Data Summary Report for the Monitoring Survey at the Rhode Island Sound Disposal Site -October 2015

# Disposal Area Monitoring System DAMOS



Data Summary Report DR 2015-02 February 2017





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<u>Note on units of this report</u>: As a scientific data summary, information and data are presented in the metric system. However, given the prevalence of English units in the dredging industry of the United States, conversions to English units are provided for general information in Section 1. A table of common conversions can be found in Appendix A.

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| 13. ABSTRACT A monitoring survey was conducted at the Rhode Island Sound Disposal Site (RISDS) in October 2015 as part of the U.S. Army Corps of Engineers (USACE) New England District (NAE) Disposal Area Monitoring System (DAMOS) Program. The 2015 RISDS acoustic monitoring survey was designed as a limited confirmatory DAMOS survey of the active portion of the site to aid in site management for the uncoming 2015-16 dredging season |  |   |   |   |  |  |  |  |  |
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# DATA SUMMARY REPORT FOR THE MONITORING SURVEY AT THE RHODE ISLAND SOUND DISPOSAL SITE - OCTOBER 2015

February 2017 DR 2015-02

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# LIST OF ACRONYMS

| ASCII  | American Standard Code for Information Interchange   |
|--------|--|
| CAD    | Confined aquatic disposal                            |
| ССОМ   | Center for Coastal and Ocean Mapping                 |
| CI     | Confidence interval                                  |
| CTD    | Conductivity-temperature-depth                       |
| DAMOS  | Disposal Area Monitoring System                      |
| DGPS   | Differential global positioning system               |
| EIS    | Environmental Impact Study                           |
| GIS    | Graphic information system                           |
| GPS    | Global positioning system                            |
| MBES   | Multibeam Echo Sounder                               |
| MLLW   | Mean lower low water                                 |
| MRU    | motion reference unit                                |
| NAE    | New England District                                 |
| NOAA   | National Oceanic and Atmospheric Administration      |
| NOS    | National Ocean Service                               |
| NTRIP  | Network transport of RTCM data over IP               |
| PRHMDP | Providence River Harbor Maintenance Dredging Program |
| PV     | Plan-view  |
| RISDS  | Rhode Island Sound Disposal Site                     |
| RTCM   | Radio Technical Commission for Maritime Services     |
| RTK    | Real time kinematic GPS                              |
| SHP    | Shapefile or geospatial data file                    |
| SOP    | Standard Operating Procedures                        |
| SPI    | Sediment-profile imaging                             |
| TIF    | Tagged image file                                    |
| USACE  | U.S. Army Corps of Engineers                         |
| USEPA  | U.S. Environmental Protection Agency                 |



# **1.0 INTRODUCTION**

A monitoring survey was conducted at the Rhode Island Sound Disposal Site (RISDS) in October 2015 as part of the U.S. Army Corps of Engineers (USACE) New England District (NAE) Disposal Area Monitoring System (DAMOS) Program. DAMOS is a comprehensive monitoring and management program designed and conducted to address environmental concerns surrounding the placement of dredged material at aquatic disposal sites throughout the New England region. An introduction to the DAMOS Program and RISDS, including brief descriptions of previous dredged material disposal and site monitoring activities, is provided below.

# 1.1 Overview of the DAMOS Program

The DAMOS Program features a tiered management protocol designed to ensure that any potential adverse environmental impacts associated with dredged material disposal are promptly identified and addressed (Germano et al. 1994). For over 39 years, the DAMOS Program has collected and evaluated disposal site data throughout New England. Based on these data, patterns of physical, chemical, and biological responses of seafloor environments to dredged material disposal activity have been documented (Fredette and French 2004).

DAMOS monitoring surveys fall into two general categories: confirmatory studies and focused studies. The data collected and evaluated during these studies provide answers to strategic management questions in determining the next step in the disposal site management process to guide the management of disposal activities at existing sites, plan for use of future sites, and evaluate the long-term status of historic sites.

Confirmatory studies are designed to test hypotheses related to expected physical and ecological response patterns following placement of dredged material on the seafloor at established, active disposal sites. Two primary goals of DAMOS confirmatory monitoring surveys are to document the physical location and stability of dredged material placed into the aquatic environment and to evaluate the biological recovery of the benthic community following placement of dredged material. Several survey techniques are employed in order to characterize these responses to dredged material placement. Sequential acoustic monitoring surveys (including bathymetric, acoustic backscatter, and side-scan sonar data collection) are performed to characterize the height and spread of discrete dredged material deposits or mounds created at open water sites as well as the accumulation/consolidation of dredged material into confined aquatic disposal cells.

Sediment-profile (SPI) and plan-view (PV) imaging surveys are often performed in confirmatory studies to provide further physical characterization of the material and to support evaluation of seafloor (benthic) habitat conditions and recovery over time. Each type of data collection activity is conducted periodically at disposal sites and the conditions found after a defined period of disposal activity are compared with the long-term data set at specific sites to determine the next step in the disposal site management process (Germano et al. 1994).

Focused studies are periodically undertaken within the DAMOS Program to evaluate inactive or historical disposal sites and contribute to the development of dredged material placement and



monitoring techniques. Focused DAMOS monitoring surveys may also feature additional types of data collection activities as deemed appropriate to achieve specific survey objectives, such as subbottom profiling, towed video, sediment coring, or grab sampling.

The 2015 RISDS acoustic monitoring survey was designed as a limited confirmatory DAMOS survey of the active portion of the site to aid in site management for the upcoming 2015-16 dredging season.

# 1.2 Introduction to the Rhode Island Sound Disposal Site

The Rhode Island Sound Disposal Site (RISDS) is located south of Narragansett Bay and approximately 16.7 km (10.4 mi) south of Point Judith, Rhode Island, within the separation zone for the Narragansett Bay shipping lanes. The site is defined as an 1800 × 1800 m (5900 ft × 5900 ft) area on the seafloor centered at 41°13.850' N, 71°22.817' W (NAD 83) (Figure 1-1). RISDS was initially considered and surveyed in 1997 as an open-water disposal alternative in Rhode Island Sound for the Providence River and Harbor Maintenance Dredging Project (PRHMDP; USACE 2001a). In December 2004, RISDS was officially designated as an open-water disposal site for dredged material from Rhode Island and other surrounding harbors in Massachusetts and Connecticut (40 CFR Part 228).

Prior to any dredged material disposal in 2003, the bottom topography at RISDS consisted of a broad topographic depression with water depths ranging from 34 to 39 m (111 to 128 ft; Carey et al. 2015). RISDS topography became increasingly shallow in the southeast corner of the site, extending beyond the boundaries of RISDS to the south and east. This broad topographic depression is considered part of a submerged glacial moraine formed of glacial drift and reworked coastal deposits (McMullen et al. 2011). Northeast and southeast of the disposal site large sand waves have been observed with east-west oriented crests on topographic highs (McMullen et al. 2011). Sediments at the site were observed to range from glacially-derived till to soft, silty sand (USEPA 2004).

# **1.3 Historical Dredged Material Activity**

All of the disposal activities that occurred prior to 2013 were discussed in detail in the previous RISDS survey report (Carey et al. 2015) and are summarized here.

The PRHMDP placed a total of 4 million m<sup>3</sup> (5 million yd<sup>3</sup>) of dredged material at RISDS from April 2003 and January 2005 (Table 1-1). This volume consisted of two different types of material; (1) maintenance material from the navigation channel and (2) underlying native material from the creation of confined aquatic disposal (CAD) cells beneath Providence River. The native material was placed along the western boundary of RISDS to create a continuous ridge or berm of sediment. This berm was created to enhance the capacity of the natural bottom depression located in the southeastern quadrant of the disposal site and to limit the lateral spread of disposed unconsolidated sediment. The maintenance material from the channel and additional material was directed to a series of disposal points across the site to create a relatively even deposit. RISDS was also used for disposal of dredged material from the National Marine Fisheries Service, Great Harbor, Woods Hole, from the Port of Davisville, and from New



Bedford Harbor (Table 1-1). Material from the Port of Davisville and New Bedford Harbor was primarily deposited in the northern area of RISDS, while material from Great Harbor was deposited in the center depression.

# 1.4 Previous Monitoring Events at RISDS

Prior to the PRHMDP, several baseline studies (Tables 1-2 and 1-3) were conducted as part of the site evaluation and characterization process for the Environmental Impact Study (EIS) for designating RISDS (USEPA 2004) and for the PRHMDP EIS (USACE 2001a).

A series of investigations were then conducted at RISDS throughout and immediately following the PRHMDP from 2003 to 2005. Bathymetric surveys that included RISDS were conducted as part of two National Ocean Service (NOS) surveys in 2008 and 2009 and processed by the United States Geological Survey (McMullen et al. 2011, NOS 2008; Poppe et al. 2012, NOS 2009). The most recent survey of RISDS in 2013 involved high resolution acoustic bathymetric data to characterize seafloor topography and dredged material distribution, as well as a combined sediment profile and plan-view imaging survey and benthic grab sampling to provide additional physical characterization and to assess benthic recolonization.

The 2013 survey confirmed observations made in 2009 noting that the western berm existed relatively undisturbed and still curved toward the northeast, extended by several non-contiguous small mounds near the northern margin of the site (Figure 1-2). The berm and non-contiguous mounds continued to form a horseshoe-shaped feature around a central depression. The central depression contained a small mound in the center.

# 1.5 Recent Dredged Material Disposal Activity

Since the August 2013 survey, approximately 483,900 m<sup>3</sup> (632,900 yd<sup>3</sup>) of dredged material has been placed at the site (Table 1-3). All of this material originated from the construction of CAD cells in New Bedford Harbor, and was targeted to an area located south of and near the midpoint of the northern site boundary (Figure 1-3). This placement continued the formation of a containment berm within the site for future placement of less consolidated material. The material from the New Bedford CAD cells was primarily glacial till and clay (consolidated material which can form relatively steep mounds). Disposal of this material at RISDS occurred from the end of August 2013 to mid-July 2015.

# 1.6 2015 Survey Objectives

The primary objective of the 2015 acoustic survey was to characterize the seafloor topography and surface features over the active portion of RISDS by completing a high-resolution acoustic survey.



## Table 1-1.

Estimated Volume of Dredged Material Placed at RISDS from April 2003 to July 2015 as Reported by USACE

| Project   | <b>Disposal Dates</b>     | Volume (m <sup>3</sup> ) | Volume (yd³) |
|---|---------------------------|--------------------------|--------------|
| Providence River and Harbor<br>Maintenance Dredging   | 04/2003 to 01/2005        | 4,062,000                | 5,312,000    |
| National Marine Fisheries<br>Service at Great Harbor,<br>Woods Hole, MA -<br>Maintenance Dredging | 11/2008 to 01/2009        | 23,200                   | 30,400       |
| Port of Davisville, Quonset<br>Point, RI - Improvement<br>Dredging                                | 01/2012 to 01/2013        | 196,000                  | 257,000      |
| New Bedford Harbor CAD<br>Cell Construction Material  | 05/20/2013 to 08/25/2015* | 163,000                  | 213,200      |
| New Bedford Harbor CAD<br>Cell Construction Material  | 08/28/2013 to 07/19/2015* | 483,900                  | 632,900      |
| Total   |                           | 4,928,100                | 6,445,500    |

\*Acoustic surveys performed 08/27/2013 and 10/14/2015



# Table 1-2.

#### Overview of DAMOS Survey Activities in Rhode Island Sound since 1997

| Date      | Purpose of Survey   | Acoustic Surveys   | SPI Stations               | Additional<br>Studies      | Reference              |
|-----------|---|--|----------------------------|----------------------------|------------------------|
| June 1997 | Evaluation of potential disposal sites  |  | 18                         |                            | SAIC 1997 <sup>a</sup> |
| Nov 1999  | Characterize benthic resources and<br>sediment at potential dredged material<br>disposal sites    |  | 35                         |                            | SAIC 2000 <sup>b</sup> |
| Sept 2001 | Rhode Island regional long-term<br>dredged material disposal site<br>evaluation                   |  | RISDS - 9<br>REF Areas - 9 |                            | Battelle 2002          |
| Feb 2003  | Baseline bathymetry survey in support of PRHMDP   | Multibeam<br>4000 x 3800 m                                       |                            |                            | SAIC 2004              |
| July 2003 | First postdisposal monitoring survey  | Single-beam<br>1900 x 1900 m                                     |                            |                            | SAIC 2004              |
| Sept 2003 | Second postdisposal monitoring survey   | Single-beam<br>1900 x 1900 m<br>Side-scan sonar<br>2900 x 2900 m |                            |                            | SAIC 2004              |
| Oct 2003  | Assessment of surface sediment<br>composition within RISDS and<br>surrounding Area W <sup>c</sup> |  | 11                         | Towed video 8<br>transects | SAIC 2004              |



# Table 1-2. (continued)

#### Overview of DAMOS Survey Activities in Rhode Island Sound since 1997

| Date  | Purpose of Survey  | Acoustic Surveys   | SPI Stations   | Additional Studies                  | Reference                              |
|---|--|--|--|-------------------------------------|--|
| Apr 2004<br>Sept 2004                         | Track and assess suspended sediment plume                                    |  |  | ADCP OBS drogues,<br>water analysis | SAIC 2005a<br>SAIC 2005b               |
| Feb 2004<br>May 2004<br>Sept 2004<br>Aug 2005 | Postdisposal monitoring in support of PRHMDP                                 | Single-beam<br>1900 x 1900 m                                   |  |                                     | Unpublished<br>DAMOS data<br>ENSR 2008 |
| July 2005                                     | Assess benthic recolonization status   |  | RISDS – 30 (RISDS-A<br>through E BE <sup>d</sup> )<br>Ref Areas - 15 | Infauna Analysis                    | ENSR 2007                              |
| Aug 2005<br>Sept 2005<br>Nov 2005             | Assess postdisposal lobster abundance  |  |  | Lobster trapping                    | Valente et al.<br>2007                 |
| Oct 2009                                      | Assess benthic recolonization status   |  | RISDS – 30 (RISDS-A<br>through E BE <sup>d</sup> )<br>Ref Areas - 15 |                                     | Valente et al.<br>2012                 |
| Aug 2013                                      | Assess full-site seafloor topography<br>Assess benthic recolonization status | Multibeam<br>2000 x 2000 m<br>Side-scan sonar<br>2000 x 2000 m | RISDS – 15 (RISDS-B,<br>C and D)<br>Ref Areas - 15                   | Infauna Analysis                    | Carey et al.<br>2015                   |

Notes: a - Dimensions of site 69b and 69a were different from current configuration.

b - Dimensions of site 69b and 69a were consistent with current boundaries.

c - Area W was 2900 x 2900 m with RISDS included in the southeast quadrant.

d - BE refers to the berm area.



# Table 1-3.

#### Overview of Additional Survey Activities in Rhode Island Sound since 1997

| Date                                 | Purpose of Survey   | Purpose of Survey Additional Studies |  |
|--------------------------------------|---|--------------------------------------|--|
| 1997                                 | Shellfish Sampling and Site Characterization  |                                      | USACE 1998                               |
| Fall 1999                            | Short-term current measurements   | 1-month current meter deployment     | USACE 2001b                              |
| Fall 2001                            | Benthic/sediment<br>characterization study  | Benthic                              | USACE 2002c                              |
| 2002 and<br>Summer 2003              | Quahog Survey   |                                      | USACE 2003c                              |
| Spring 2002                          | Short-term current measurements   | 2-month current meter deployment     | USACE 2003a                              |
| July 2003                            | Benthic/sediment<br>characterization study  | Benthic                              | USACE 2003b                              |
| Fall 2001; Winter<br>and Spring 2002 | Water Quality (T, S, TSS, DO, and contaminants)   |                                      | USACE 2002a; USACE 2002b;<br>USACE 2003a |
| Fall 2008                            | Surficial geology of the seafloor<br>in central RI Sound and southeast<br>of Point Judith, RI |                                      | McMullen et al. 2011                     |
| Spring 2009                          | Seafloor character and<br>sedimentary processes of Block<br>Island Sound, offshore RI         |                                      | Poppe et al. 2012                        |





Figure 1-1. Location of the Rhode Island Sound Disposal Site (RISDS)





Figure 1-2. Bathymetric depth data with 0.5 m contours – August 2013





**Figure 1-3.** Location of reported disposal events at RISDS: 2013 – 2015



# 2.0 METHODS

The October 2015 survey at RISDS was conducted by a team of investigators from DAMOSVision (CoastalVision and CR Environmental) aboard the 55-foot R/V *Jamie Hanna*. The acoustic survey was conducted on 14 October 2015. An overview of the methods used to collect, process, and analyze the survey data is provided below. Detailed Standard Operating Procedures (SOPs) for data collection and processing are available in the Quality Assurance Project Plan for the DAMOS Program (Battelle 2015).

# 2.1 Navigation and On-Board Data Acquisition

Navigation for the acoustic survey was accomplished using a Hemisphere VS-330 Real-time kinematic Global Positioning System (RTK GPS) which received base station correction through the Keynet NTRIP broadcast. Horizontal position accuracy in fixed RTK mode was approximately 2 cm. A dual-antennae Hemisphere VS110 differential GPS (DGPS) was available if necessary as a backup. The GPS system was interfaced to a desktop computer running HYPACK MAX® hydrographic survey software. HYPACK MAX® continually recorded vessel position and GPS satellite quality and provided a steering display for the vessel captain to accurately maintain the position of the vessel along pre-established survey transects. Vessel heading measurements were provided by an IxBlue Octans III fiber optic gyrocompass.

# 2.2 Acoustic Survey

The acoustic survey included bathymetric, backscatter, and side-scan sonar data collection. The bathymetric data provided measurements of water depth that, when processed, were used to map the seafloor topography. Backscatter and side-scan sonar data provided images that supported the characterization of surface sediment texture and roughness. Each of these acoustic data types is useful for assessing dredged material placement and surface sediment features.

# 2.2.1 Acoustic Survey Planning

The acoustic survey featured a high spatial resolution survey of the portion of RISDS active during the 2013-2015 disposal seasons. DAMOSVision hydrographers coordinated with USACE NAE scientists and reviewed alternative survey designs. For RISDS, a 600 × 1000 m area was selected. Hydrographers obtained site coordinates, imported them to graphic information system (GIS) software, and created maps to aid planning. Transects spaced 60 m apart and cross-lines spaced 200 m apart were created to meet conservative beam angle constraints (Figure 2-1). The survey area and design were then reviewed and approved by NAE scientists.

# 2.2.2 Acoustic Data Collection

Data layers generated by the survey included bathymetric, acoustic backscatter, and side-scan sonar and were collected using an R2Sonic 2022 broadband multibeam echosounder (MBES). This 200-400 kHz system forms up to 256 1-2° beams (frequency dependent) distributed equiangularly or equidistantly across a 10 - 160° swath. The MBES transducer was mounted



amidships to the port rail of the survey vessel using a high strength adjustable boom. The primary GPS antenna was mounted on the transducer boom. The transducer depth below the water surface (draft) and antenna height were checked and recorded at the beginning and end of data acquisition, and the draft was confirmed using the "bar check" method.

An IxBlue Octans III motion reference unit (MRU) was interfaced to the MBES topside processor and to the acquisition computer. Precise linear offsets between the MRU and MBES were recorded and applied during acquisition. Depth and backscatter data were synchronized using pulse-per-second timing and transmitted to the HYPACK MAX® acquisition computer via Ethernet communications. Several patch tests were conducted during the survey to allow computation of angular offsets between the MBES system components.

The system was calibrated for local water mass speed of sound by performing sound velocity profile casts at frequent intervals throughout the survey day using an AML Minos Sound Velocity Profiler.

# 2.2.3 Bathymetric Data Processing

Bathymetric data were processed using HYPACK HYSWEEP® software. Processing steps are described below and included:

- Adjustment of data for tidal elevation fluctuations
- Correction of ray bending (refraction) due to density variation in the water column
- Removal of spurious points associated with water column interference or system errors
- Development of a grid surface representing depth solutions
- Statistical estimation of sounding solution uncertainty
- Generation of data visualization products

Tidal adjustments were accomplished using RTK GPS. Water surface elevations derived using RTK were adjusted to Mean Lower Low Water (MLLW) elevations using NOAA's VDATUM Model. Processed RTK tide data were successfully ground-truthed against a data series acquired at NOAA's Newport Tide Station (#8452660) after application of a site-specific tide zoning model provided by NOAA.

Correction of sounding depth and position (range and azimuth) for refraction due to water column stratification was conducted using a series of four sound-velocity profiles acquired by the survey team. Data artifacts associated with refraction remain in the bathymetric surface model at a relatively fine scale (generally less than 5 to 10 cm) relative to the survey depth.

Rough sea states were experienced during the survey. Heave amplitudes were as great as 1.5 m, while roll and pitch angles commonly approached 10 degrees. Motion artifacts remain in the processed data set with average amplitudes of approximately 10 cm.



Data acquired in the disposal site portion of the survey area were filtered to accept only beams falling within an angular limit of 50° to minimize refraction artifacts. Spurious sounding solutions were rejected based on the careful examination of data on a sweep-specific basis.

As indicated earlier, the R2Sonics 2022 MBES system was operated at 249 kHz. At this frequency the system has a published beam width of  $1.75^{\circ}$ . Assuming an average depth of 37 m and a maximum beam angle of 50°, the average diameter of the beam footprint was calculated at approximately  $1.6 \text{ m} \times 1.0 \text{ m} (1.6 \text{ m}^2)$ . Data were reduced to a cell (grid) size of  $2.0 \times 2.0 \text{ m}$ , acknowledging the system's fine range resolution while accommodating beam position uncertainty associated with rough sea conditions experienced during the survey. This data reduction was accomplished by calculating and exporting the average elevation for each cell in accordance with USACE recommendations (USACE 2013).

Statistical analysis of data as summarized on Table 2-1 showed negligible tide bias and vertical uncertainty substantially lower than values recommended by USACE (2013) or NOAA (2015). Note that the most stringent National Ocean Service (NOS) standard for this project depth (Special Order 1A) would call for a 95<sup>th</sup> percentile confidence interval (CI) of 0.38 m at the maximum site depth (38 m) and 0.37 m at the average site depth (36.7 m). The dominant source of uncertainty for this data set appears to be motion associated with rough sea states.

Reduced data were exported in ASCII text format with fields for Easting, Northing, and MLLW Elevation (meters). All data were projected to the Rhode Island State Plane, NAD83 (metric) grid. A variety of data visualizations were generated using a combination of ESRI ArcMap (V.10.1) and Golden Software Surfer (V.13). Visualizations and data products included:

- ASCII data files of all processed soundings including MLLW depths and elevations;
- Contours of seabed elevation (50-cm and 1.0-m intervals) in a geospatial data file (SHP) format suitable for plotting using GIS and computer-aided design software;
- 3-dimensional surface maps of the seabed created using 2× vertical exaggeration and artificial illumination to highlight fine-scale features not visible on contour layers; delivered in grid and tagged image file (TIF) formats; and
- An acoustic relief map of the survey area created using 5× vertical exaggeration, delivered in georeferenced TIF format.

# 2.2.4 Backscatter Data Processing

Backscatter data were extracted from cleaned MBES TruePix formatted files then used to provide an estimation of surface sediment texture based on seabed surface roughness. Mosaics of backscatter data were created using HYPACK®'s implementation of GeoCoder software developed by scientists at the University of New Hampshire's NOAA Center for Coastal and Ocean Mapping (UNH/NOAA CCOM). A seamless mosaic of unfiltered backscatter data was developed and exported in grayscale TIF format. Backscatter data were also exported in ASCII format with fields for Easting, Northing, and backscatter (dB). A Gaussian filter was applied to backscatter data to minimize nadir artifacts and the filtered data were used to develop backscatter



values on a 2-m grid. The grid was exported as an ESRI binary GRD format to facilitate comparison with other data layers.

# 2.2.5 Side-Scan Sonar Data Processing

Side-scan sonar data were processed using both Chesapeake Technology, Inc. Sonar Wiz software and HYPACK®'s implementation of GeoCoder software to generate a database of images that maximized both textural information and structural detail.

A seamless mosaic of side-scan sonar data was developed using GeoCoder and exported in grayscale TIF format using a resolution of 0.20 m per pixel. This mosaic optimized textural information but is less well suited for analysis of fine seabed structures due to blending of overlapping data. Two additional mosaics of side-scan data were created using SonarWiz to facilitate detailed inspection of sonar imagery. Mosaic versions included raw swath data and a version that utilized an automatic gain adjustment algorithm.

# 2.2.6 Acoustic Data Analysis

The processed bathymetric grids were converted to rasters, and bathymetric contour lines and acoustic relief models were generated and displayed using GIS. The backscatter mosaics and filtered backscatter grid were combined with acoustic relief models in GIS to facilitate visualization of relationships between acoustic datasets. This is done by rendering images and color-coded grids with sufficient transparency to allow three-dimensional acoustic relief model to be visible underneath.



# Table 2-1.

#### Accuracy and Uncertainty Analysis of Bathymetric Data

|                   |   | Results (m)          |                      |                            |  |  |
|-------------------|---|----------------------|----------------------|----------------------------|--|--|
| Survey<br>Date(s) | <b>Quality Control Metric</b>   | Mean                 | 95%<br>Uncertainty   | Range                      |  |  |
| 10/14/2015        | Cross-Line Swath Comparisons<br>Within Cell Uncertainty<br>Beam Angle Uncertainty (0 - 50°) | 0.01<br>0.06<br>0.01 | 0.20<br>0.18<br>0.21 | 0.00 - 2.69<br>0.10 - 0.11 |  |  |

Notes:

- 1. The mean of cross-line nadir and full swath comparisons are indicators of tide bias.
- 2. 95% uncertainty values were calculated using the sums of mean differences and standard deviations expressed at the 2-sigma level.
- 3. Within cell uncertainty values include biases and random errors.
- 4. Beam angle uncertainty was assessed by comparing cross-line data (50-degree swath limit) with a reference surface created using mainstay transect data.
- 5. Swath and cell based comparisons were conducted using 2 m x 2 m cell averages. These analyses do not exclude sounding variability associated with terrain slopes.





Figure 2-1. RISDS acoustic survey area and tracklines



# 3.0 **RESULTS**

# 3.1 Acoustic Survey

The results of the acoustic survey included bathymetry, backscatter mosaics, and side-scan sonar mosaics that were used to assess the seafloor topography and surface sediment characteristics of the north central section of RISDS. Analysis of each type of acoustic data led to insights regarding the topography and surface sediment in the study area.

# 3.1.1 Bathymetry

The bathymetry of the active disposal area of RISDS, as surveyed in 2015, revealed a distinct topographic mound in the western half of the survey area with deeper areas to the north, south, and east (Figure 3-1). The majority of the mound rose above the adjacent sea bottom between 5 and 7 m, and had an elongated crest as much as ~13 m above the ambient seafloor and ~9 m above the existing berm. The western portion of the survey area was almost entirely composed of this disposal mound with a broad base extending 500 m east to west and 400 m north to south. The eastern portion of the survey area was relatively flat, except for a small area of bathymetric relief to the southeast that was present in 2013. The overall site bathymetry contained water depths that ranged from approximately 25 m over the pinnacle of the disposal mound to 38 m in the northeastern portion of the survey area.

Multibeam bathymetric data rendered as an acoustic relief model (hill-shading) provided a more detailed representation of the site topography (Figure 3-2). The western portion of the survey area was distinctive with a rough relief over the surface of a steep-sided mound. Large blocks of consolidated dredged material (1-2 m) are visible on the mound and surrounding seafloor. Patterns consistent with placement of dredged material (pits with raised rims 35 m in diameter) were also observed to the north, south and east of the disposal mound.

# 3.1.2 Acoustic Backscatter and Side-Scan Sonar

Unfiltered backscatter imagery of the disposal site indicated extensive patterns of dredged material disposal throughout the survey area. Strong backscatter returns that indicate rougher or coarse grain sediment were evident at the large disposal mound to the west and at the smaller mound to the south east (Figure 3-3). Strong backscatter was also apparent at several smaller isolated mounds in the eastern portion of the survey area. Weaker returns were found south of the large mound to the west of the survey area, and in the northeast of the survey area, indicating finer-grained sediment typical of ambient conditions. There were extensive linear patterns (appearing as long white lines in Figure 3-3) consistent with release of material while barges were under transport within the site.

Filtered backscatter, which presents a quantitative assessment of surface characteristics independent of slope effects, showed that the weakest sonar returns (-28 to -32 dB), indicating softer sediment, were to the northeast and was coincident with the deeper area near the northern margin of the site (Figure 3-4). The areas surrounding the large mound to the west and smaller



relief to the southeast had moderate backscatter (-20 to -24 dB) with a relatively steep transition to stronger backscatter returns (-18 to -16 dB), which occurred on the crest of the large disposal mound and at the small relief. Moderate backscatter returns were also observed as linear patterns where release of barge material occurred during transport. The slightly shallower area of ambient sediments on the northeast margin of the survey area had the strongest backscatter returns (-17 to -14) suggesting coarse sands consistent with findings of McMullen et al. (2011).

Side-scan sonar results also provided a clear representation of disposal activity over large portions of the site. Side-scan results confirmed observations from the backscatter results, but with additional information and some distinct differences (Figure 3-5). The side-scan sonar results had a higher resolution and are more responsive to minor surface textural features and slope than the backscatter. The rough texture of the disposal mound, the small relief to the south east, and curved disposal trails were apparent as features with stronger returns depicted in light gray (Figure 3-5). The outline of the curved disposal activity of transport barges were more apparent in the side-scan sonar results including some smaller isolated mounds. Blocks of consolidated dredged material can be seen clearly in the side-scan sonar record, with shadows indicating relief. Distinctive patches of high and low returns (sand and silt) appeared over areas that have received dredged material in the past (shallow mound in southeast corner and along the eastern margin of the survey area).

# 3.1.3 Comparison with Previous Bathymetry

The multibeam data from the 2015 survey was compared with multibeam data collected in August of 2013 (Figure 3-6). The 2013 survey provided full coverage of RISDS and our comparison efforts were focused on just the active portion of RISDS between 2013 and 2015 (Figure 2-1). A subtraction of the bottom depths in the 2013 survey from the 2015 depths captured the apparent changes in bathymetry since the 2013 survey (Figure 3-6). The most notable difference was the accumulation and formation of the large mound in the western portion of the survey area, with increases since 2013 of as much as 11 m at the mound pinnacle. The area surrounding the mound pinnacle had accumulation of 4 to 7 m of dredged material, and the areas immediately adjacent the mound showed some accumulation (<1 m). The area of RISDS with increases in elevation, corresponded to areas that received dredged material from the CAD disposal activities (Figures 1-3 and 3-6). The targeted placement of this disposal material appears to have achieved its goal. Differences in depth between 2013 and 2015 were limited to the large mound in the western portion of the survey area. Other topographical features documented in the survey area east of the disposal mound, appeared to be relics of disposal activity before the 2013 survey. These areas were found to have no elevation differences between 2013 and 2015. The height of the new mound exceeds the existing berm by as much as 9 m. Future placement of dredged material could be spread more widely to extend the berm to the east.



#### DAMOS Data Summary Report Monitoring Survey at the Rhode Island Sound Disposal Site October 2015



#### Figure 3-1. Bathymetric depth map of RISDS – October 2015



#### DAMOS Data Summary Report Monitoring Survey at the Rhode Island Sound Disposal Site October 2015



Figure 3-2. Acoustic relief map (hill-shaded grayscale) of RISDS – October 2015





Figure 3-3. Mosaic of unfiltered backscatter data of RISDS – October 2015





Figure 3-4. Filtered backscatter over acoustic relief model of RISDS – October 2015



#### DAMOS Data Summary Report Monitoring Survey at the Rhode Island Sound Disposal Site October 2015







#### DAMOS Data Summary Report Monitoring Survey at the Rhode Island Sound Disposal Site October 2015







## 4.0 SUMMARY

The 2015 acoustic survey provided a high resolution bathymetric assessment of the active portion of RISDS, documenting the disposal of material from the New Bedford Harbor CAD Cell Construction. Targeted placement of disposal material achieved its goal. Dredged material was limited to the western portion of the survey area where a prominent disposal mound was formed. Since 2013 as much as 11 m of material accumulated at the mound pinnacle, and 4 to 7 m of dredged material accumulation occurred in the area adjacent the pinnacle. This mound was located to the east of the existing disposal berm, and is disproportionally higher than historical placements in RISDS (Figure 4-1). The height of the disposal mound exceeds the berm height by as much as 9 m. It is recommended that future disposal efforts be spread more widely increasing the spatial extent of the berm.



#### DAMOS Data Summary Report Monitoring Survey at the Rhode Island Sound Disposal Site October 2015



Figure 4-1. Bathymetric depth map of entire RISDS – 2013/2015



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# 6.0 DATA TRANSMITTAL

Data transmittal to support this data summary report will be provided as a separate deliverable for inclusion in a Technical Support Notebook. The data submittal will include:

- Scope of Work
- Raw and processed acoustic survey data
- Survey field logs
- Report figures and associated files, including an ArcGIS geo-database
- Electronic copies of all final report products



# APPENDIX A

# TABLE OF COMMON CONVERSIONS

| Metric Unit Conver                 | sion to English Unit    | English Unit Conversion to Metric Unit |                       |  |  |
|------------------------------------|-------------------------|--|-----------------------|--|--|
| 1 meter                            | 3.2808 ft               | 1 foot                                 | 0.3048 m              |  |  |
| 1 square meter<br>1 m <sup>2</sup> | 10.7639 ft <sup>2</sup> | 1 square foot<br>1 ft <sup>2</sup>     | 0.0929 m <sup>2</sup> |  |  |
| 1 kilometer<br>1 km                | 0.6214 mi               | 1 mile<br>1 mi                         | 1.6093 km             |  |  |
| 1 cubic meter<br>1 m <sup>3</sup>  | 1.3080 yd <sup>3</sup>  | 1 cubic yard<br>1 yd <sup>3</sup>      | 0.7646 m <sup>3</sup> |  |  |
| 1 centimeter<br>1 cm               | 0.3937 in               | 1 inch<br>1 in                         | 2.54 cm               |  |  |



# APPENDIX B

# RISDS DISPOSAL LOG DATA FROM AUGUST 2013 TO JULY 2015

| Target Site<br>Code | Project Name                  | City/Town   | State | Placement<br>Date | Load<br>Volume<br>(CM) | Load<br>Volume<br>(CY) | Placement<br>Latitude | Placement<br>Longitude | Permit Number |
|---------------------|-------------------------------|-------------|-------|-------------------|------------------------|------------------------|-----------------------|------------------------|---------------|
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 8/28/2013         | 1918                   | 2508                   | 41.23825              | -71.38309              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 8/28/2013         | 1918                   | 2508                   | 41.23801              | -71.38306              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 8/30/2013         | 1918                   | 2508                   | 41.23635              | -71.38388              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 8/30/2013         | 1918                   | 2508                   | 41.23678              | -71.38354              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 9/1/2013          | 1918                   | 2508                   | 41.23664              | -71.38452              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 9/1/2013          | 1918                   | 2508                   | 41.23755              | -71.38314              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 9/2/2013          | 1918                   | 2508                   | 41.23684              | -71.38299              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 9/3/2013          | 1918                   | 2508                   | 41.23810              | -71.38256              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 9/3/2013          | 1918                   | 2508                   | 41.23657              | -71.38385              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 9/4/2013          | 1918                   | 2508                   | 41.23682              | -71.38316              | NAE-2007-2709 |
| RISDS 12/13         | Harbor Development Commission | New Bedford | MA    | 9/5/2013          | 1918                   | 2508                   | 41.23732              | -71.38420              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 1/30/2014         | 895                    | 1170                   | 41.23860              | -71.38175              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 2/1/2014          | 895                    | 1170                   | 41.23710              | -71.37992              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 2/2/2014          | 895                    | 1170                   | 41.23840              | -71.38115              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 2/6/2014          | 895                    | 1170                   | 41.23970              | -71.37977              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 2/8/2014          | 895                    | 1170                   | 41.23888              | -71.38052              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 2/27/2014         | 895                    | 1170                   | 41.23713              | -71.38028              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/1/2014          | 895                    | 1170                   | 41.23756              | -71.38089              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/2/2014          | 895                    | 1170                   | 41.23720              | -71.38080              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/5/2014          | 895                    | 1170                   | 41.23844              | -71.38087              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/7/2014          | 895                    | 1170                   | 41.23667              | -71.38110              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/9/2014          | 895                    | 1170                   | 41.23800              | -71.38205              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/11/2014         | 895                    | 1170                   | 41.23801              | -71.38111              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/12/2014         | 895                    | 1170                   | 41.23764              | -71.37932              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/12/2014         | 895                    | 1170                   | 41.23710              | -71.38210              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/14/2014         | 895                    | 1170                   | 41.23792              | -71.38055              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/16/2014         | 895                    | 1170                   | 41.23681              | -71.38145              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/18/2014         | 895                    | 1170                   | 41.23704              | -71.38150              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/19/2014         | 895                    | 1170                   | 41.23826              | -71.38153              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/21/2014         | 895                    | 1170                   | 41.23781              | -71.38084              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/22/2014         | 895                    | 1170                   | 41.23633              | -71.38061              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/23/2014         | 895                    | 1170                   | 41.23769              | -71.38060              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/25/2014         | 895                    | 1170                   | 41.23774              | -71.38110              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/27/2014         | 895                    | 1170                   | 41.23762              | -71.38074              | NAE-2007-2709 |

| Target Site<br>Code | Project Name                  | City/Town   | State | Placement<br>Date | Load<br>Volume<br>(CM) | Load<br>Volume<br>(CY) | Placement<br>Latitude | Placement<br>Longitude | Permit Number |
|---------------------|-------------------------------|-------------|-------|-------------------|------------------------|------------------------|-----------------------|------------------------|---------------|
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/29/2014         | 895                    | 1170                   | 41.23690              | -71.38103              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/1/2014          | 895                    | 1170                   | 41.23650              | -71.37991              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/4/2014          | 895                    | 1170                   | 41.23737              | -71.38150              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/5/2014          | 895                    | 1170                   | 41.23821              | -71.38170              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/6/2014          | 895                    | 1170                   | 41.23739              | -71.38119              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/8/2014          | 895                    | 1170                   | 41.23775              | -71.38152              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/10/2014         | 895                    | 1170                   | 41.23835              | -71.38076              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/12/2014         | 895                    | 1170                   | 41.23787              | -71.38082              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/13/2014         | 895                    | 1170                   | 41.23775              | -71.38107              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/25/2014         | 895                    | 1170                   | 41.23729              | -71.38180              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/26/2014         | 895                    | 1170                   | 41.23682              | -71.38176              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/27/2014         | 895                    | 1170                   | 41.23675              | -71.38084              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/29/2014         | 895                    | 1170                   | 41.23637              | -71.38233              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/30/2014         | 895                    | 1170                   | 41.23393              | -71.38510              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/3/2014          | 895                    | 1170                   | 41.23272              | -71.38455              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/4/2014          | 895                    | 1170                   | 41.23768              | -71.37986              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/4/2014          | 895                    | 1170                   | 41.23177              | -71.38301              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/6/2014          | 895                    | 1170                   | 41.23659              | -71.38269              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/7/2014          | 895                    | 1170                   | 41.23562              | -71.38250              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/7/2014          | 895                    | 1170                   | 41.23824              | -71.38085              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/8/2014          | 895                    | 1170                   | 41.23717              | -71.38117              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/8/2014          | 895                    | 1170                   | 41.23716              | -71.38010              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/9/2014          | 895                    | 1170                   | 41.23654              | -71.38120              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/10/2014         | 895                    | 1170                   | 41.23818              | -71.38049              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/10/2014         | 895                    | 1170                   | 41.23813              | -71.37995              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/11/2014         | 895                    | 1170                   | 41.23770              | -71.37979              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/12/2014         | 895                    | 1170                   | 41.23689              | -71.38179              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/12/2014         | 895                    | 1170                   | 41.23777              | -71.38076              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/14/2014         | 895                    | 1170                   | 41.23744              | -71.38095              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/14/2014         | 895                    | 1170                   | 41.23842              | -71.38090              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/15/2014         | 895                    | 1170                   | 41.23800              | -71.38008              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/16/2014         | 895                    | 1170                   | 41.23852              | -71.38099              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/16/2014         | 895                    | 1170                   | 41.23826              | -71.38060              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/19/2014         | 895                    | 1170                   | 41.23727              | -71.37995              | NAE-2007-2709 |

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|---------------------|-------------------------------|-------------|-------|-------------------|------------------------|------------------------|-----------------------|------------------------|---------------|
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/23/2014         | 895                    | 1170                   | 41.23891              | -71.38054              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/25/2014         | 895                    | 1170                   | 41.23666              | -71.38173              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/27/2014         | 895                    | 1170                   | 41.23686              | -71.38009              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/28/2014         | 895                    | 1170                   | 41.23567              | -71.38415              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/29/2014         | 895                    | 1170                   | 41.23817              | -71.38003              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/30/2014         | 895                    | 1170                   | 41.23719              | -71.38344              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/31/2014         | 895                    | 1170                   | 41.23790              | -71.37988              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/1/2014          | 895                    | 1170                   | 41.23700              | -71.38114              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/2/2014          | 895                    | 1170                   | 41.23824              | -71.38013              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/3/2014          | 895                    | 1170                   | 41.23700              | -71.38147              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/4/2014          | 895                    | 1170                   | 41.23834              | -71.38198              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/5/2014          | 895                    | 1170                   | 41.23720              | -71.38230              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/6/2014          | 895                    | 1170                   | 41.23836              | -71.38092              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/6/2014          | 895                    | 1170                   | 41.23753              | -71.38150              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/7/2014          | 895                    | 1170                   | 41.23824              | -71.38044              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/8/2014          | 895                    | 1170                   | 41.23741              | -71.38061              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/11/2014         | 895                    | 1170                   | 41.23858              | -71.38082              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/12/2014         | 895                    | 1170                   | 41.23837              | -71.38040              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/13/2014         | 895                    | 1170                   | 41.23255              | -71.38712              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/13/2014         | 895                    | 1170                   | 41.23766              | -71.37990              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/17/2014         | 895                    | 1170                   | 41.23809              | -71.38087              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/18/2014         | 895                    | 1170                   | 41.23807              | -71.38076              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/19/2014         | 895                    | 1170                   | 41.23628              | -71.38225              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/19/2014         | 895                    | 1170                   | 41.23776              | -71.38007              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/20/2014         | 895                    | 1170                   | 41.23679              | -71.38256              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/21/2014         | 895                    | 1170                   | 41.23811              | -71.38075              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/22/2014         | 895                    | 1170                   | 41.23851              | -71.38229              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/23/2014         | 895                    | 1170                   | 41.23586              | -71.38355              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/24/2014         | 895                    | 1170                   | 41.23706              | -71.38012              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/24/2014         | 895                    | 1170                   | 41.23752              | -71.38025              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/24/2014         | 895                    | 1170                   | 41.23839              | -71.38050              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/25/2014         | 895                    | 1170                   | 41.23823              | -71.38050              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/26/2014         | 895                    | 1170                   | 41.23840              | -71.38101              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/28/2014         | 895                    | 1170                   | 41.23640              | -71.38133              | NAE-2007-2709 |

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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/29/2014         | 895                    | 1170                   | 41.23758              | -71.38083              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/1/2014          | 895                    | 1170                   | 41.23673              | -71.38111              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/2/2014          | 895                    | 1170                   | 41.23745              | -71.38111              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/3/2014          | 895                    | 1170                   | 41.23819              | -71.38003              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/8/2014          | 895                    | 1170                   | 41.23802              | -71.37951              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/10/2014         | 911                    | 1192                   | 41.23729              | -71.38139              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/11/2014         | 895                    | 1170                   | 41.23753              | -71.38336              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/17/2014         | 1968                   | 2574                   | 41.23708              | -71.38012              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/18/2014         | 1968                   | 2574                   | 41.23776              | -71.38150              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/19/2014         | 1968                   | 2574                   | 41.23789              | -71.38040              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/20/2014         | 1968                   | 2574                   | 41.23780              | -71.38093              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/21/2014         | 1968                   | 2574                   | 41.23711              | -71.38040              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/22/2014         | 1968                   | 2574                   | 41.23694              | -71.38124              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/23/2014         | 1968                   | 2574                   | 41.23793              | -71.38123              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/23/2014         | 1968                   | 2574                   | 41.23849              | -71.38125              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/25/2014         | 1968                   | 2574                   | 41.23777              | -71.38101              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/25/2014         | 1968                   | 2574                   | 41.23732              | -71.38146              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/26/2014         | 1968                   | 2574                   | 41.23710              | -71.38061              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/30/2014         | 1968                   | 2574                   | 41.23771              | -71.38002              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/30/2014         | 1968                   | 2574                   | 41.23795              | -71.38178              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/31/2014         | 1968                   | 2574                   | 41.23693              | -71.37988              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/2/2014          | 1968                   | 2574                   | 41.23809              | -71.38142              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/2/2014          | 1968                   | 2574                   | 41.23701              | -71.38201              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/3/2014          | 1968                   | 2574                   | 41.23755              | -71.38081              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/5/2014          | 1968                   | 2574                   | 41.23695              | -71.37980              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/5/2014          | 1968                   | 2574                   | 41.23858              | -71.38017              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/6/2014          | 1968                   | 2574                   | 41.23722              | -71.37977              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/6/2014          | 1968                   | 2574                   | 41.23588              | -71.38443              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/7/2014          | 1968                   | 2574                   | 41.23754              | -71.37988              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/7/2014          | 1968                   | 2574                   | 41.23726              | -71.38047              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/8/2014          | 1968                   | 2574                   | 41.23814              | -71.38025              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/8/2014          | 1968                   | 2574                   | 41.23777              | -71.38064              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/9/2014          | 1968                   | 2574                   | 41.23794              | -71.38154              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/10/2014         | 1968                   | 2574                   | 41.23673              | -71.38123              | NAE-2007-2709 |

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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/11/2014         | 1968                   | 2574                   | 41.23713              | -71.38122              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/11/2014         | 1968                   | 2574                   | 41.23758              | -71.38023              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/12/2014         | 1968                   | 2574                   | 41.23740              | -71.38051              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/12/2014         | 1968                   | 2574                   | 41.23762              | -71.37936              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/13/2014         | 1968                   | 2574                   | 41.23738              | -71.38124              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/14/2014         | 1968                   | 2574                   | 41.23721              | -71.38126              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/15/2014         | 1968                   | 2574                   | 41.23758              | -71.38054              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/17/2014         | 1968                   | 2574                   | 41.23785              | -71.37971              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/19/2014         | 1968                   | 2574                   | 41.23722              | -71.38159              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/19/2014         | 1968                   | 2574                   | 41.23769              | -71.38052              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/20/2014         | 1968                   | 2574                   | 41.23759              | -71.38029              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/20/2014         | 1968                   | 2574                   | 41.23681              | -71.38224              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/21/2014         | 1968                   | 2574                   | 41.23791              | -71.38023              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/21/2014         | 1968                   | 2574                   | 41.23757              | -71.38093              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/22/2014         | 1968                   | 2574                   | 41.23756              | -71.38183              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/22/2014         | 1968                   | 2574                   | 41.23779              | -71.38084              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/24/2014         | 1968                   | 2574                   | 41.23693              | -71.38024              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/24/2014         | 1968                   | 2574                   | 41.23766              | -71.37940              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/24/2014         | 1968                   | 2574                   | 41.23795              | -71.38159              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/24/2014         | 1968                   | 2574                   | 41.23766              | -71.38085              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/25/2014         | 1968                   | 2574                   | 41.23770              | -71.38055              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/26/2014         | 1968                   | 2574                   | 41.23739              | -71.38099              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/27/2014         | 1968                   | 2574                   | 41.23761              | -71.38052              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/28/2014         | 1968                   | 2574                   | 41.23692              | -71.38148              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/29/2014         | 1968                   | 2574                   | 41.23743              | -71.38137              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/30/2014         | 1968                   | 2574                   | 41.23775              | -71.38082              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 8/31/2014         | 1968                   | 2574                   | 41.23684              | -71.38172              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/1/2014          | 1968                   | 2574                   | 41.23739              | -71.38134              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/2/2014          | 1968                   | 2574                   | 41.23791              | -71.38008              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/2/2014          | 1968                   | 2574                   | 41.23790              | -71.38019              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/3/2014          | 1968                   | 2574                   | 41.23722              | -71.38038              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/3/2014          | 1968                   | 2574                   | 41.23888              | -71.38112              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/4/2014          | 1968                   | 2574                   | 41.23763              | -71.38073              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/4/2014          | 1968                   | 2574                   | 41.24627              | -71.35801              | NAE-2007-2709 |

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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/5/2014          | 1968                   | 2574                   | 41.23756              | -71.38086              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/5/2014          | 1968                   | 2574                   | 41.23734              | -71.38046              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/6/2014          | 1968                   | 2574                   | 41.23704              | -71.38194              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/6/2014          | 1968                   | 2574                   | 41.23786              | -71.37972              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/8/2014          | 1968                   | 2574                   | 41.23751              | -71.38011              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/9/2014          | 1968                   | 2574                   | 41.23717              | -71.38196              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/10/2014         | 1968                   | 2574                   | 41.23791              | -71.38034              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/11/2014         | 1968                   | 2574                   | 41.23750              | -71.38139              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/11/2014         | 1968                   | 2574                   | 41.23745              | -71.38047              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/12/2014         | 1968                   | 2574                   | 41.23723              | -71.37994              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/13/2014         | 1968                   | 2574                   | 41.23827              | -71.38163              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/13/2014         | 1968                   | 2574                   | 41.23678              | -71.38033              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/14/2014         | 1968                   | 2574                   | 41.23727              | -71.37989              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/14/2014         | 1968                   | 2574                   | 41.23812              | -71.37903              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/15/2014         | 1968                   | 2574                   | 41.23825              | -71.38138              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/15/2014         | 1968                   | 2574                   | 41.23824              | -71.37984              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/17/2014         | 1968                   | 2574                   | 41.23850              | -71.38095              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/18/2014         | 1968                   | 2574                   | 41.23774              | -71.38005              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/19/2014         | 1968                   | 2574                   | 41.23649              | -71.38461              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/20/2014         | 1968                   | 2574                   | 41.23749              | -71.38054              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/21/2014         | 1968                   | 2574                   | 41.23766              | -71.37997              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/22/2014         | 1968                   | 2574                   | 41.23758              | -71.38001              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/26/2014         | 1968                   | 2574                   | 41.23671              | -71.38036              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 9/28/2014         | 1968                   | 2574                   | 41.23771              | -71.38012              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/1/2014         | 1968                   | 2574                   | 41.23715              | -71.37998              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/3/2014         | 1968                   | 2574                   | 41.23713              | -71.37998              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/7/2014         | 1968                   | 2574                   | 41.23784              | -71.38049              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/9/2014         | 1968                   | 2574                   | 41.23774              | -71.38040              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/11/2014        | 1968                   | 2574                   | 41.23691              | -71.37999              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/12/2014        | 1968                   | 2574                   | 41.23750              | -71.38095              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/14/2014        | 1968                   | 2574                   | 41.23723              | -71.38100              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 10/15/2014        | 1968                   | 2574                   | 41.23789              | -71.38187              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 11/22/2014        | 1968                   | 2574                   | 41.23780              | -71.37944              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 11/23/2014        | 1968                   | 2574                   | 41.23831              | -71.37962              | NAE-2007-2709 |

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|---------------------|-------------------------------|-------------|-------|-------------------|------------------------|------------------------|-----------------------|------------------------|---------------|
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 11/28/2014        | 1968                   | 2574                   | 41.23790              | -71.38163              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 11/28/2014        | 1968                   | 2574                   | 41.23843              | -71.38090              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 11/30/2014        | 1968                   | 2574                   | 41.23720              | -71.38195              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 12/2/2014         | 1968                   | 2574                   | 41.23832              | -71.38047              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 1/30/2015         | 1968                   | 2574                   | 41.23854              | -71.37933              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 2/4/2015          | 1968                   | 2574                   | 41.23738              | -71.38064              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 2/4/2015          | 1954                   | 2556                   | 41.23774              | -71.38052              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/20/2015         | 1395                   | 1824                   | 41.23726              | -71.37972              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/21/2015         | 1395                   | 1824                   | 41.23733              | -71.38035              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/23/2015         | 1395                   | 1824                   | 41.23654              | -71.37990              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/24/2015         | 1395                   | 1824                   | 41.23644              | -71.37997              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/25/2015         | 1395                   | 1824                   | 41.23737              | -71.37906              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/26/2015         | 1395                   | 1824                   | 41.23946              | -71.38024              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 3/30/2015         | 1395                   | 1824                   | 41.23802              | -71.38124              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/1/2015          | 1395                   | 1824                   | 41.23676              | -71.38238              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/2/2015          | 1395                   | 1824                   | 41.22623              | -71.38205              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/2/2015          | 1395                   | 1824                   | 41.23851              | -71.37508              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/5/2015          | 1395                   | 1824                   | 41.23860              | -71.38264              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/6/2015          | 1395                   | 1824                   | 41.23693              | -71.38163              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/13/2015         | 1395                   | 1824                   | 41.23719              | -71.38028              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/14/2015         | 1395                   | 1824                   | 41.23770              | -71.38003              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/15/2015         | 1395                   | 1824                   | 41.23658              | -71.38222              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/16/2015         | 1395                   | 1824                   | 41.23704              | -71.38066              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/17/2015         | 1395                   | 1824                   | 41.23766              | -71.38049              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/18/2015         | 1395                   | 1824                   | 41.23767              | -71.38071              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/19/2015         | 1395                   | 1824                   | 41.23730              | -71.38071              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/23/2015         | 1395                   | 1824                   | 41.23854              | -71.37868              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/25/2015         | 1395                   | 1824                   | 41.23790              | -71.38028              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/26/2015         | 1395                   | 1824                   | 41.23726              | -71.38121              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/28/2015         | 1395                   | 1824                   | 41.23726              | -71.38246              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/29/2015         | 1395                   | 1824                   | 41.23751              | -71.38073              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 4/30/2015         | 1395                   | 1824                   | 41.23718              | -71.38166              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/1/2015          | 1395                   | 1824                   | 41.23722              | -71.38224              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/2/2015          | 1395                   | 1824                   | 41.23733              | -71.38126              | NAE-2007-2709 |

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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/3/2015          | 1395                   | 1824                   | 41.23724              | -71.38156              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/5/2015          | 1395                   | 1824                   | 41.23732              | -71.38134              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/6/2015          | 1395                   | 1824                   | 41.23593              | -71.38361              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/7/2015          | 1395                   | 1824                   | 41.23704              | -71.38174              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/8/2015          | 1395                   | 1824                   | 41.23697              | -71.38172              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/9/2015          | 1395                   | 1824                   | 41.23790              | -71.38133              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/10/2015         | 1395                   | 1824                   | 41.23819              | -71.38090              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/12/2015         | 1395                   | 1824                   | 41.23877              | -71.38035              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/13/2015         | 1395                   | 1824                   | 41.23918              | -71.37801              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/14/2015         | 1395                   | 1824                   | 41.23781              | -71.38069              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/15/2015         | 1395                   | 1824                   | 41.23755              | -71.37959              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/16/2015         | 1395                   | 1824                   | 41.23769              | -71.38055              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/17/2015         | 1395                   | 1824                   | 41.23798              | -71.37964              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/19/2015         | 1395                   | 1824                   | 41.23756              | -71.38013              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/20/2015         | 1395                   | 1824                   | 41.23726              | -71.38064              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/21/2015         | 1395                   | 1824                   | 41.23730              | -71.38054              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/22/2015         | 1395                   | 1824                   | 41.23762              | -71.38035              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/23/2015         | 1395                   | 1824                   | 41.23765              | -71.38023              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/25/2015         | 1395                   | 1824                   | 41.23835              | -71.37996              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/26/2015         | 1395                   | 1824                   | 41.23784              | -71.37998              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/27/2015         | 1395                   | 1824                   | 41.23765              | -71.37992              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/28/2015         | 1395                   | 1824                   | 41.23799              | -71.37968              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/29/2015         | 1395                   | 1824                   | 41.23768              | -71.38009              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/30/2015         | 1395                   | 1824                   | 41.23725              | -71.38083              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 5/31/2015         | 1395                   | 1824                   | 41.23728              | -71.38239              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/2/2015          | 1395                   | 1824                   | 41.23767              | -71.37974              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/3/2015          | 1395                   | 1824                   | 41.23736              | -71.38032              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/4/2015          | 1395                   | 1824                   | 41.23782              | -71.38099              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/4/2015          | 1395                   | 1824                   | 41.23809              | -71.38070              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/5/2015          | 1395                   | 1824                   | 41.23689              | -71.38165              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/5/2015          | 1395                   | 1824                   | 41.23677              | -71.38100              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/6/2015          | 1395                   | 1824                   | 41.23716              | -71.38049              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/7/2015          | 1395                   | 1824                   | 41.23654              | -71.38189              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/9/2015          | 1395                   | 1824                   | 41.23803              | -71.38160              | NAE-2007-2709 |

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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/10/2015         | 1395                   | 1824                   | 41.23728              | -71.38079              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/10/2015         | 1395                   | 1824                   | 41.23743              | -71.38060              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/11/2015         | 1395                   | 1824                   | 41.23765              | -71.38061              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/12/2015         | 1395                   | 1824                   | 41.23769              | -71.38090              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/13/2015         | 1395                   | 1824                   | 41.23720              | -71.38111              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/13/2015         | 1395                   | 1824                   | 41.23809              | -71.38080              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/14/2015         | 1395                   | 1824                   | 41.23650              | -71.38197              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/16/2015         | 1395                   | 1824                   | 41.23710              | -71.38106              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/17/2015         | 1395                   | 1824                   | 41.23730              | -71.38115              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/17/2015         | 1395                   | 1824                   | 41.23801              | -71.38085              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/18/2015         | 1395                   | 1824                   | 41.23772              | -71.38131              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/19/2015         | 1395                   | 1824                   | 41.23762              | -71.38056              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/19/2015         | 1395                   | 1824                   | 41.23752              | -71.38121              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/20/2015         | 1395                   | 1824                   | 41.23753              | -71.38152              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/20/2015         | 1395                   | 1824                   | 41.23732              | -71.38146              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/21/2015         | 1395                   | 1824                   | 41.23701              | -71.38225              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/23/2015         | 1395                   | 1824                   | 41.23740              | -71.38136              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/24/2015         | 1395                   | 1824                   | 41.23762              | -71.38054              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/25/2015         | 1395                   | 1824                   | 41.23766              | -71.37989              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/25/2015         | 1395                   | 1824                   | 41.23766              | -71.38028              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/26/2015         | 1395                   | 1824                   | 41.23768              | -71.38078              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/27/2015         | 1395                   | 1824                   | 41.23733              | -71.38018              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/27/2015         | 1395                   | 1824                   | 41.23661              | -71.38179              | NAE-2007-2709 |
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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/29/2015         | 1395                   | 1824                   | 41.23702              | -71.38244              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/29/2015         | 1395                   | 1824                   | 41.23630              | -71.38296              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 6/30/2015         | 1395                   | 1824                   | 41.23789              | -71.38043              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/1/2015          | 1395                   | 1824                   | 41.23498              | -71.38594              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/1/2015          | 1395                   | 1824                   | 41.23760              | -71.37984              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/1/2015          | 1395                   | 1824                   | 41.23817              | -71.38069              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/2/2015          | 1395                   | 1824                   | 41.23738              | -71.38016              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/2/2015          | 1395                   | 1824                   | 41.23672              | -71.38441              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/2/2015          | 1395                   | 1824                   | 41.23770              | -71.38028              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/3/2015          | 1395                   | 1824                   | 41.23733              | -71.38055              | NAE-2007-2709 |

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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/3/2015          | 1395                   | 1824                   | 41.23778              | -71.38076              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/4/2015          | 1395                   | 1824                   | 41.23686              | -71.38248              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/4/2015          | 1395                   | 1824                   | 41.23799              | -71.38089              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/5/2015          | 1395                   | 1824                   | 41.23752              | -71.38098              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/6/2015          | 1395                   | 1824                   | 41.23667              | -71.38076              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/7/2015          | 1395                   | 1824                   | 41.23746              | -71.37993              | NAE-2007-2709 |
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| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/8/2015          | 1471                   | 1924                   | 41.23766              | -71.37984              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/9/2015          | 1395                   | 1824                   | 41.23762              | -71.38150              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/9/2015          | 1395                   | 1824                   | 41.23666              | -71.38090              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/10/2015         | 1395                   | 1824                   | 41.23708              | -71.38148              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/10/2015         | 1395                   | 1824                   | 41.23791              | -71.38202              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/10/2015         | 1759                   | 2301                   | 41.23776              | -71.38025              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/11/2015         | 1395                   | 1824                   | 41.23697              | -71.38046              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/11/2015         | 1471                   | 1924                   | 41.23791              | -71.38160              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/12/2015         | 1471                   | 1924                   | 41.23790              | -71.37999              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/12/2015         | 1471                   | 1924                   | 41.23753              | -71.38161              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/12/2015         | 1471                   | 1924                   | 41.23756              | -71.38037              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/14/2015         | 1471                   | 1924                   | 41.23748              | -71.38042              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/14/2015         | 1471                   | 1924                   | 41.23796              | -71.38067              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/15/2015         | 1471                   | 1924                   | 41.23725              | -71.38089              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/15/2015         | 1471                   | 1924                   | 41.23818              | -71.38092              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/16/2015         | 1471                   | 1924                   | 41.23755              | -71.38312              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/17/2015         | 1471                   | 1924                   | 41.23742              | -71.38002              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/18/2015         | 1471                   | 1924                   | 41.23715              | -71.38245              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/18/2015         | 1471                   | 1924                   | 41.23800              | -71.38023              | NAE-2007-2709 |
| RISDS13             | Harbor Development Commission | New Bedford | MA    | 7/19/2015         | 1471                   | 1924                   | 41.22975              | -71.38046              | NAE-2007-2709 |
|                     |                               |             |       | TOTAL             | 483,851                | 632,853                |                       |                        |               |