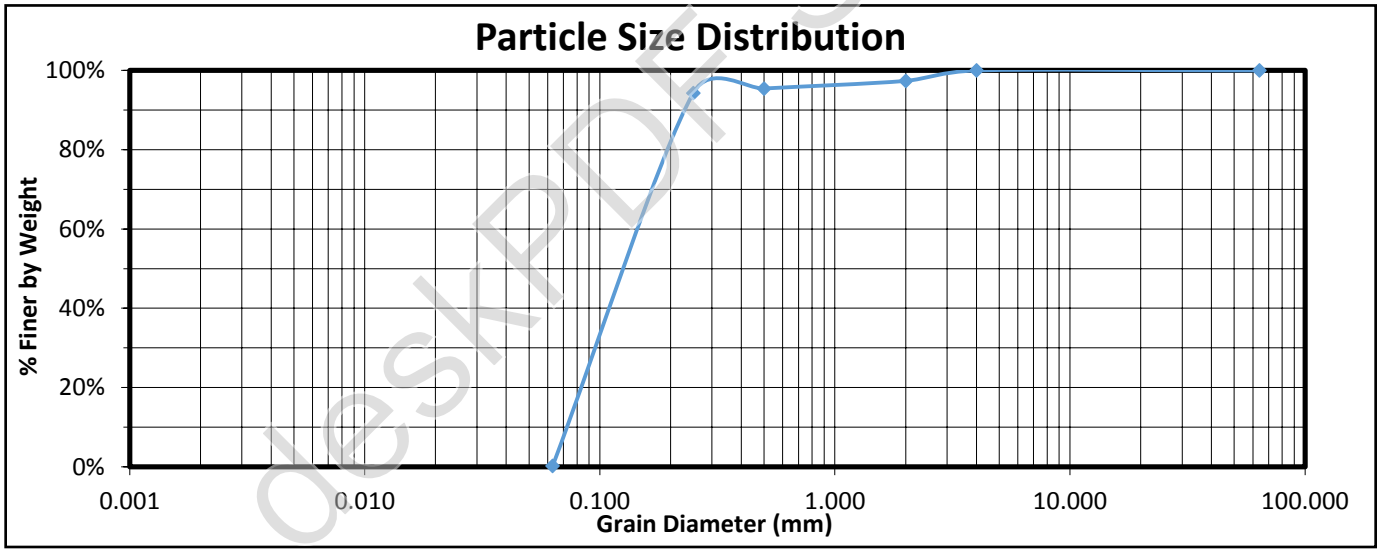
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er25	Total Dry Weight	21.37

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	21.37	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	21.37	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.56	20.81	97.38%	2.62%	Granule Gravel	Total Gravel	2.62%
35	0.0197	0.500	0.41	20.4	95.46%	1.92%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.24	20.16	94.34%	1.12%	Medium Sand		
230	0.0025	0.063	20.12	0.04	0.19%	94.15%	Very Fine & Fine Sand	Total Sand	97.19%
-	-	-	0.04	-	-	0.19%	Silt & Clay	Total Silt & Clay	0.19%



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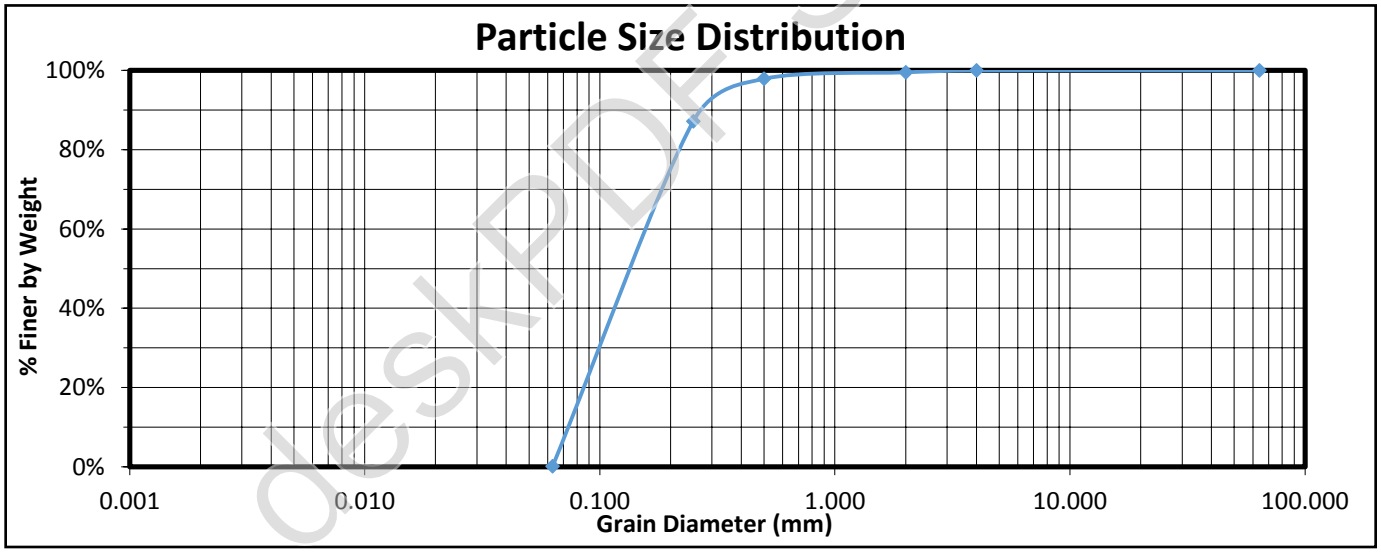
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er26	Total Dry Weight	23.79

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	23.79	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	23.79	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.11	23.68	99.54%	0.46%	Granule Gravel	Total Gravel	0.46%
35	0.0197	0.500	0.39	23.29	97.90%	1.64%	Very Coarse & Coarse Sand		
60	0.0098	0.25	2.54	20.75	87.22%	10.68%	Medium Sand		
230	0.0025	0.063	20.72	0.03	0.13%	87.10%	Very Fine & Fine Sand	Total Sand	99.41%
-	-	-	0.03	-	-	0.13%	Silt & Clay	Total Silt & Clay	0.13%



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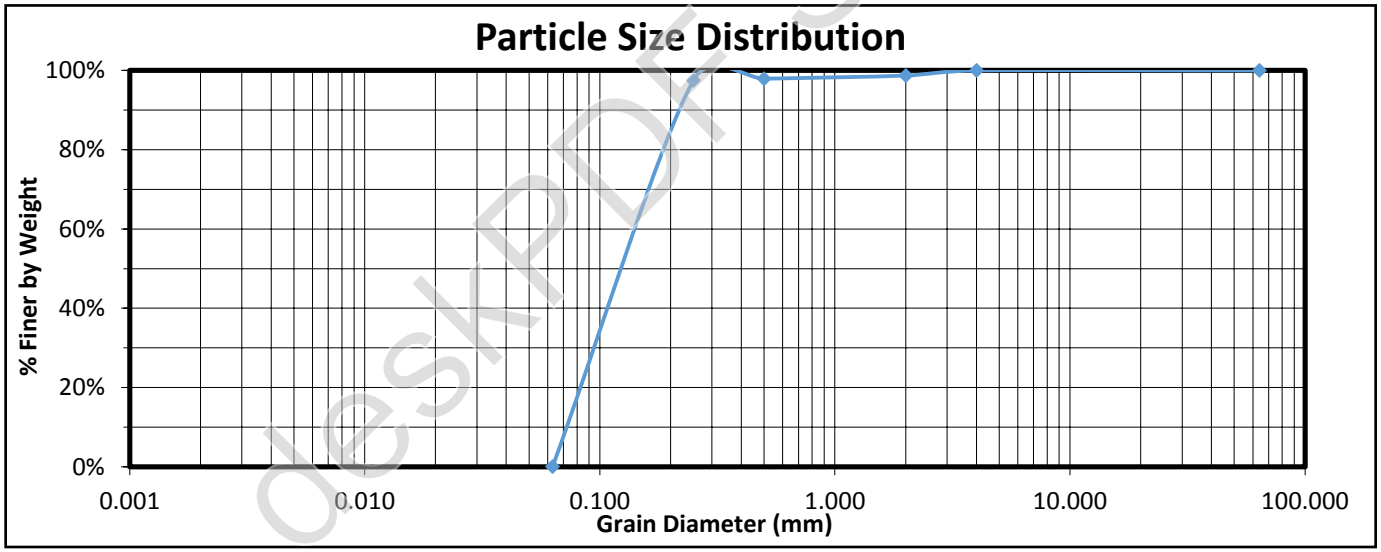
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er27	Total Dry Weight	28.78

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	28.78	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	28.78	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.37	28.41	98.71%	1.29%	Granule Gravel	Total Gravel	1.29%
35	0.0197	0.500	0.23	28.18	97.92%	0.80%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.12	28.06	97.50%	0.42%	Medium Sand		
230	0.0025	0.063	28.05	0.01	0.03%	97.46%	Very Fine & Fine Sand	Total Sand	98.68%
-	-	-	0.01	-	-	0.03%	Silt & Clay	Total Silt & Clay	0.03%



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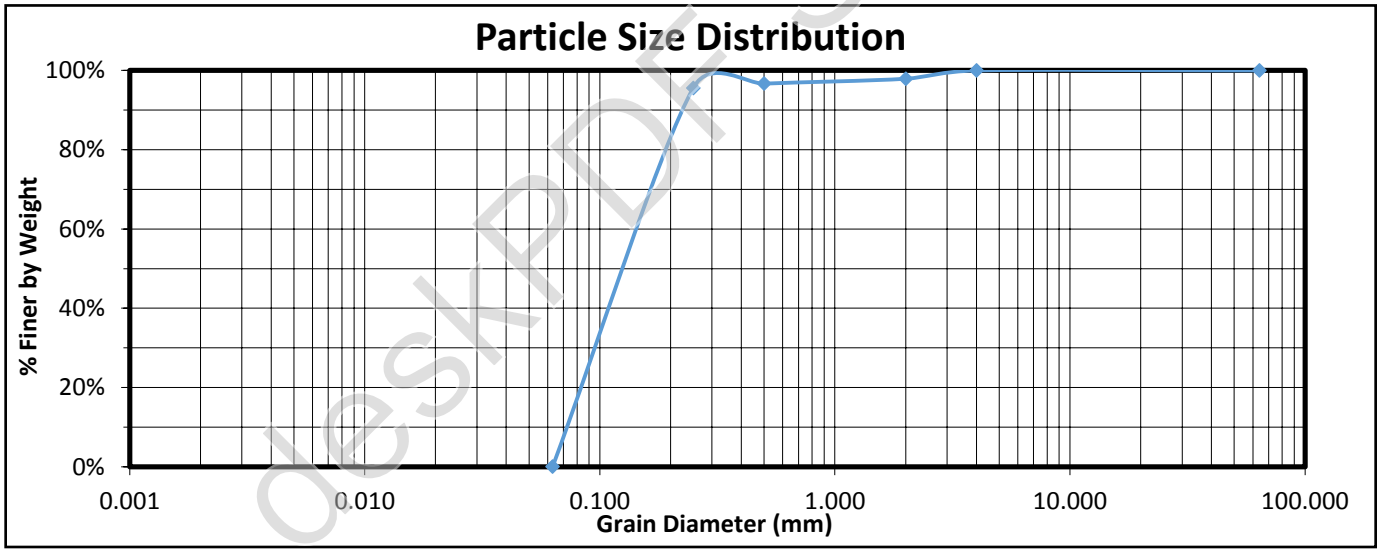
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er28	Total Dry Weight	39.83

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	39.83	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	39.83	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.83	39	97.92%	2.08%	Granule Gravel	Total Gravel	2.08%
35	0.0197	0.500	0.49	38.51	96.69%	1.23%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.42	38.09	95.63%	1.05%	Medium Sand		
230	0.0025	0.063	38.08	0.01	0.03%	95.61%	Very Fine & Fine Sand	Total Sand	97.89%
-	-	-	0.01	-	-	0.03%	Silt & Clay	Total Silt & Clay	0.03%



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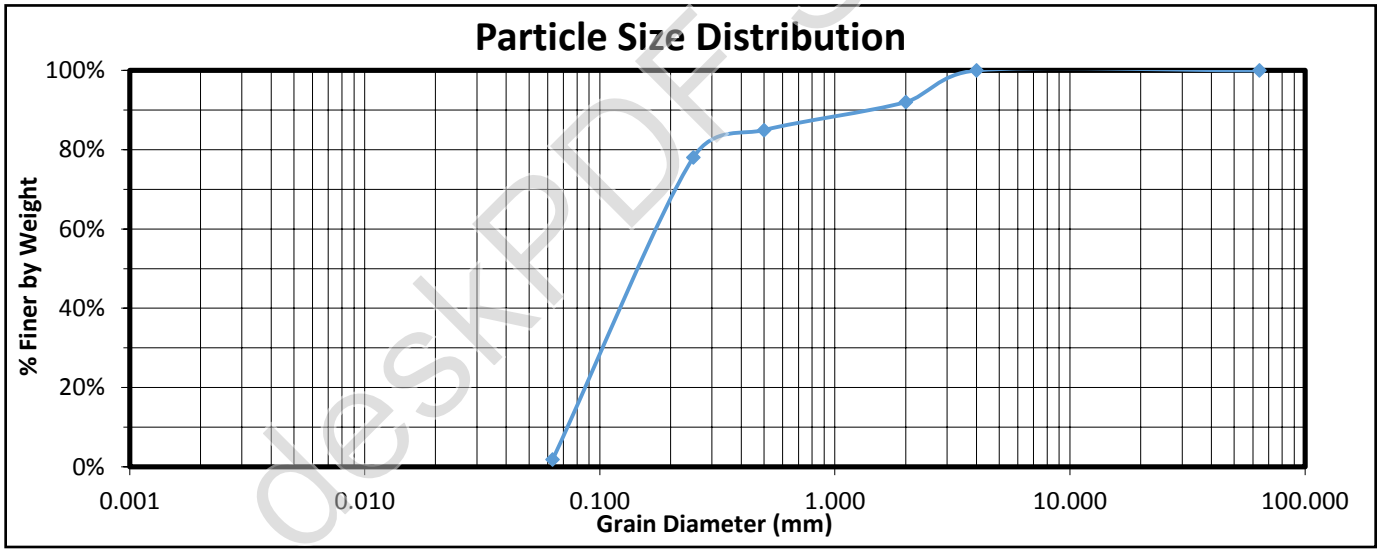
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er29	Total Dry Weight	6.65

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	6.65	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	6.65	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.53	6.12	92.03%	7.97%	Granule Gravel	Total Gravel	7.97%
35	0.0197	0.500	0.47	5.65	84.96%	7.07%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.46	5.19	78.05%	6.92%	Medium Sand		
230	0.0025	0.063	5.07	0.12	1.80%	76.24%	Very Fine & Fine Sand	Total Sand	90.23%
-	-	-	0.12	-	-	1.80%	Silt & Clay	Total Silt & Clay	1.80%



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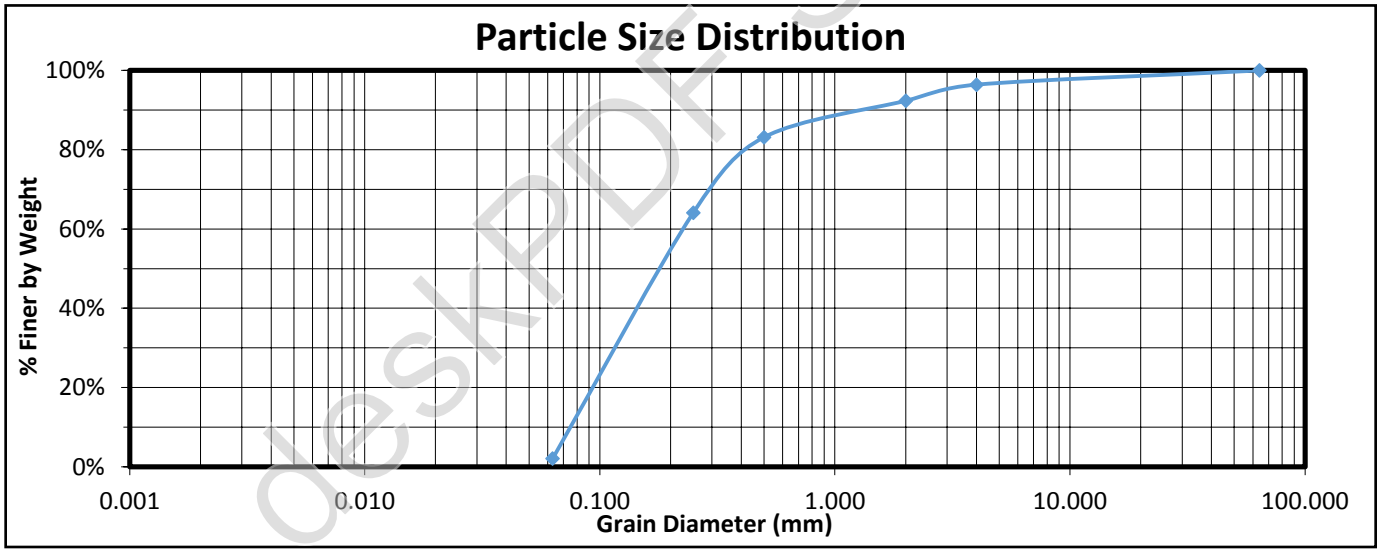
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er30	Total Dry Weight	5.88

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	5.88	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.21	5.67	96.43%	3.57%	Pebble Gravel		
10	0.7870	2.00	0.24	5.43	92.35%	4.08%	Granule Gravel	Total Gravel	7.65%
35	0.0197	0.500	0.54	4.89	83.16%	9.18%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.12	3.77	64.12%	19.05%	Medium Sand		
230	0.0025	0.063	3.65	0.12	2.04%	62.07%	Very Fine & Fine Sand	Total Sand	90.31%
-	-	-	0.12	-	-	2.04%	Silt & Clay	Total Silt & Clay	2.04%



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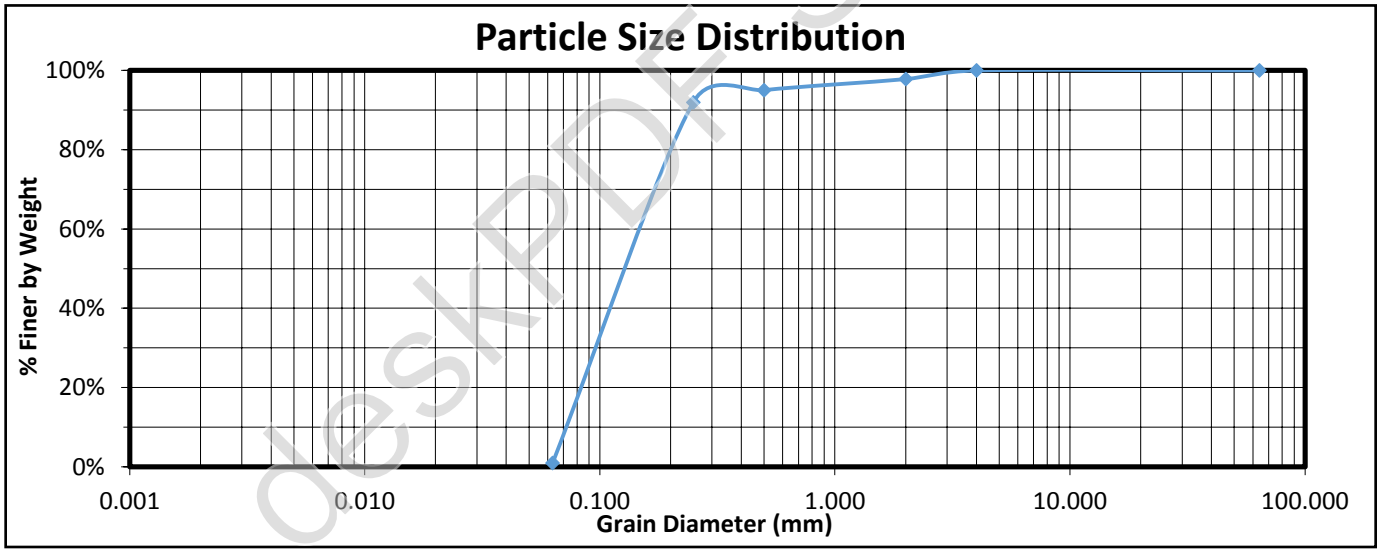
Client: Tetra Tech

Date Analyzed: 11/14/2014
Analyst: K. Thyberg

Sample ID	er31	Total Dry Weight	11.5

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	11.5	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	11.5	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.25	11.25	97.83%	2.17%	Granule Gravel	Total Gravel	2.17%
35	0.0197	0.500	0.32	10.93	95.04%	2.78%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.35	10.58	92.00%	3.04%	Medium Sand		
230	0.0025	0.063	10.47	0.11	0.96%	91.04%	Very Fine & Fine Sand	Total Sand	96.87%
-	-	-	0.11	-	-	0.96%	Silt & Clay	Total Silt & Clay	0.96%



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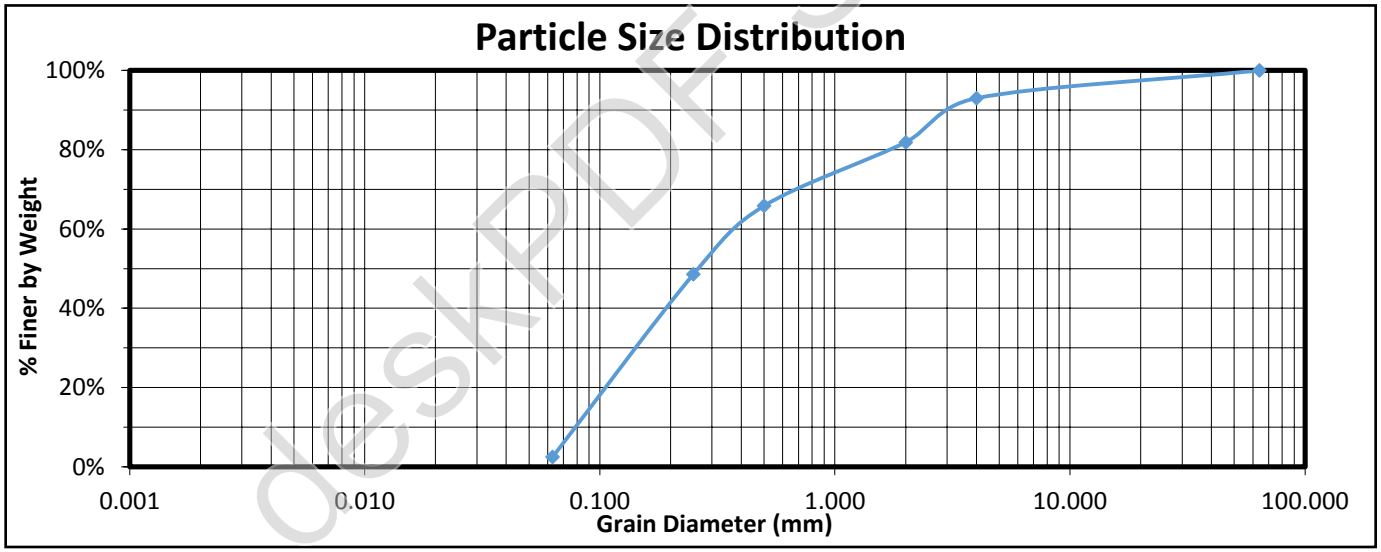
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er32	Total Dry Weight	2.43

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	2.43	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.17	2.26	93.00%	7.00%	Pebble Gravel		
10	0.7870	2.00	0.27	1.99	81.89%	11.11%	Granule Gravel	Total Gravel	18.11%
35	0.0197	0.500	0.39	1.6	65.84%	16.05%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.42	1.18	48.56%	17.28%	Medium Sand		
230	0.0025	0.063	1.12	0.06	2.47%	46.09%	Very Fine & Fine Sand	Total Sand	79.42%
-	-	-	0.06	-	-	2.47%	Silt & Clay	Total Silt & Clay	2.47%



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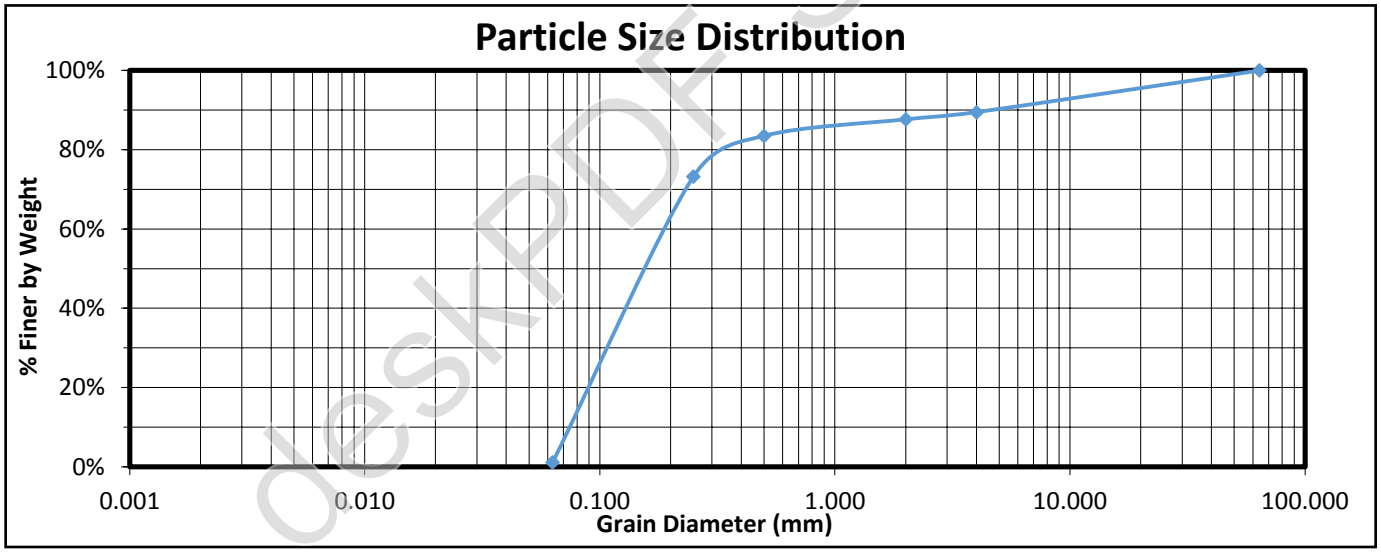
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er33	Total Dry Weight	5.52

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	5.52	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.58	4.94	89.49%	10.51%	Pebble Gravel		
10	0.7870	2.00	0.1	4.84	87.68%	1.81%	Granule Gravel	Total Gravel	12.32%
35	0.0197	0.500	0.23	4.61	83.51%	4.17%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.57	4.04	73.19%	10.33%	Medium Sand		
230	0.0025	0.063	3.98	0.06	1.09%	72.10%	Very Fine & Fine Sand	Total Sand	86.59%
-	-	-	0.06	-	-	1.09%	Silt & Clay	Total Silt & Clay	1.09%



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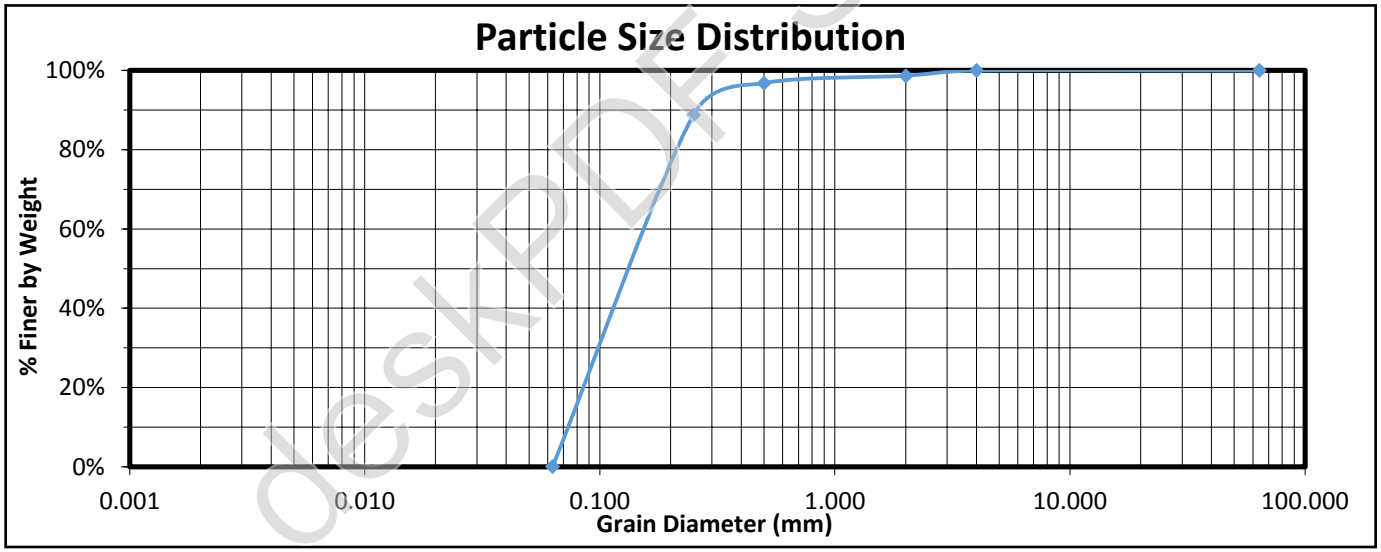
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er34	Total Dry Weight	23.44

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	23.44	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	23.44	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.31	23.13	98.68%	1.32%	Granule Gravel	Total Gravel	1.32%
35	0.0197	0.500	0.43	22.7	96.84%	1.83%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.9	20.8	88.74%	8.11%	Medium Sand		
230	0.0025	0.063	20.79	0.01	0.04%	88.69%	Very Fine & Fine Sand	Total Sand	98.63%
-	-	-	0.01	-	-	0.04%	Silt & Clay	Total Silt & Clay	0.04%



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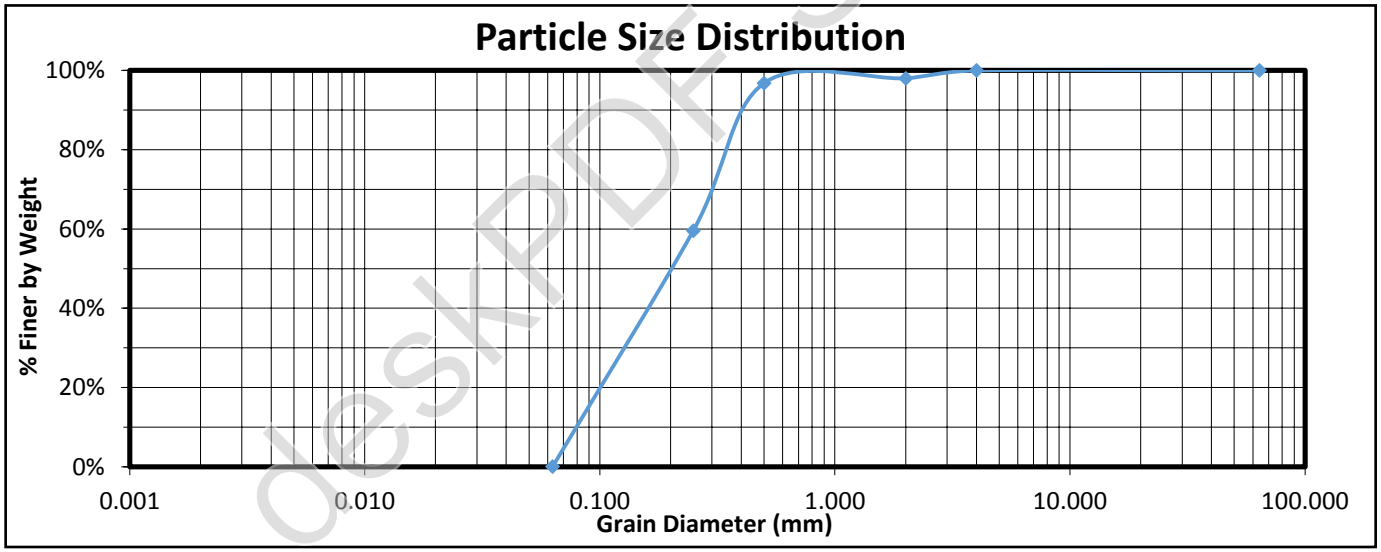
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er35	Total Dry Weight	23.99

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	23.99	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	23.99	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.47	23.52	98.04%	1.96%	Granule Gravel	Total Gravel	1.96%
35	0.0197	0.500	0.29	23.23	96.83%	1.21%	Very Coarse & Coarse Sand		
60	0.0098	0.25	8.93	14.3	59.61%	37.22%	Medium Sand		
230	0.0025	0.063	14.29	0.01	0.04%	59.57%	Very Fine & Fine Sand	Total Sand	98.00%
-	-	-	0.01	-	-	0.04%	Silt & Clay	Total Silt & Clay	0.04%



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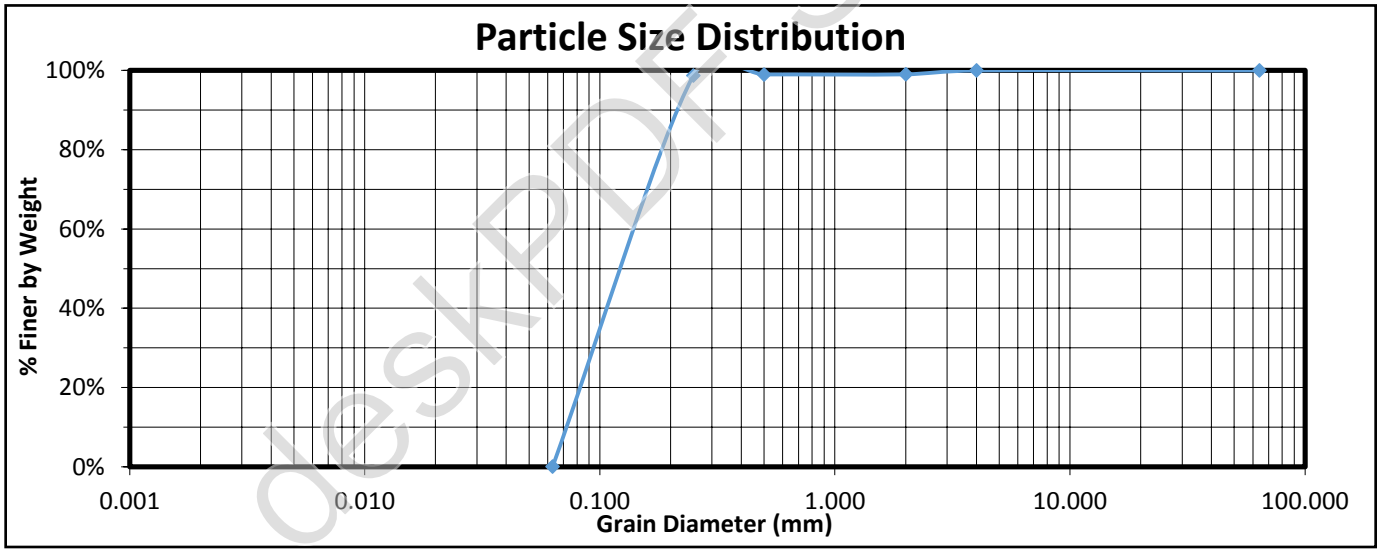
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er36	Total Dry Weight	31.92

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	31.92	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	31.92	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.31	31.61	99.03%	0.97%	Granule Gravel	Total Gravel	0.97%
35	0.0197	0.500	0.01	31.6	99.00%	0.03%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.09	31.51	98.72%	0.28%	Medium Sand		
230	0.0025	0.063	31.5	0.01	0.03%	98.68%	Very Fine & Fine Sand	Total Sand	99.00%
-	-	-	0.01	-	-	0.03%	Silt & Clay	Total Silt & Clay	0.03%



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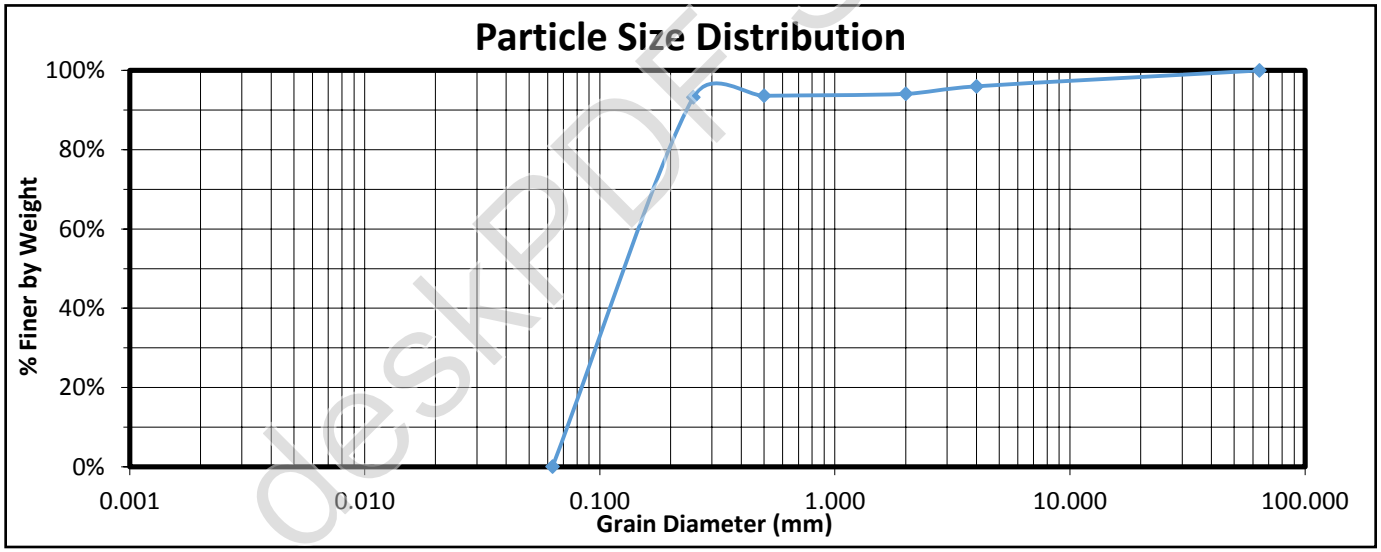
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er37	Total Dry Weight	33.06

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	33.06	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	1.32	31.74	96.01%	3.99%	Pebble Gravel		
10	0.7870	2.00	0.63	31.11	94.10%	1.91%	Granule Gravel	Total Gravel	5.90%
35	0.0197	0.500	0.16	30.95	93.62%	0.48%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.13	30.82	93.22%	0.39%	Medium Sand		
230	0.0025	0.063	30.79	0.03	0.09%	93.13%	Very Fine & Fine Sand	Total Sand	94.01%
-	-	-	0.03	-	-	0.09%	Silt & Clay	Total Silt & Clay	0.09%



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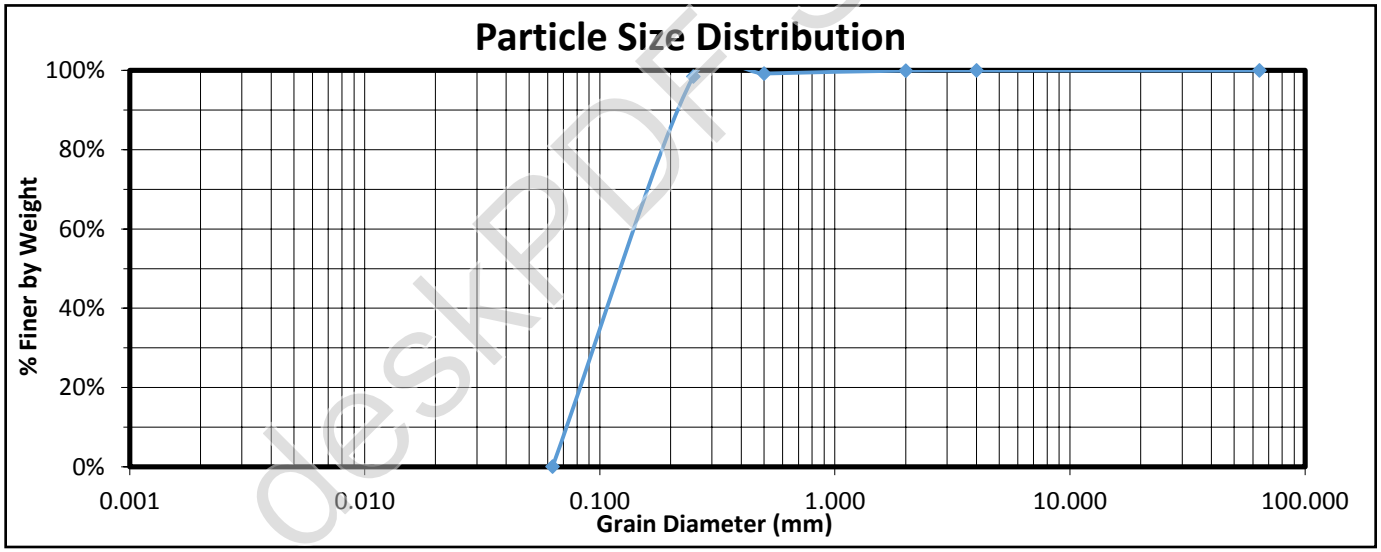
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er38	Total Dry Weight	29.91

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	29.91	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	29.91	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.01	29.9	99.97%	0.03%	Granule Gravel	Total Gravel	0.03%
35	0.0197	0.500	0.22	29.68	99.23%	0.74%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.22	29.46	98.50%	0.74%	Medium Sand		
230	0.0025	0.063	29.44	0.02	0.07%	98.43%	Very Fine & Fine Sand	Total Sand	99.90%
-	-	-	0.02	-	-	0.07%	Silt & Clay	Total Silt & Clay	0.07%



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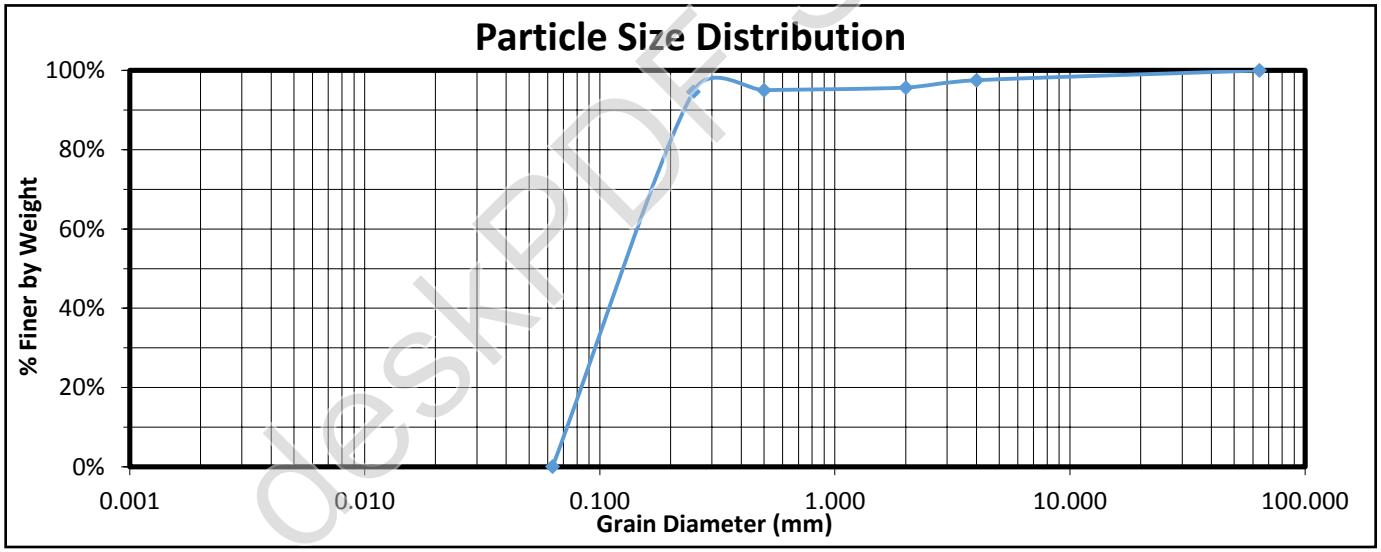
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er39	Total Dry Weight	27.63

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	27.63	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.68	26.95	97.54%	2.46%	Pebble Gravel		
10	0.7870	2.00	0.51	26.44	95.69%	1.85%	Granule Gravel	Total Gravel	4.31%
35	0.0197	0.500	0.18	26.26	95.04%	0.65%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.11	26.15	94.64%	0.40%	Medium Sand		
230	0.0025	0.063	26.14	0.01	0.04%	94.61%	Very Fine & Fine Sand	Total Sand	95.66%
-	-	-	0.01	-	-	0.04%	Silt & Clay	Total Silt & Clay	0.04%



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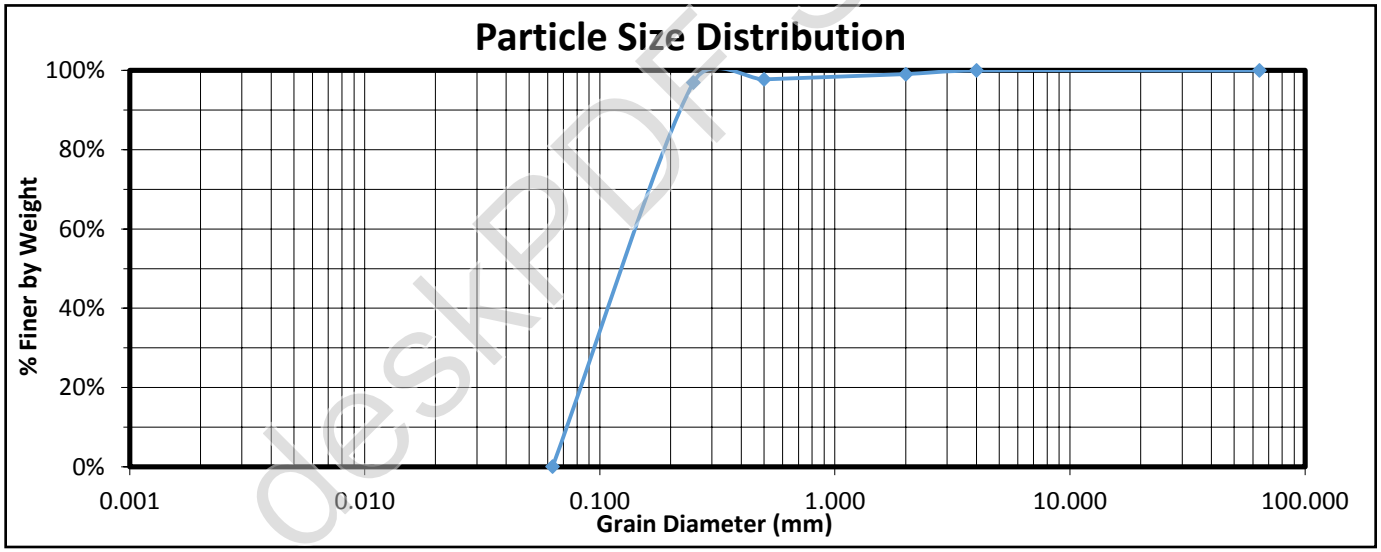
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er40	Total Dry Weight	25.42

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	25.42	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	25.42	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.23	25.19	99.10%	0.90%	Granule Gravel	Total Gravel	0.90%
35	0.0197	0.500	0.34	24.85	97.76%	1.34%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.21	24.64	96.93%	0.83%	Medium Sand		
230	0.0025	0.063	24.63	0.01	0.04%	96.89%	Very Fine & Fine Sand	Total Sand	99.06%
-	-	-	0.01	-	-	0.04%	Silt & Clay	Total Silt & Clay	0.04%



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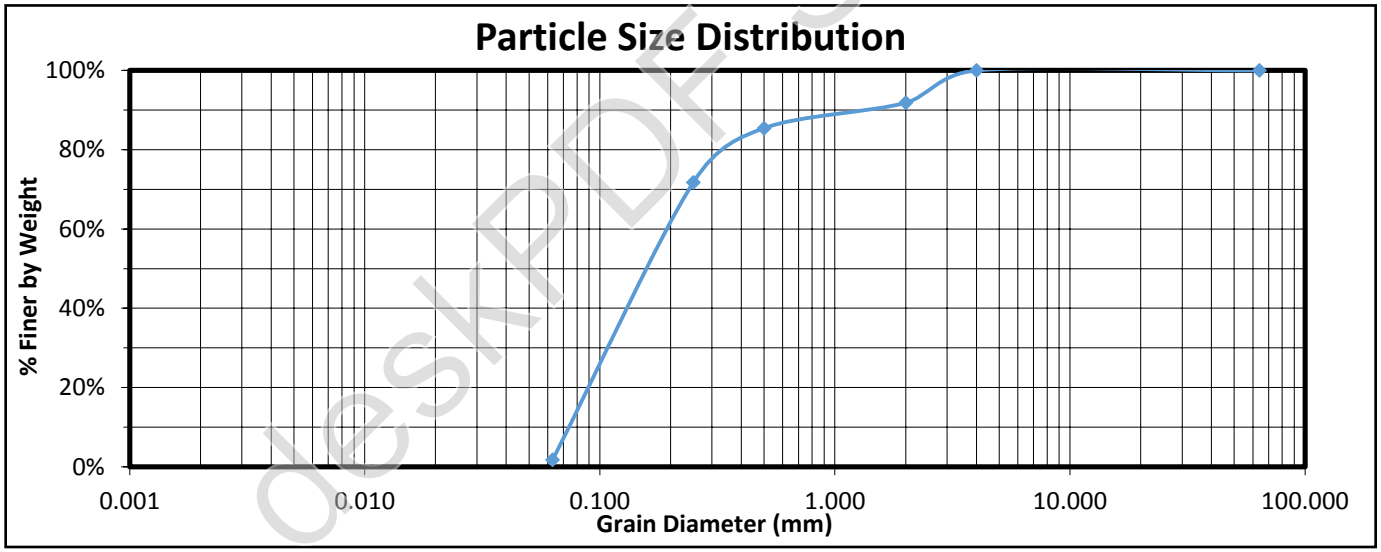
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er41	Total Dry Weight	7.97

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	7.97	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	7.97	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.65	7.32	91.84%	8.16%	Granule Gravel	Total Gravel	8.16%
35	0.0197	0.500	0.51	6.81	85.45%	6.40%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.09	5.72	71.77%	13.68%	Medium Sand		
230	0.0025	0.063	5.58	0.14	1.76%	70.01%	Very Fine & Fine Sand	Total Sand	90.09%
-	-	-	0.14	-	-	1.76%	Silt & Clay	Total Silt & Clay	1.76%



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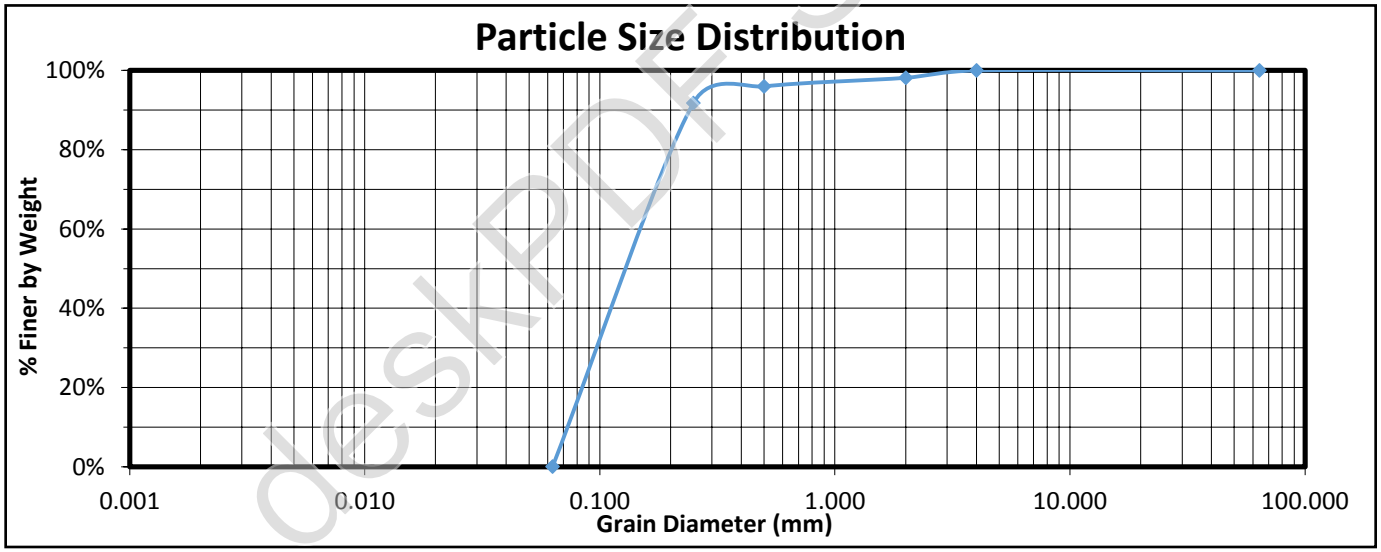
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er42	Total Dry Weight	33.51

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	33.51	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	33.51	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.62	32.89	98.15%	1.85%	Granule Gravel	Total Gravel	1.85%
35	0.0197	0.500	0.73	32.16	95.97%	2.18%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.41	30.75	91.76%	4.21%	Medium Sand		
230	0.0025	0.063	30.73	0.02	0.06%	91.70%	Very Fine & Fine Sand	Total Sand	98.09%
-	-	-	0.02	-	-	0.06%	Silt & Clay	Total Silt & Clay	0.06%



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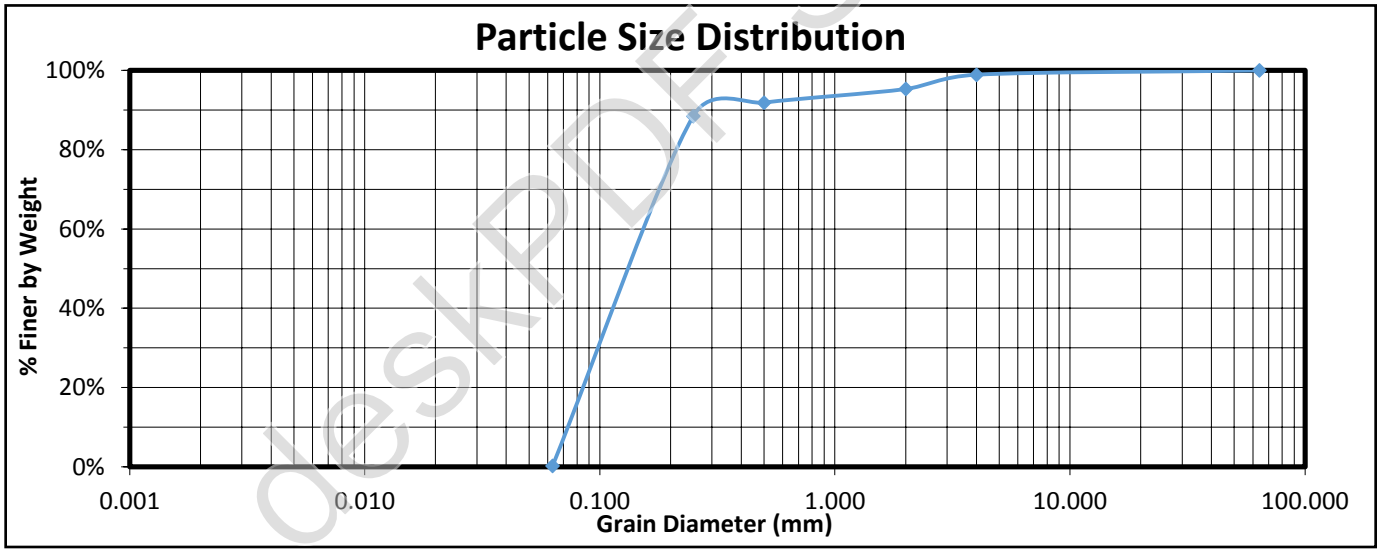
Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er43	Total Dry Weight	24.57

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	24.57	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0.26	24.31	98.94%	1.06%	Pebble Gravel		
10	0.7870	2.00	0.89	23.42	95.32%	3.62%	Granule Gravel	Total Gravel	4.68%
35	0.0197	0.500	0.84	22.58	91.90%	3.42%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.83	21.75	88.52%	3.38%	Medium Sand		
230	0.0025	0.063	21.69	0.06	0.24%	88.28%	Very Fine & Fine Sand	Total Sand	95.08%
-	-	-	0.06	-	-	0.24%	Silt & Clay	Total Silt & Clay	0.24%



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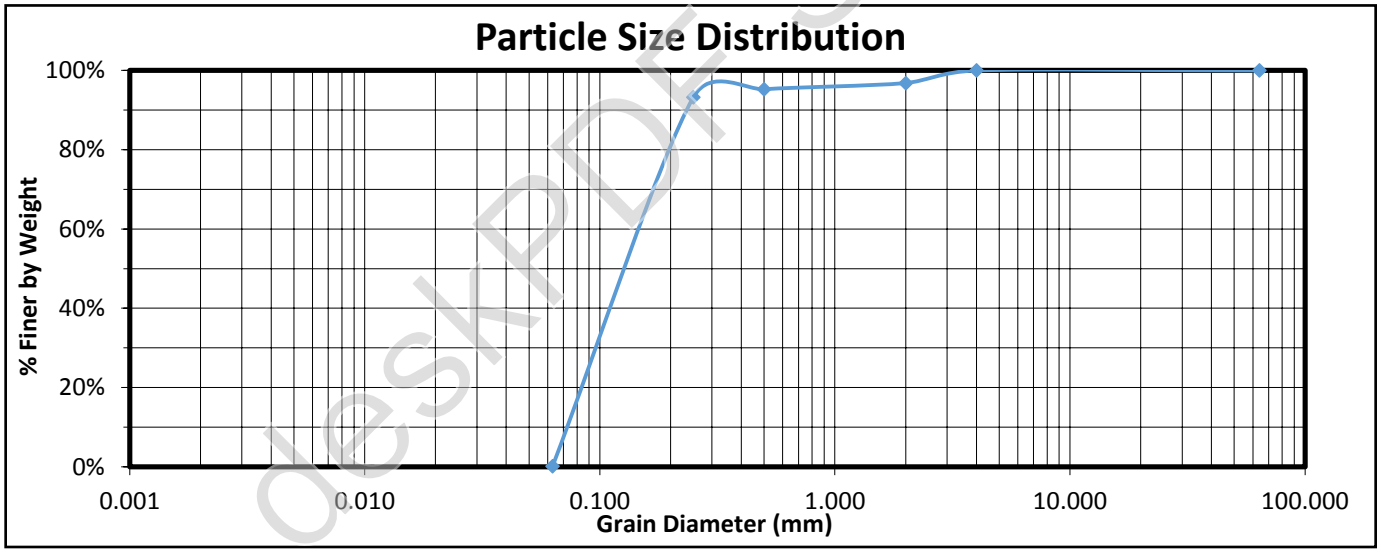
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er44	Total Dry Weight	23.69

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	23.69	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	23.69	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.75	22.94	96.83%	3.17%	Granule Gravel	Total Gravel	3.17%
35	0.0197	0.500	0.37	22.57	95.27%	1.56%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.48	22.09	93.25%	2.03%	Medium Sand		
230	0.0025	0.063	22.05	0.04	0.17%	93.08%	Very Fine & Fine Sand	Total Sand	96.67%
-	-	-	0.04	-	-	0.17%	Silt & Clay	Total Silt & Clay	0.17%



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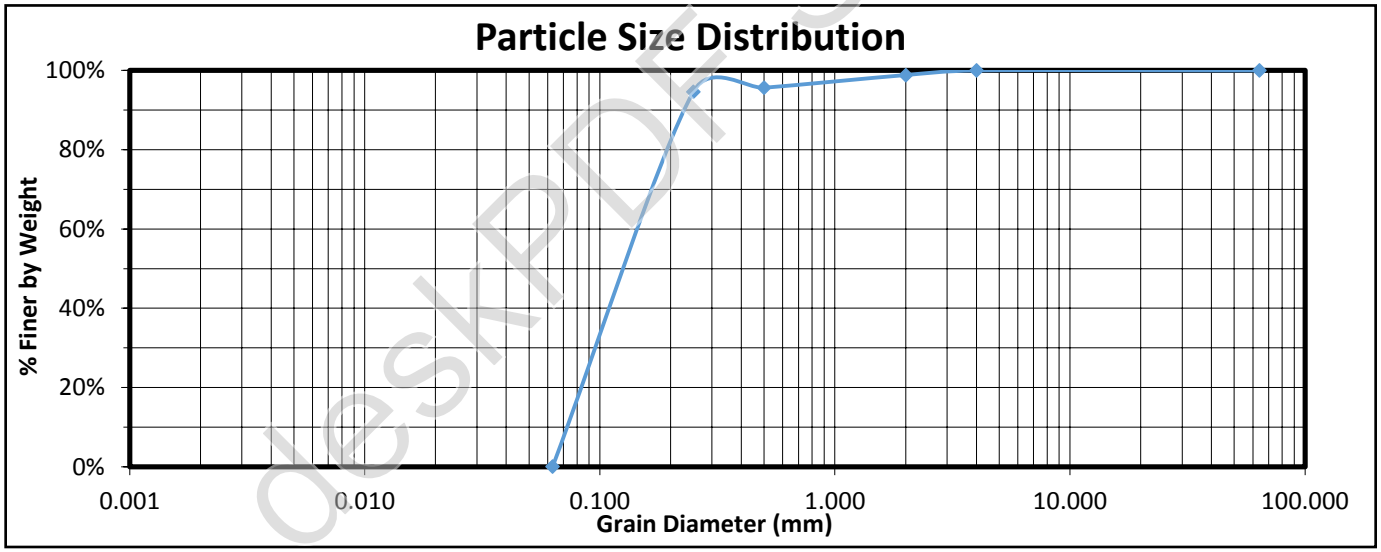
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er45	Total Dry Weight	32.15

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	32.15	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	32.15	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.37	31.78	98.85%	1.15%	Granule Gravel	Total Gravel	1.15%
35	0.0197	0.500	1.03	30.75	95.65%	3.20%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.33	30.42	94.62%	1.03%	Medium Sand		
230	0.0025	0.063	30.41	0.01	0.03%	94.59%	Very Fine & Fine Sand	Total Sand	98.82%
-	-	-	0.01	-	-	0.03%	Silt & Clay	Total Silt & Clay	0.03%



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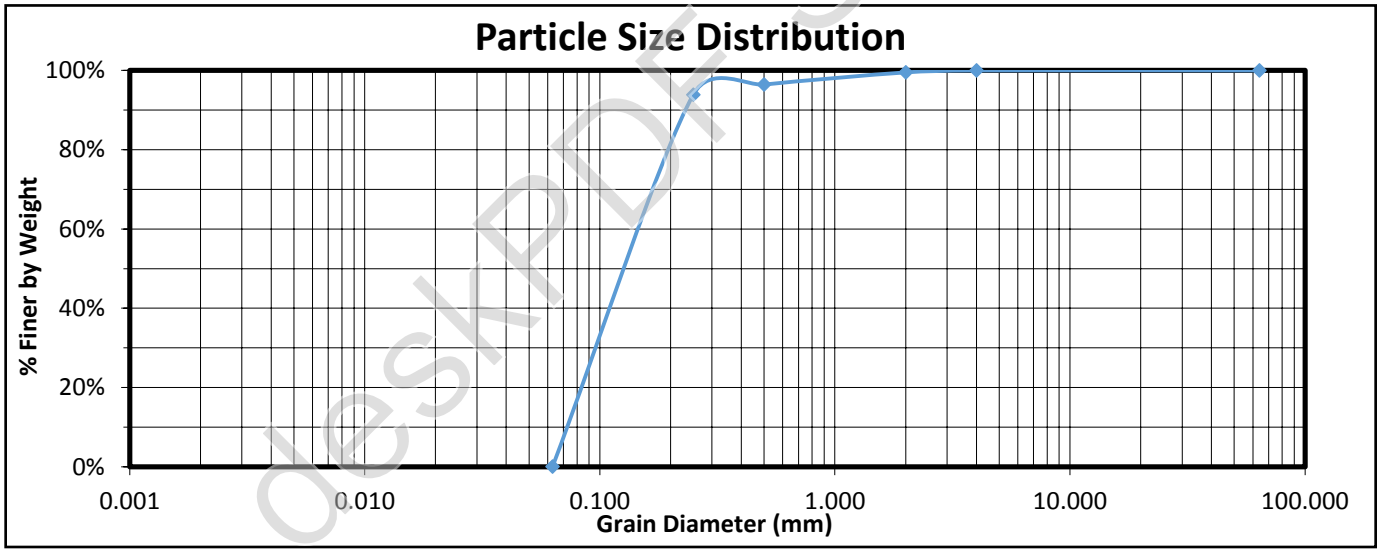
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er46	Total Dry Weight	25.04

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	25.04	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	25.04	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.12	24.92	99.52%	0.48%	Granule Gravel	Total Gravel	0.48%
35	0.0197	0.500	0.77	24.15	96.45%	3.08%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.63	23.52	93.93%	2.52%	Medium Sand		
230	0.0025	0.063	23.5	0.02	0.08%	93.85%	Very Fine & Fine Sand	Total Sand	99.44%
-	-	-	0.02	-	-	0.08%	Silt & Clay	Total Silt & Clay	0.08%



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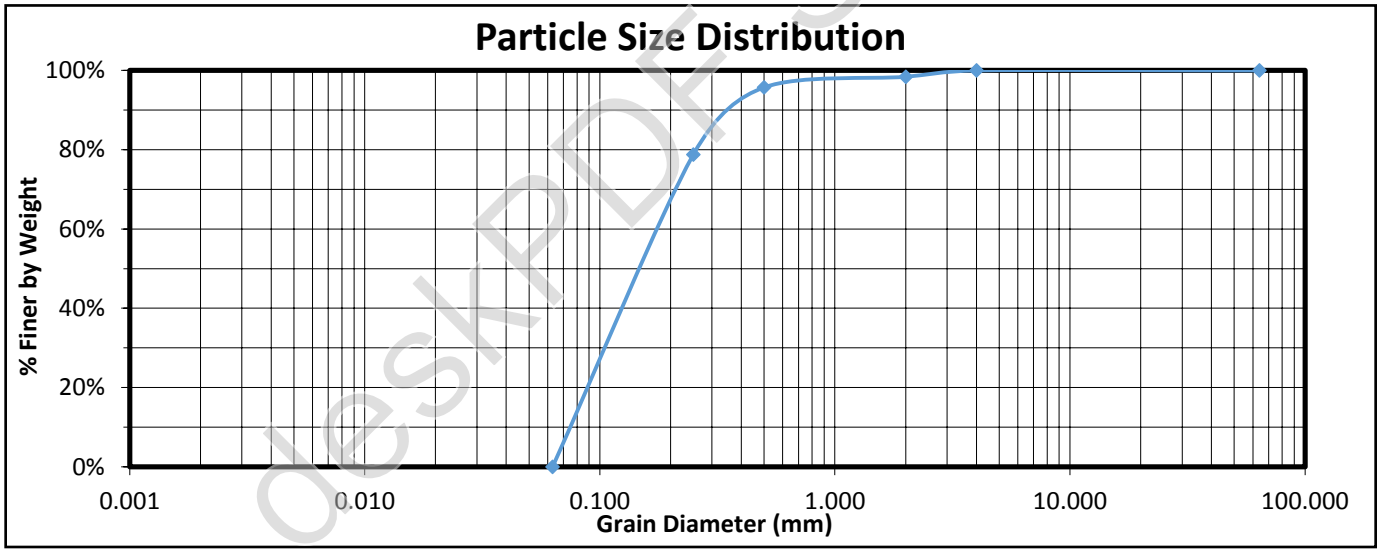
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er47	Total Dry Weight	25.27

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	25.27	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	25.27	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.4	24.87	98.42%	1.58%	Granule Gravel	Total Gravel	1.58%
35	0.0197	0.500	0.68	24.19	95.73%	2.69%	Very Coarse & Coarse Sand		
60	0.0098	0.25	4.28	19.91	78.79%	16.94%	Medium Sand		
230	0.0025	0.063	19.91	0	0.00%	78.79%	Very Fine & Fine Sand	Total Sand	98.42%
-	-	-	0	-	-	0.00%	Silt & Clay	Total Silt & Clay	0.00%



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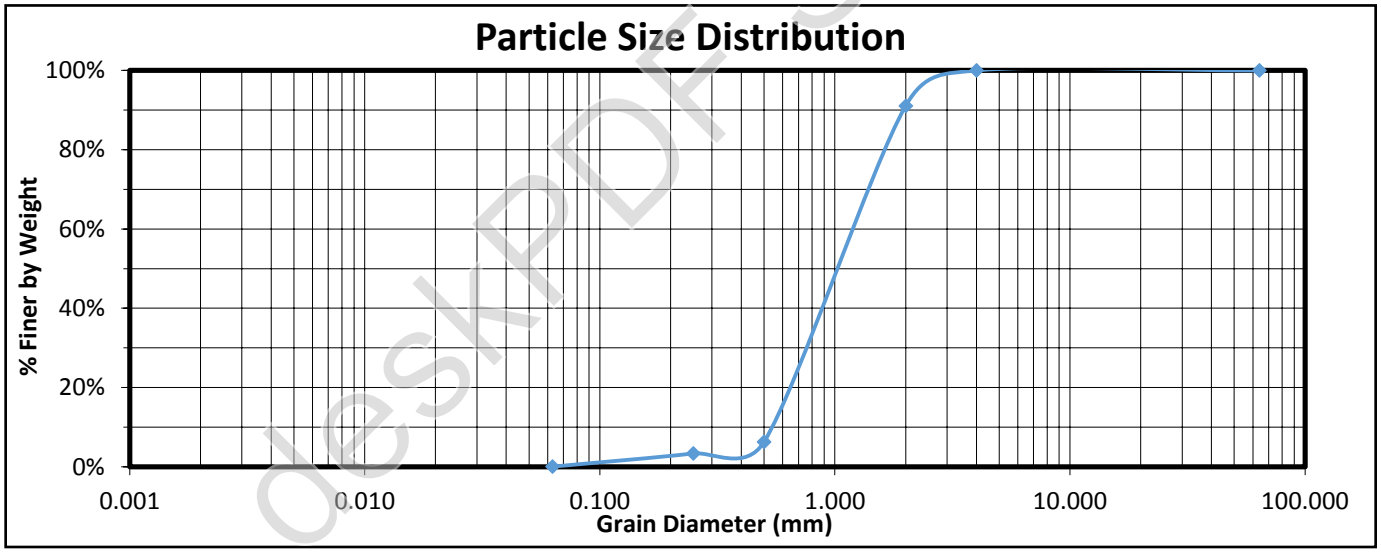
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er48	Total Dry Weight	37.16

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	37.16	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	37.16	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	3.32	33.84	91.07%	8.93%	Granule Gravel	Total Gravel	8.93%
35	0.0197	0.500	31.5	2.34	6.30%	84.77%	Very Coarse & Coarse Sand		
60	0.0098	0.25	1.09	1.25	3.36%	2.93%	Medium Sand		
230	0.0025	0.063	1.24	0.01	0.03%	3.34%	Very Fine & Fine Sand	Total Sand	91.04%
-	-	-	0.01	-	-	0.03%	Silt & Clay	Total Silt & Clay	0.03%



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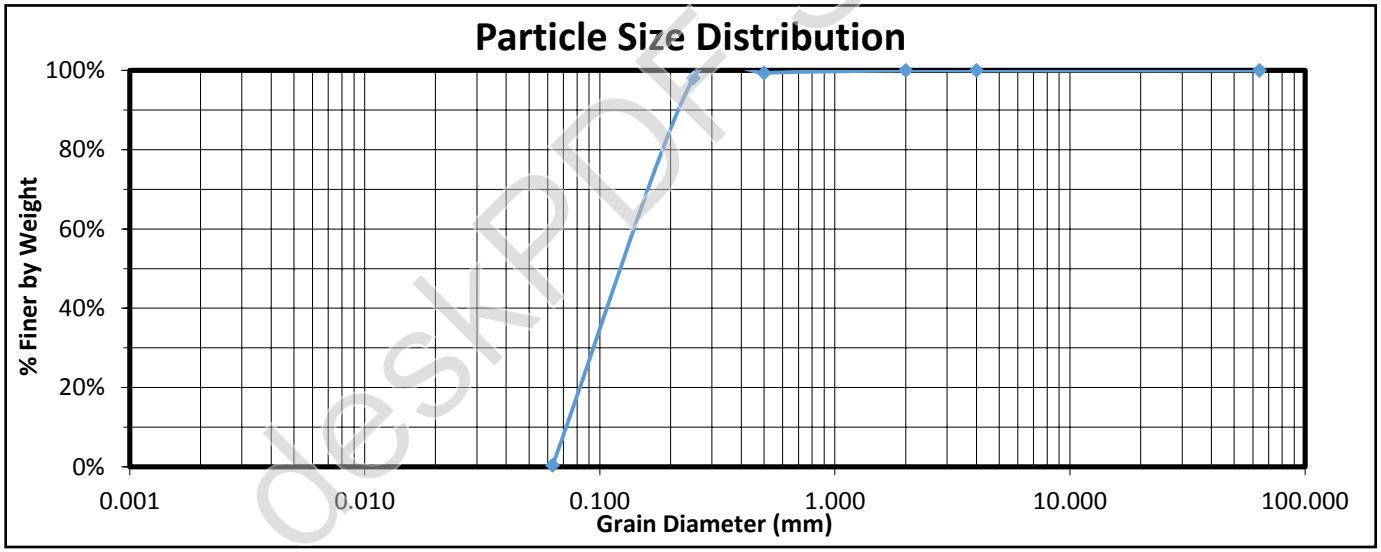
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er49	Total Dry Weight	8.41

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	8.41	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	8.41	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0	8.41	100.00%	0.00%	Granule Gravel	Total Gravel	0.00%
35	0.0197	0.500	0.05	8.36	99.41%	0.59%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.11	8.25	98.10%	1.31%	Medium Sand		
230	0.0025	0.063	8.22	0.03	0.36%	97.74%	Very Fine & Fine Sand	Total Sand	99.64%
-	-	-	0.03	-	-	0.36%	Silt & Clay	Total Silt & Clay	0.36%



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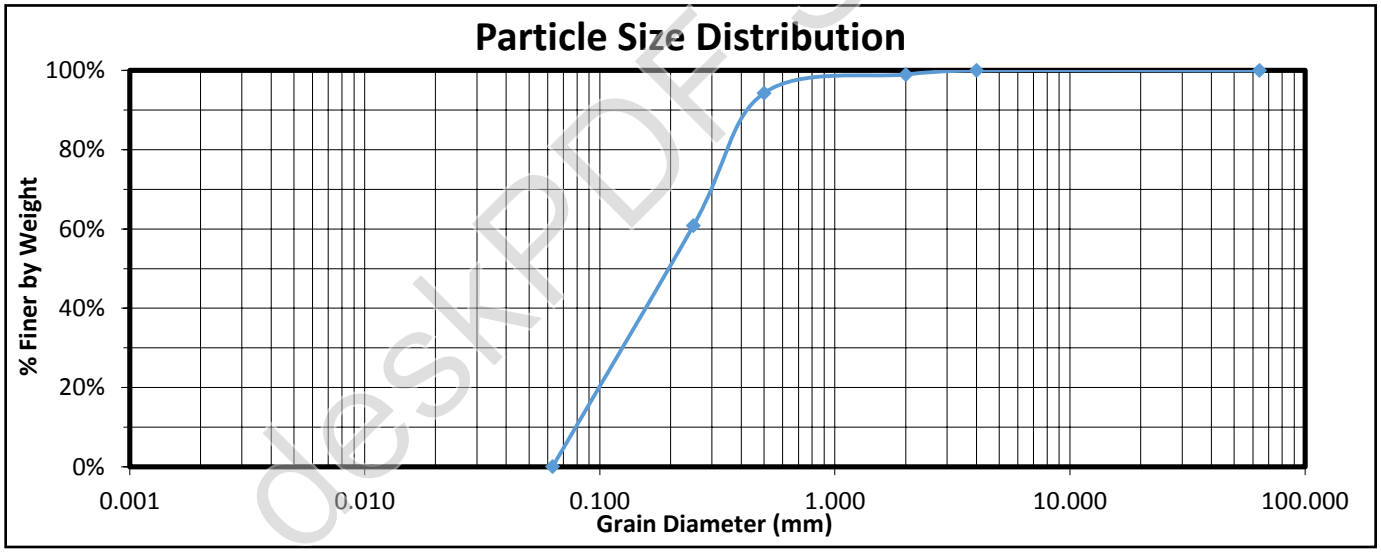
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	er50	Total Dry Weight	18.84

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	18.84	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	18.84	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.19	18.65	98.99%	1.01%	Granule Gravel	Total Gravel	1.01%
35	0.0197	0.500	0.88	17.77	94.32%	4.67%	Very Coarse & Coarse Sand		
60	0.0098	0.25	6.31	11.46	60.83%	33.49%	Medium Sand		
230	0.0025	0.063	11.45	0.01	0.05%	60.77%	Very Fine & Fine Sand	Total Sand	98.94%
-	-	-	0.01	-	-	0.05%	Silt & Clay	Total Silt & Clay	0.05%



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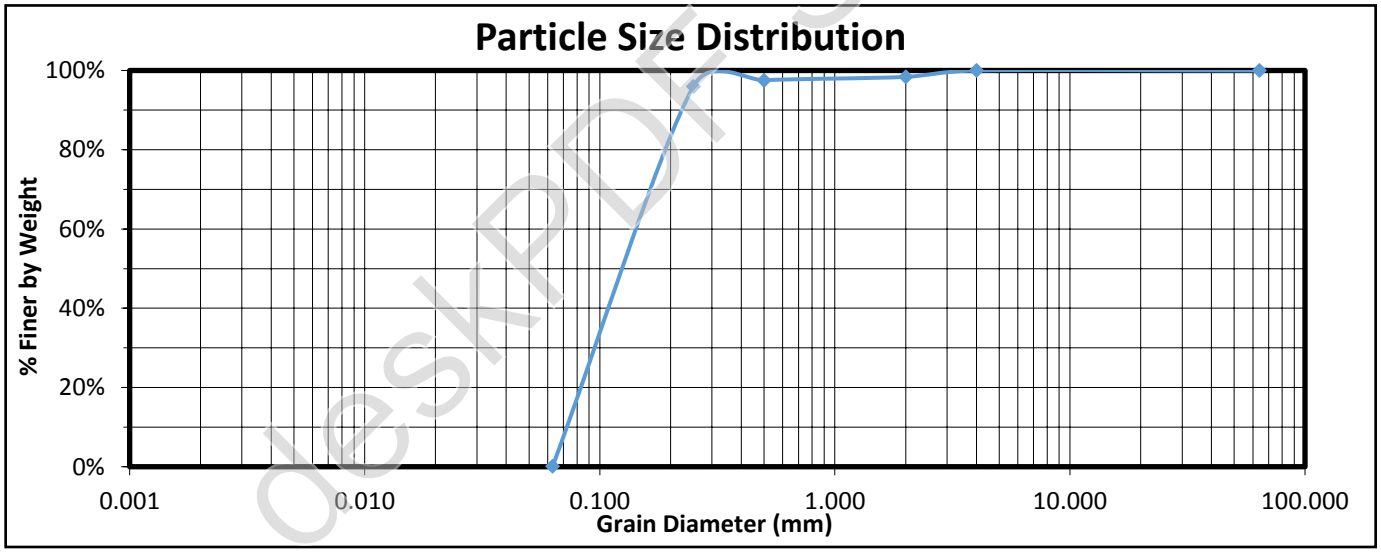
Cashin Associates
1200 Veterans HWY
Happauge, NY 11788

Client: Tetra Tech

Date Analyzed: 11/13/2014
Analyst: K. Thyberg

Sample ID	NoName	Total Dry Weight	20.43

US Seive #	Seive Size (In)	Seive Size (mm)	Mass of Sediment Retained per Seive (g)	Total Mass Passing Seive (g)	Total Passing Seive (%)	Total %	Size Description	Size Description (Unified)	%
-	2.5000	64.00	0	20.43	100.00%	0.00%	Cobble Gravel		
5	0.1570	4.00	0	20.43	100.00%	0.00%	Pebble Gravel		
10	0.7870	2.00	0.33	20.1	98.38%	1.62%	Granule Gravel	Total Gravel	1.62%
35	0.0197	0.500	0.17	19.93	97.55%	0.83%	Very Coarse & Coarse Sand		
60	0.0098	0.25	0.32	19.61	95.99%	1.57%	Medium Sand		
230	0.0025	0.063	19.59	0.02	0.10%	95.89%	Very Fine & Fine Sand	Total Sand	98.29%
-	-	-	0.02	-	-	0.10%	Silt & Clay	Total Silt & Clay	0.10%



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Appendix E – Raw Laboratory Data; Benthic Infauna

East Rockaway
October 2014

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Name/Site	**039**	**049**	**038**	**046**	**031**	**033**	**050**	**036**	**037**	**047**	**045**	**034**	**041**	**029**	**030**	**032**	**040**	**044**	**048**	**043**	**042**	**035**	**012**	**014**	**018**	**001**	**019**	**022**	**008**	**009**	**010**	**011**	**002**	**005**	**006**	**007**	**013**	**016**	**004**	**023**	**025**	**021**	**003**	**020**	**015**	**024**	**026**	**027**	**028**	**017**
ARTHROPOPDA																																																		
Amphipoda																																																		
Ampelisca verrilli	3		8	20	91	32	2	321	655	10	138	29	66	36	26	139	2	147		80	158	1		4	31		2	5	19	14	116	1		3	2	4	2	1	1	127	20	1	2	3	8	25	3		30	6
Batea catharinensis																														1	1																			
Corophium sp																					8														1						1				12					
Microprotopus raneyi																							1							1					1													1		
Parametopella cypris																																													1					1
Protohaustorius wigleyi							3																										2																	
Synchelidium americanum																												1				1					1													1
Unciola irrorata	2	2	1	5	2				2	6	3	3	1	2	1	2		2	1	2	4				1		6	1	10	4	5			1	5	2		1							1	2	5	2	1	1	
Cumacea																																																		
Diastylis sculpta														1	1			1																																	
Oxyurostlyus smithi						2				1						1						1	2						1										1	1						2				
Pseudolectocuma minor																	1					1																													
Decapoda																																																		
Crangon septemspinosa																													1	1																		1			
Pagurus longicarpus											1								1										1																		1				
Isopoda																																																		
Chiridotea sp																																																		
Edotea triloba	1					2	1															1															2		1										1		
Isopoda sp																				1			3	1										2	2						1										
Tanaidacea																																																		
Leptognathia caeca																																	1																	
ECHINODERMA																																																		
Echinarachnius parma	1										1	1																																						
MOLLUSKA																																																		
Bivalvia																																																		
Anadara transversa																														2																				
Lyonsia hyalina				2					2		2		1		1		2					2		1	2			1	1		1							1								1				1
Mulinia lateralis															2										1																										
Nucula spp		265						11	4	1		4				2	2	6		3	2	4		1	9		1	2		9	2			1	4	1	3			12	6				4	4			1	6
Pitar morrhuanus		3			2										1	1	1																																		
Siliqua costata																																																		1
Spisula solidissima	1				4	5	1	8	2	3	3	2			2	4	2	6	1	3	1	5	1			1	1		2	5		1			1	3	1	1		6	2		2	1	2	8		1	1	2
Tellina agilis	3		4	21	7	12		4	11	12	10	10	8	14	7	14	3	17		10	3	9	8	15	14	2	7	5	15	15	15	5	5	4	8	7	5	9	1	26	9	7	6	3	5	11	9	4	7	10
Yoldia limatula		2		1	3			1	2	1	2	5		1			1	1			1	2		1	4			2	2					2	1		2		1	4					1		2	1	
Unknown bivalve juvenile																					1																														
Gastropoda																																																		
Crepidula sp (juvenile)																					2								1															1						
Ilyanassa trivittata		3	1					1		1								1							1									1	1			1	1		1					1		1		
Naticidae sp (juvenile)																																								1										
Odostomia sp																					1																														
Turbonilla sp																														1																				
POLYCHAETA																																																		
Ampharete arctica																						1																													
Arabella iricolor																																							1											
Aricidea spp			1	16	22	13	9	30	1	30	17	39	7	16	13	13	7	33		21	13	8	3	16	19	2	1	20	5	7	17	3	4	2	6	6	3	5	7	19	6	4	1	1	16	18	24	1	11	20
Asabellides oculata		39				1							1						2				1	1	4		2	1	9	2					4	1	3		2	1				1	1	2		1		2
Capitellidae spp (juveniles)	15	96	19	28	17	14	7	13	12	27	3	25	6	4	3		4	8		2	4	2	9	20	15	2	13	14	12		14	23	3	17	11	3	8	13	13	5	12	7	36		25	19	34	16	13	36
Clymenella torquata						1					1																						1																	
Diopatra cuprea												1				1					1																			1										
Drilonereis sp																						1																													
Eteone sp		2				2														1							1								1																
Eteone lactea																													1																						
Eumida sanguinea																1													1																						
Glycera americana		1	2	1		2			1	2			1	1	2			1	3		1		1			1	2	2			1	1			1	1		1	2	4	1			1		1	1	1		
Glycera dibranchiata							1				2																														1										
Glycinde solitaire		1																		1																															
Goniadella gracilis																																																		
Harmothoe sp																																																		
Lumbrinereis fragilis	1										1							1																1																
Magelona sp	9		5	9	2	3	13	4		9	1	2	6	4	2		6			2	2	6	2	5			4	3	1	1	1	3	1	6	2		2	1	2	3	2	9	3	2	10	1	1	2	1	2
Nepthys picta	8		9	11	3	3	6	2	6	12	5	6	2	10	13	5	4	3	2	2	6	30	13	4	5	2	5	1	5	14	6	6	4	6	6	6	6	8	3	6	1	4	4		4	6	4	1	4	8
Nepthys incisa		1																																																
Nereis sp		4																																																
Owenia fusiformis						2					1	1	1	1	1	1		1		1				1	1			1	1		1	1			1	1		1									1	1	1	
Onuphis opalina	1		2							3	4	1			1		4	1				4		1	1		1	3	4		1			3	5	1	1		3	1		1	2	1	2			1		
Orbinia sp																																																		
Paranaitis speciosa																1																																		
Pectinaria gouldi		22			1			1			1		1	1		2		1			1									2										2			3							1	
Phyllodoce arenae	1	2		2				1	1	1		1				1	2			1		1			1		1			1	1		1	1		1	1		1	2										1
Polydora spp.								1				1						1		2				1																					3						
Polygordius sp	18		6	16	14	6	6	16	6	26	8	8	6	4	5	19	4	39	42	53	17	36	17	18	15	4	6	24	15	6	23	9	5	10	12	6	7	12	3	31	25	6	4		9	39	37	9	5	24
Prionospio pygmaea	36		30	37	19	18	1	18	19	38	46	61	16	18	30	22	29	25	2	20	12	19	13	28	16	3	24	21	32	12	26	4	1	25	24	16	15	18	10	27	25	16	18	5	38	21	12	9	13	31
Schistomeringos caecus																						1		1																										
Scoloplos robustus	4			1		4	2	1	1	4	2		1	1	2	3	3	2			2		1		3		2	1	4		1			1	2	3	4	3	2	2	1	3	2	1	1	2	3		3	1
Sigalion arenicola	1		3	2			1		1	1						1	2	1		1	2	2	1	1			1	3	1		2			2	2	1	2	1		1		1	1		1				3	1	1
Spiochaetopterus oculatus		1		1		2		2	2	1		1	2	1		1		6		4	3	2		2	3		1	2	2	1	6			1			1		2	1	1					7	1	1	1	2
Spiophanes bombyx	3		1	1		3		1	3	3	2	6	6	1	1	1	2	3	1	1	2	1	3	1	3		2	1	4	4	6	3		2	2	3	2	1	3	2		6	1	1		3		3	6	5
Streblospio benedicti		30																																																
Tharyx sp	11	26	4				5	2	4	1			2	4		3	9	5	1		3	1	6	5	11	6	10	4	12	7	6		11	5	6	2	10	6	8	3		4	6	2		6	5	7	3	1
OTHER																																																		
Actinaria sp (A)		14		1						1	1																																								
Actinaria sp (B)																												1																							
Holothuroidea sp (Sea Cucumber)		1																																														2			
Nematoda spp			28		3	6	56	6		36			3	4		10			432	58		38	4	7	15	10	12	33	12	18	16	22	35	5	17	14			3	16	12	6	2		7	6		15	24	30
Nemertinea spp	8?	22	1	10	8	17	12	10	18	6	26	14	4	17	2	12	3	2	1	3	3	8	5	7	11	1	6	20	11	3	9	5	3	21	7	7	5	3	6	10	11	7	11	1	11	12	20	6	5	22
Oligochaeta spp				2			15	1		1		1						1					1		1				1			2	1	1					1					1						2
Polycladida spp	1	1	1	1											1													1							1															
Syngnathus fuscus (Northern Pipefish)		1																																																
Organism Count	19	21	18	21	15	21	17	22	20	26	24	22	20	20	21	24	21	26	12	22	25	26	20	23	24	11	23	26	29	23	23	16	15	24	28	21	23	19	23	28	17	15	18	18	18	24	18	22	20	24

East Rockaway
October 2014

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Name/Site	**039**	**049**	**038**	**046**	**031**	**033**	**050**	**036**	**037**	**047**	**045**	**034**	**041**	**029**	**030**	**032**	**040**	**044**	**048**	**043**	**042**	**035**	**012**	**014**	**018**	**001**	**019**	**022**	**008**	**009**	**010**	**011**	**002**	**005**	**006**	**007**	**013**	**016**	**004**	**023**	**025**	**021**	**003**	**020**	**015**	**024**	**026**	**027**	**028**	**017**
ARTHROPOPDA																																																		
Amphipoda																																																		
Ampelisca verrilli	3		8	20	91	32	2	321	655	10	138	29	66	36	26	139	2	147		80	158	1		4	31		2	5	19	14	116	1		3	2	4	2	1	1	127	20	1	2	3	8	25	3		30	6
Batea catharinensis																														1	1																			
Corophium sp																					8														1						1				12					
Microprotopus raneyi																							1							1					1													1		
Parametopella cypris																																													1					1
Protohaustorius wigleyi							3																										2																	
Synchelidium americanum																												1				1					1													1
Unciola irrorata	2	2	1	5	2				2	6	3	3	1	2	1	2		2	1	2	4				1		6	1	10	4	5			1	5	2		1							1	2	5	2	1	1	
Cumacea																																																		
Diastylis sculpta														1	1			1																																	
Oxyurostlyus smithi						2				1						1						1	2						1										1	1						2				
Pseudolectocuma minor																	1					1																													
Decapoda																																																		
Crangon septemspinosa																													1	1																		1			
Pagurus longicarpus											1								1										1																		1				
Isopoda																																																		
Chiridotea sp																																																		
Edotea triloba	1					2	1															1															2		1										1		
Isopoda sp																				1			3	1										2	2						1										
Tanaidacea																																																		
Leptognathia caeca																																	1																	
ECHINODERMA																																																		
Echinarachnius parma	1										1	1																																						
MOLLUSKA																																																		
Bivalvia																																																		
Anadara transversa																														2																				
Lyonsia hyalina				2					2		2		1		1		2					2		1	2			1	1		1							1								1				1
Mulinia lateralis															2										1																										
Nucula spp		265						11	4	1		4				2	2	6		3	2	4		1	9		1	2		9	2			1	4	1	3			12	6				4	4			1	6
Pitar morrhuanus		3			2										1	1	1																																		
Siliqua costata																																																		1
Spisula solidissima	1				4	5	1	8	2	3	3	2			2	4	2	6	1	3	1	5	1			1	1		2	5		1			1	3	1	1		6	2		2	1	2	8		1	1	2
Tellina agilis	3		4	21	7	12		4	11	12	10	10	8	14	7	14	3	17		10	3	9	8	15	14	2	7	5	15	15	15	5	5	4	8	7	5	9	1	26	9	7	6	3	5	11	9	4	7	10
Yoldia limatula		2		1	3			1	2	1	2	5		1			1	1			1	2		1	4			2	2					2	1		2		1	4					1		2	1	
Unknown bivalve juvenile																					1																														
Gastropoda																																																		
Crepidula sp (juvenile)																					2								1															1						
Ilyanassa trivittata		3	1					1		1								1							1									1	1			1	1		1					1		1		
Naticidae sp (juvenile)																																								1										
Odostomia sp																					1																														
Turbonilla sp																														1																				
POLYCHAETA																																																		
Ampharete arctica																						1																													
Arabella iricolor																																							1											
Aricidea spp			1	16	22	13	9	30	1	30	17	39	7	16	13	13	7	33		21	13	8	3	16	19	2	1	20	5	7	17	3	4	2	6	6	3	5	7	19	6	4	1	1	16	18	24	1	11	20
Asabellides oculata		39				1							1						2				1	1	4		2	1	9	2					4	1	3		2	1				1	1	2		1		2
Capitellidae spp (juveniles)	15	96	19	28	17	14	7	13	12	27	3	25	6	4	3		4	8		2	4	2	9	20	15	2	13	14	12		14	23	3	17	11	3	8	13	13	5	12	7	36		25	19	34	16	13	36
Clymenella torquata						1					1																						1																	
Diopatra cuprea												1				1					1																			1										
Drilonereis sp																						1																													
Eteone sp		2				2														1							1								1																
Eteone lactea																													1																						
Eumida sanguinea																1													1																						
Glycera americana		1	2	1		2			1	2			1	1	2			1	3		1		1			1	2	2			1	1			1	1		1	2	4	1			1		1	1	1		
Glycera dibranchiata							1				2																														1										
Glycinde solitaire		1																		1																															
Goniadella gracilis																																																		
Harmothoe sp																																																		
Lumbrinereis fragilis	1										1							1																1																
Magelona sp	9		5	9	2	3	13	4		9	1	2	6	4	2		6			2	2	6	2	5			4	3	1	1	1	3	1	6	2		2	1	2	3	2	9	3	2	10	1	1	2	1	2
Nepthys picta	8		9	11	3	3	6	2	6	12	5	6	2	10	13	5	4	3	2	2	6	30	13	4	5	2	5	1	5	14	6	6	4	6	6	6	6	8	3	6	1	4	4		4	6	4	1	4	8
Nepthys incisa		1																																																
Nereis sp		4																																																
Owenia fusiformis						2					1	1	1	1	1	1		1		1				1	1			1	1		1	1			1	1		1									1	1	1	
Onuphis opalina	1		2							3	4	1			1		4	1				4		1	1		1	3	4		1			3	5	1	1		3	1		1	2	1	2			1		
Orbinia sp																																																		
Paranaitis speciosa																1																																		
Pectinaria gouldi		22			1			1			1		1	1		2		1			1									2										2			3							1	
Phyllodoce arenae	1	2		2				1	1	1		1				1	2			1		1			1		1			1	1		1	1		1	1		1	2										1
Polydora spp.								1				1						1		2				1																					3						
Polygordius sp	18		6	16	14	6	6	16	6	26	8	8	6	4	5	19	4	39	42	53	17	36	17	18	15	4	6	24	15	6	23	9	5	10	12	6	7	12	3	31	25	6	4		9	39	37	9	5	24
Prionospio pygmaea	36		30	37	19	18	1	18	19	38	46	61	16	18	30	22	29	25	2	20	12	19	13	28	16	3	24	21	32	12	26	4	1	25	24	16	15	18	10	27	25	16	18	5	38	21	12	9	13	31
Schistomeringos caecus																						1		1																										
Scoloplos robustus	4			1		4	2	1	1	4	2		1	1	2	3	3	2			2		1		3		2	1	4		1			1	2	3	4	3	2	2	1	3	2	1	1	2	3		3	1
Sigalion arenicola	1		3	2			1		1	1						1	2	1		1	2	2	1	1			1	3	1		2			2	2	1	2	1		1		1	1		1				3	1	1
Spiochaetopterus oculatus		1		1		2		2	2	1		1	2	1		1		6		4	3	2		2	3		1	2	2	1	6			1			1		2	1	1					7	1	1	1	2
Spiophanes bombyx	3		1	1		3		1	3	3	2	6	6	1	1	1	2	3	1	1	2	1	3	1	3		2	1	4	4	6	3		2	2	3	2	1	3	2		6	1	1		3		3	6	5
Streblospio benedicti		30																																																
Tharyx sp	11	26	4				5	2	4	1			2	4		3	9	5	1		3	1	6	5	11	6	10	4	12	7	6		11	5	6	2	10	6	8	3		4	6	2		6	5	7	3	1
OTHER																																																		
Actinaria sp (A)		14		1						1	1																																								
Actinaria sp (B)																												1																							
Holothuroidea sp (Sea Cucumber)		1																																														2			
Nematoda spp			28		3	6	56	6		36			3	4		10			432	58		38	4	7	15	10	12	33	12	18	16	22	35	5	17	14			3	16	12	6	2		7	6		15	24	30
Nemertinea spp	8?	22	1	10	8	17	12	10	18	6	26	14	4	17	2	12	3	2	1	3	3	8	5	7	11	1	6	20	11	3	9	5	3	21	7	7	5	3	6	10	11	7	11	1	11	12	20	6	5	22
Oligochaeta spp				2			15	1		1		1						1					1		1				1			2	1	1					1					1						2
Polycladida spp	1	1	1	1											1													1							1															
Syngnathus fuscus (Northern Pipefish)		1																																																
Organism Count	19	21	18	21	15	21	17	22	20	26	24	22	20	20	21	24	21	26	12	22	25	26	20	23	24	11	23	26	29	23	23	16	15	24	28	21	23	19	23	28	17	15	18	18	18	24	18	22	20	24

Appendix F – Subcontractor Information

Subcontractor Information

Cashin Associates, P.C. – grain size analysis
1200 Veterans Memorial Highway
Hauppauge, NY 11788

Ecological Consulting Organization (ECO) – benthic taxonomy
23 Avenue D
Lake Ronkonkoma, NY 11779
Point of Contact: Keith Brewer, President
P: (631) 521-0395, E: emerg23@aol.com