# APPENDIX A

PERTINANT CORRESPONDENCE

# BLUE HILL HARBOR
# MAINE

# FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

# APPENDIX A
# PERTINENT CORRESPONDENCE

## LIST OF PERTINENT CORRESPONENCE

Part 1. Correspondence during Preparation and Review of the Final Feasibility Report and Final Environmental Assessment

Part 2. Correspondence during Public Review of the Draft Feasibility Report and Draft Environmental Assessment

Part 3. Correspondence during Preparation of the Draft Feasibility Report and Draft Environmental Assessment

Penobscot Nation THPO – 15 January 2019
Maine Historical Preservation Commission – 11 December 2018
New England District – Coordination Letter to MESHPO – 04 December 2018
New England District – Funds Request to Town of Blue Hill – 17 April 2015
Town of Blue Hill – Funds Limitation Letter – 17 June 2015
New England District – FCSA Transmittal to Town of Blue Hill – 13 March 2015
North Atlantic Division – FCSA Approval Memo – 05 May 2015
New England District – FCSA Execution Request Memo to NAD – 18 March 2015
Assistant Secretary of the Army (Civil Works) – Fact Sheet Approval – 21 November 2014
Town of Blue Hill – Study Support Letter – 18 November 2013
North Atlantic Division – IAR Approval Memo – 29 October 2013
North Atlantic Division – PSD Concurrence Memo
New England District – Memo Transmitting Initial Appraisal to NAD – 13 August 2013
Town of Blue Hill – Study Request – 04 September 2009

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# Part 1

# Correspondence during Preparation and Review of the Final Feasibility Report and Final Environmental Assessment

To be Added for Submittal of Final Report

# Part 2

## Correspondence during Public Review of the Draft Feasibility Report and Draft Environmental Assessment

To be Added at Conclusion of Public Review

# Part 3

# Correspondence During Preparation of the Draft Feasibility Report and Draft Environmental Assessment

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PENOBSCOT NATION
CULTURAL & HISTORIC PRESERVATION
12 WABANAKI WAY, INDIAN ISLAND, ME 04468

CHRIS SOCKALEXIS – TRIBAL HISTORIC PRESERVATION OFFICER
E-MAIL: chris.sockalexis@penobscotnation.org

| | |
|---|---|
| **NAME** | Marc Paiva |
| **ADDRESS** | US Army Corps of Engineers<br>New England District<br>696 Virginia Road<br>Concord, MA 01742-2751 |
| **OWNER'S NAME** | Town of Blue Hill |
| **TELEPHONE** | (978) 318-8796 |
| **EMAIL** | Marcos.A.Paiva@usace.army.mil |
| **PROJECT NAME** | Navigation Improvement Project located at Blue Hill Harbor |
| **PROJECT SITE** | Blue Hill, ME |
| **DATE OF REQUEST** | December 4, 2018 |
| **DATE REVIEWED** | January 15, 2019 |

Thank you for the opportunity to comment on the above referenced project. This project appears to have no impact on a structure or site of historic, architectural or archaeological significance to the Penobscot Nation as defined by the National Historic Preservation Act of 1966, as amended.

If Native American cultural materials are encountered during the course of the project, please contact my office at (207) 817-7471. Thank you for consulting with the Penobscot Nation Tribal Historic Preservation Office with this project.

Chris Sockalexis, THPO
Penobscot Nation

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

PAUL R. LEPAGE
GOVERNOR

KIRK F. MOHNEY
DIRECTOR

December 11, 2018

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

Project: MHPC# 1664-18 Town of Blue Hill; Blue Hill Harbor
Proposed Navigation Improvement Project

Town: Blue Hill, ME

Dear Mr. Kennelly:

In response to your recent request, I have reviewed the information received December 6, 2018 to initiate consultation on the above referenced project in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information submitted, I have concluded that there will be no historic properties affected by this proposed undertaking, as defined by Section 106.

Please contact Megan Rideout at (207) 287-2992 or megan.m.rideout@maine.gov if we can be of further assistance in this matter.

Sincerely,

Kirk F. Mohney

Kirk F. Mohney
State Historic Preservation Officer

PHONE: (207) 287-2132 FAX: (207) 287-2335

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

December 4, 2018

Planning Division
Evaluation Branch

Mr. Kirk F. Mohney, State Historic Preservation Officer
Maine Historic Preservation Commission
55 Capitol Street, 65 State House Station
Augusta, ME 04333

Dear Mr. Mohney:

The U.S. Army Corps of Engineers (USACE), New England District is preparing an Environmental Assessment for a proposed Navigation Improvement Project at Blue Hill Harbor in Blue Hill, Maine (see enclosed figures). We would like your comments on the following undertaking in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

Blue Hill Harbor is the principal commercial fishing harbor of the Town of Blue Hill, located on the western shore of Blue Hill Bay in Hancock County, Maine. The harbor is located about 30 miles south-southeast of Bangor and 103 miles east of Portland, Maine. Blue Hill Harbor is located on the northwest side of Blue Hill Bay, northwest of Long and Mount Desert Islands.

The principal navigation issue at Blue Hill Harbor is that existing conditions do not accommodate safe and efficient operations for commercial fishermen and other vessel operators in the Blue Hill area. Given the regional demands from the commercial fishing fleet, navigation delays and inefficiencies have become problematic for the facilities. There is a lack of sufficient water depth in the western portion of the inner harbor to the publicly-owned shorefront facilities in Blue Hill Harbor. Under present conditions, navigation is limited to the period of three hours before and three hours after high tide. At low tide a boat drawing two feet or more cannot approach closer than 2,000 feet seaward of the wharf.

Currently, a majority of commercial vessels load and offload at town facilities at South Blue Hill Wharf, located outside the protected inner harbor and five miles by road from the town center. South Blue Hill Wharf contains a municipal ramp, docks and floats, as well as 23 moorings for commercial fishermen. South Blue Hill is at maximum capacity with no room for expansion. Other fishermen are based in East Blue Hill Harbor, located outside the protected inner harbor to the northeast, and at Steamboat Wharf, located inside the protected inner harbor on the eastern shore.

USACE is proposing the following alternatives to improve existing navigation conditions in Blue Hill Harbor:

Alternative A:

- A 6-foot deep channel (MLLW), 80-feet wide from the outer harbor to the town wharf, widened at its upper end to form a turning basin 160 feet by 80 feet adjacent to the Town Wharf.
- A Confined Aquatic Disposal (CAD) cell adjacent to the channel to dispose of the 10,000 cubic yards (CY) of unsuitable material.
- Suitable material (63,000 CY) will be hauled by scow to Eastern Passage Disposal Site for open water placement (14 miles one-way travel).

Alternative B:

- A 6-foot deep channel (MLLW), 80-feet wide from the outer harbor to the town wharf, widened at its upper end to form a turning basin 160 feet by 80 feet adjacent to the Town Wharf.
- Dewatering and treatment of unsuitable material (10,000 CY) onshore at the Town Wharf, then transport to Juniper Ridge landfill in Alton, ME by truck (56 miles one-way travel).
- Suitable material (63,000 CY) will be hauled by scow to Eastern Passage Disposal Site for open water placement (14 miles one-way travel).

A review of the National Oceanic and Atmospheric Administration (NOAA) Coast Survey's Automated Wreck and Obstruction Information System (AWOIS) and Electronic Navigation Charts (ENC) identified no potential submerged archaeological sites or shipwrecks within the project area and proposed disposal locations. Sediment cores were collected to project depth throughout the channel from seven sample stations (see sample locations figure). Sediments in the outer portion of the channel were predominantly gray, poorly graded medium to coarse sands overlying marine clay deposits with mixtures of fine, woody organic debris. Sediments within the inner harbor were composed of medium to coarse sands overlain by a thin layer of loose fine sand and silt with shell and wood fragments. The area surrounding the town dock was composed of mixed sand, gravel, and silt over a cobble and gravel substrate.

Sanborn Fire Insurance maps of Blue Hill (1925) depict the G.M. Allen and Son sawmill adjacent to the dam in the inner harbor area (Main Street). Earlier historic maps (Walling 1860 and Map of Blue Hill Village 1881) indicate a dense concentration of commercial and industrial development in the inner harbor area. The Blue Hill Historic District is centered on and around Main Street. However, dredging of the harbor will commence from the Town Wharf south, well outside of the inner harbor area. Historic and archaeological properties are not expected within this area.

Therefore, dredging of Blue Hill Harbor with disposal within a CAD cell adjacent to the channel, at the Eastern Passage Disposal Site, or via transport to the Juniper Ridge landfill will have no effect upon any site or structure of historic, architectural or archaeological significance as defined by Section 106 of the NHPA and implementing

regulations 36 CFR 800. We would appreciate your concurrence with this determination. If unanticipated historic properties are identified during project construction, we will follow the procedures for post-review discoveries at 36 CFR 800.13.

If you have any questions, please feel free to contact Mr. William Bartlett, Study Manager at (978) 318-8004 or Mr. Marc Paiva, Project Archaeologist at (978) 318-8796.

Sincerely,

John R. Kennelly
Chief, Planning Division

Enclosures

Same Letter Sent (with enclosures):
Mr. Donald Soctomah, Tribal Historic Preservation Officer
Passamaquoddy Tribe
P.O. Box 159
Princeton, ME 04668

Mr. Chris Sockalexis, Tribal Historic Preservation Officer
Penobscot Indian Nation
Cultural and Historic Preservation Department
12 Wabanaki Way
Indian Island, ME 04468

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

September 25, 2018

Planning Division

Attn: Jim Schatz
Board of Selectmen
Town of Blue Hill
P.O. Box 412
Blue Hill, ME 04614

Dear Mr. Schatz:

I am writing in reference to the Blue Hill Harbor Navigation Improvement project and the Feasibility Cost Sharing Agreement (FCSA) signed on June 29, 2015 between the Town of Blue Hill and the U.S. Army Corps of Engineers.

In accordance with discussions held between the USACE and the Blue Hill Board of Selectmen, we request that you provide an additional $15,000 towards your share of total project costs. The additional Town funds together with additional Federal funds, will be used to complete sampling and testing of sediment and the design of a confined aquatic disposal cell in Blue Hill Harbor. The purpose of this additional work is to allow for disposal of dredge spoils deemed unsuitable for open water disposal. This additional payment will increase your total cash contribution for the project to $104,000.

Please provide a check in the amount of $15,000 payable to "FAO, U.S. Army Corps of Engineers, New England District." The mailing address is New England District, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742,
Attn: Mr. John Kennelly.

If you have any questions or require any additional information, please contact the project manager, Mr. William Bartlett at (978) 318-8004 or at William.C.Bartlett@usace.army.mil

Sincerely,

John R. Kennelly
Chief, Planning Division

# Town of Blue Hill, Maine

**SELECTMEN/ASSESSORS**
JOHN R. BANNISTER
JAMES M. SCHATZ
VAUGHN LEACH

**OVERSEERS OF POOR**
JOHN R. BANNISTER
JAMES M. SCHATZ
VAUGHN LEACH

**ASSESSORS' AGENTS**
R. J. D. APPRAISALS

FIRST SETTLED 1762

INCORPORATED JAN. 30, 1789

SELECTMEN IN OFFICE
FRIDAY AFTERNOONS
P.O. Box 412
Blue Hill, Maine 04614

**TREASURER/ADMI ASST.**
ANN STADDEN
**TAX COLLECTOR**
ETTA PERKINS
**TOWN CLERK**
ETTA PERKINS
**ROAD COMMISSIONER**
WILLIAM H. COUSINS
**FIRE CHIEF**
DENNIS ROBERTSON

**BLUE HILL, MAINE**
TELEPHONE 207-374-2281 FAX 207-374-9935


June 17, 2015

Mr. William Bartlett
Study Manager
Army Corps of Engineers / New England District
Engineering/Planning Division
696 Virginia Road
Concord, MA 01742-2751

RE: Certificate of Authority (Unclassified)

Dear Mr. Bartlett:

The Town understands that the $80,000 non-Federal cost share is based on the feasibility cost estimate of $160,000 as stated in the FCSA. Town Meeting's authorization to the Selectmen is presently limited to that $80,000 cash contribution. Any increase in the study scope and estimate requiring an increase in the Town's study cost-share will require additional authority from the Town Meeting before the Selectmen can make any commitment to providing additional funds.

Please note that the signature of our Town attorney on the "Certificate of Authority" was provided with the full expectation that the Town must comply with the conditions cited in the above statement.

Sincerely,

James M. Schatz
For the Selectmen of Blue Hill

JMS:djb

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

June 30, 2015

Engineering/Planning Division
Planning Branch

Town of Blue Hill
Board of Selectmen
P.O. Box 412
Blue Hill, Maine 04614

Dear Board of Selectmen:

Enclosed for your use are two fully executed copies of the Feasibility Cost Sharing Agreement (FCSA) for the Navigation Improvement Feasibility Study in Blue Hill, Maine.

As stipulated in Article I V – Method of Payment of the FCSA, your estimated cash contribution toward study costs is $80,000. We request that you transmit a check to cover this amount payable to "FAO, USAED, NEW ENGLAND" to the attention of the Project Manager, Mr. William Bartlett. This office must receive the check by July 30, 2015.

If you have any questions or require any additional information, please contact me at (978) 318-8505 or Mr. Bartlett, at (978) 318-8004.

Sincerely,

John R. Kennelly
Chief, Planning Branch

Enclosure

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

May 13, 2015

Engineering/Planning Division
Planning Branch

Town of Blue Hill
c/o Board of Selectmen
P.O. Box 412
Blue Hill, Maine 04614

Dear Board of Selectmen:

On May 5, 2015 the New England District received approval from our North Atlantic Division to execute the Feasibility Cost Sharing Agreement between the Town of Blue Hill and the Department of the Army Corps of Engineers for the Feasibility Study of navigation improvements at Blue Hill Harbor, Maine. Enclosed are four (4) copies of the Feasibility Cost Sharing Agreement. Please sign and date the three signature pages at the end of each copy of the agreement and return all four (4) to this office for the Corps New England District Engineer's signature. Once signed by the District Engineer, we will date the first page and send you two (2) copies of the fully executed agreement for your records, along with our request for sponsor cost-share funds.

If you have any questions or require any additional information, please contact me or Mr. William Bartlett, at (978) 318-8162 or (978) 318-8004 respectively.

Sincerely,

Scott E. Acone, P.E.
Chief, Engineering/Planning Division

Enclosures

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 GENERAL LEE AVENUE
BROOKLYN NY 11252-6700

CENAD-PD-C 5 May 2015

MEMORANDUM FOR Commander, US Army Corps of Engineers, New England District (CENAE-PP-C), 696 Virginia Road, Concord, MA 01742-2752

SUBJECT: Blue Hill Harbor, Maine, Continuing Authorities Program Section 107 Feasibility Cost Sharing Agreement (FCSA) (CWIS/P2: 328230)

1. References:

a. Memorandum, CENAE-EP-PN, 20 March 2015, Subject: Approval to Execute the FCSA for the Blue Hill Harbor, Blue Hill, Maine Navigation Improvement Study, Blue Hill, Maine, PWI 328230, Section 107.

b. E-mail, CENAE-EP-P, 29 April 2015, Subject: Blue Hill Harbor.

2. The enclosed subject Feasibility Cost Sharing Agreement package (FCSA) is approved for execution by the District Commander. The Division has reviewed the package (References 1a and 1b) and determined it is policy compliant. The FCSA reflects a total study cost of $160,000, which will be cost shared on a 50% Federal and 50% non-Federal basis.

3. The District is required to enter a feasibility phase project network schedule in P2, which includes the milestone (CW 130) for FCSA execution through (CW 170) Final Report Approval. Please provide this office with a signed, digital copy, of the agreement upon execution. You may not deviate from this approved FCSA without prior authorization from the North Atlantic Division.

4. The point of contact is Mr. Paul A. Sabalis, P.E., PMP. Mr. Sabalis may be reached at 347-370-4589.

JOHN O'CONNOR, P.E.
Continuing Authorities Program Manager

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

REPLY TO
ATTENTION OF

CENAE-EP-PN

18 March 2015

MEMORANDUM FOR Commander, North Atlantic Division, U.S. Army Corps of Engineers CENAD-PD-CID-P (Attn: Mr. Forcina), Ft. Hamilton Military Community, 302 General Lee Avenue, Brooklyn, New York 11252-5700

SUBJECT: Approval to Execute the Feasibility Cooperation Study Agreement (FCSA) for the Blue Hill Harbor, Blue Hill, Maine Navigation Improvement Study, Blue Hill, Maine, PWI 328230, Section 107

1. NAE requests that NAD approve for execution the enclosed FCSA for the Blue Hill Harbor, Navigation Improvement Study, Blue Hill, Maine. HQUSACE review and coordination of the CAP Fact Sheet with the OASA (CW) has been completed.

2. The town of Blue Hill, Maine, the non-Federal sponsor, supports this study and will provide the non-Federal share when requested. There are no deviations to the revised model Feasibility Cost Sharing Agreement, dated October 15, 2014. As directed by the OASA (CW) the non-Federal sponsor was advised that the Army does not budget for the Section 107 program.

3. Enclosed for your information are the non-Federal sponsor's Support Letter, Self Certification of Financial capability, Review Plan, negotiated FCSA, FCSA Legal certification, funds allocation table, and the OASA (CW) Fact Sheet approval memo.

FOR THE COMMANDER:

Ends

Scott E. Acone, P. E.
Chief Engineering/Planning Division

CF (w/encls):
Paul Sabalis, NAD
Peter Blum, NAD

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

NOV 2 1 2014

MEMORANDUM FOR THE DEPUTY COMMANDING GENERAL FOR CIVIL AND EMERGENCY OPERATIONS

SUBJECT: Blue Hill Harbor, Maine Navigation Improvement Project Section 107 Fact Sheet

This responds to an email submission from the North Atlantic Regional Integration Team, dated December 12, 2013, requesting concurrence with the subject fact sheet to allow the New England District to proceed with negotiating and executing a Feasibility Cost Sharing Agreement with the Office of the Selectmen, the Town of Blue Hill, the non-Federal sponsor of the project.

I concur with the fact sheet. However, the non-Federal sponsor is to be advised that, even if the Corps finds the project to be feasible, in the Federal interest, and funds project construction, future budgets for the Civil Works program might not include funding to maintain the project. Future funding for maintenance of navigation projects with low commercial tonnage is likely to be highly constrained.

Jo-Ellen Darcy
Assistant Secretary of the Army
(Civil Works)

# Town of Blue Hill, Maine

**SELECTMEN/ASSESSORS**
JOHN R. BANNISTER
JAMES M. SCHATZ
VAUGHN W. LEACH

**OVERSEERS OF POOR**
JOHN R. BANNISTER
JAMES M. SCHATZ
VAUGHN W. LEACH

**ASSESSORS' AGENTS**
R. J. D. APPRAISALS

FIRST SETTLED 1762

INCORPORATED JAN. 30, 1789

SELECTMEN IN OFFFICE
FRIDAY AFTERNOONS
P.O. Box 412
Blue Hill, Maine 04614

**BLUE HILL, MAINE**
TELEPHONE 207-374-2281 FAX 207-374-9935

**TREASURER/ADMI ASST.**
ANN STADDEN
**TAX COLLECTOR**
ETTA PERKINS
**TOWN CLERK**
ETTA PERKINS
**ROAD COMMISSIONER**
WILLIAM H. COUSINS
**FIRE CHIEF**
DENNIS ROBERTSON


November 18, 2013

John Kennelly, Chief of Planning Branch
Engineering/Planning Division
US Army Corps of Engineers
696 Virginia Road
Concord, MA 01742

Dear Mr. Kennelly,

The purpose of this letter is to reiterate the Town of Blue Hill's support of further feasibility study of navigation improvements in Blue Hill Harbor. We understand that we have the responsibility to provide 50 percent of the $160,000 study cost. The Town voted to support that portion of the study at our last Town Meeting (04/06/13).

We look forward to our partnership with the US Army Corps of Engineers. Jointly, we will improve the economic viability of those who use our harbor facilities.

Sincerely,

James M. Schatz
For the Blue Hill Board of Selectmen

Cc: Rob Russo
Study Manager
Engineering/Planning Division
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742/2751

**DEPARTMENT OF THE ARMY**
NORTH ATLANTIC DIVISION, CORPS OF ENGINEERS
FORT HAMILTON MILITARY COMMUNITY
GENERAL LEE AVENUE, BLDG 301
BROOKLYN, NY 11252

REPLY TO

CENAD-PD-CS

29 October 2013

MEMORANDUM FOR Commander, New England District, US Army Corps of Engineers, ATTN: CENAE-EP-PN

SUBJECT: Blue Hill Harbor, Maine, Continuing Authorities Program, Section 107, CWIS/P2#: 328230

1. Reference is made to the following:

   a. CENAE-EP-PN e-mail, dated 17 October 2013.

   b. CENAD-PSD-P memorandum, dated 24 October 2013.

2. The North Atlantic Division (Division) has reviewed the District's resubmission (Reference 1a) and has approved the initial appraisal (Reference 1b).

3. The District should mark the completion of this milestone in P2 and the CAP database of OFA. The Division will advise your staff once we receive a response from OASA (CW) concerning the policy fact sheet.

4. The point of contact for this action is Mr. Paul A. Sabalis, P.E., PMP. (NAD DST Manager). Mr. Sabalis may be reached at 347-370-4589.

Encl

PAUL A. SABALIS, P.E., PMP
District Support Team
Civil Works Integration Division

**DEPARTMENT OF THE ARMY**
NORTH ATLANTIC DIVISION, CORPS OF ENGINEERS
FORT HAMILTON MILITARY COMMUNITY
GENERAL LEE AVENUE, BLDG 301
BROOKLYN, NY 11252

REPLY TO

CENAD-PSD-P

24 October 2013

MEMORANDUM FOR Civil Works District Support Team (Sabalis)

SUBJECT: Blue Hill Harbor, ME – Initial Appraisal Report
Continuing Authorities Program, Section 107

1. Reference is made to the following:

a. CENAD-PD-CS memorandum, dated 17 October 2013, requesting review of NAE's revised Initial Appraisal Report, SAB.

b. CENAE-EP-PS e-mail, dated 17 October 2013, SAB.

c. CENAD-PSD-P memorandum, dated 23 September 2013, SAB.

2. CENAD-PD-CS has requested review (Reference 1a) of NAE's resubmission of the initial appraisal report and extent of compliance, SAB, for Division back-check review and approval (Reference 1b). Prior Division policy review comments are enclosed (Reference 1c).

3. At your request (Reference 1a), Planning staff has reviewed the NAE's revisions to their Initial Appraisal Report (Reference 1b) and has no remaining comments. The IAR is hereby approved.

4. The point of contact for this action is Ms. Naomi Fraenkel, AICP (NAE Planning Program Manager). Ms. Fraenkel may be reached at (917) 790-8615.

PSP MM
RECEIVED
10-28-13

JOSEPH R. VIETRI
Chief, Planning and Project Formulation
Programs Directorate

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

REPLY TO
ATTENTION OF

CENAE-EP-PN

13 August 2013

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, North Atlantic Division, ATTN: CENAD-PD-CID-P (Mr. Joseph Forcina), Fort Hamilton Military Community, 302 General Lee Avenue, Brooklyn, NY 11252-6700

SUBJECT: Continuing Authorities Initial Appraisal Report, Section 107, Blue Hill Harbor, Blue Hill, Maine (PWI # 328230)

1. Enclosed are four copies of the Initial Appraisal Report and Fact Sheet for the Blue Hill Harbor Navigation Improvement Project, Blue Hill, Maine, for your review and approval to proceed to the Feasibility Phase. The initial appraisal indicates that navigation improvements consisting of developing a Federal channel connecting the central Blue Harbor wharf with deep water are in the Federal interest, and provide the basis to prepare and negotiate a Feasibility Cost Sharing Agreement (FCSA). Execution of a FCSA with the Sponsor, the town of Blue Hill, Maine, is required to share the costs of the feasibility phase.

2. If you have any questions or require additional information, please contact me at (978) 318-8162, or Mr. Robert Russo, the Project Manager, at (978) 318- 8553.

FOR THE COMMANDER:

Scott E. Acone, P.E.
Chief, Engineering/Planning Division

Encls

Copy Furnished (w/o Encl):
Paul Sabalis, DST, NAD

September 4, 2009

John Kennelly
Chief, Planning Branch
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Dear Mr. Kennelly:

The Town of Blue Hill, Maine requests that the Corps of Engineers initiate the necessary steps for the dredging of channels and associated navigation features in Blue Hill Harbor under the continuing authority of Section 107 of the River and Harbor Act of 1960. The channels would include all-tide access to the Blue Hill Municipal Wharf and Cemetery Cove areas. The Town of Blue Hill is currently facing the possible loss of a right of way to Steamboat Wharf which would eliminate public all-tide access to the inner harbor.

Regarding the location at the Blue Hill Municipal Wharf, there are several reasons for our request:

- Currently the Blue Hill Municipal Wharf is accessible only at high tide, a great inconvenience to our growing fishing community and a deterrent to marine research and the development of marine-related industry in the area.
- Dredging a channel to this location would provide access to emergency services including a helipad and Blue Hill Memorial Hospital. It would also provide a launching point for the Harbormaster's rescue boat which is currently moored approximately five miles away from his office and emergency services.
- The shorefront location of the town's waste treatment facility offers the opportunity of a pump-out station for commercial and other vessels.
- Blue Hill Harbor is an ideal location for a number of storm moorings which are sorely needed in the area.

Nearby Cemetery Cove provides many opportunities for mariners as well:

- Facilities and equipment necessary for maintenance and repair of vessels exists on site.
- Access to haul-out trailers and storage for large vessels is available. Commercial fishermen greatly benefit from these amenities but can currently use them only at high tide.
- With the expected donation to the town of private land at this location, should the dredging project proceed, public in-town water access could be maximized.

The Town of Blue Hill looks forward to working with the Army Corps of Engineers to improve Blue Hill Harbor for the benefit of our commercial fishing fleet and all navigation interests. Please contact me should you have any questions about this request.

Sincerely,

John R Bannister Duane B. Gray

The Blue Hill Board of Selectmen

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# APPENDIX B

ECONOMICS

# NAVIGATION IMPROVEMENT PROJECT

## Blue Hill Harbor
## Blue Hill, Maine

## SECTION 107
## Feasibility Study

**ECONOMICS APPENDIX**

PREPARED BY:
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
December 2019

**Contents**

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## 1.0 Introduction

This Economics Appendix evaluates the economic benefits of providing a Federal channel into the inner harbor in Blue Hill, Maine. The proposed channel would provide all-tides access to the town wharf located in the inner harbor in the town center. A turning basin would also be required. This analysis was conducted based on data provided by the Blue Hill Harbormaster and Selectmen, and based on information provided by fishermen at a workshop held in Blue Hill on 4 October 2016. All information was confirmed in October 2019. The analysis follows Corps guidance for estimating National Economic Development (NED) benefits as contained in ER 1105-2-100, April 2000, Appendix E, Section II - Navigation.

Costs and benefits are initially presented in annual terms using the FY19 Federal interest rate of 2.875 % that was used to determine the NED plan. The cost and benefits for the NED plan have been updated to the FY20 price level and annualized using the FY20 Federal discount rate of 2.75%. The updated analysis is presented at the end of the document to show the current Benefit to Cost analysis using FY20 price levels and discount rate of 2.75%.

## 2.0 Economic Setting

The town of Blue Hill is located in northeastern Maine in Hancock County. In 2010, Blue Hill had a population of 2,686 and contained 1,936 housing units (2010 US Census). The town is located 28 miles southeast of Bangor, Maine and 98 miles northeast of Portland, Maine. In the summer months the population of Blue Hill swells to over 6,000 with the addition of tourists and seasonal residents attracted to the many recreation and tourism opportunities of the area, cultural amenities such as art galleries and a chamber music center, and nearby Acadia National Park. Summary socioeconomic statistics for the town, county and state are shown in the tables below.

**Table B-1 – Population**

| | 2000 | 2010 | % change 2000-2010 |
|---|---|---|---|
| **Blue Hill** | 2,390 | 2,686 | 12.4% |
| **Hancock County** | 51,791 | 54,418 | 5.1% |
| **State of Maine** | 1,274,923 | 1,328,361 | 4.2% |

Source: US Census Bureau

**Table B-2 – Housing Units**

| | 2000 | 2010 | % change 2000-2010 |
|---|---|---|---|
| **Blue Hill** | 1,486 | 1,936 | 30.3% |
| **Hancock County** | 33,945 | 40,184 | 18.4% |
| **State of Maine** | 651,901 | 721,830 | 10.7% |

Source: US Census Bureau

**Table B-3 – Median Household Income**

| | 2000 | 2010 | % change 2000-2010 |
|---|---|---|---|
| **Blue Hill** | 31,484 | 44,158 | 40.3% |
| **Hancock County** | 35,811 | 47,533 | 32.7% |
| **State of Maine** | 37,240 | 46,933 | 26.0% |

Source: US Census Bureau

**Table B-4 – Employment – Blue Hill, Maine**

| | count | % total |
|---|---|---|
| **Unemployment rate** (Apr 2016) | | **3.1%** |
| **Labor force** (Q4 2015) | **1,240** | |
| | | |
| **Employment by Sector** | | |
| Construction | 91 | 7.3% |
| Manufacturing | 53 | 4.3% |
| Retail trade | 233 | 18.8% |
| Information | 27 | 2.2% |
| Finance and insurance | 46 | 3.7% |
| Real estate and rental and leasing | 13 | 1.0% |
| Professional, scientific, and management | 43 | 3.5% |
| Administrative and waste management services | 74 | 6.0% |
| Educational services | 111 | 9.0% |
| Health care and social assistance | 341 | 27.5% |
| Accommodation and Fodd Services | 113 | 9.1% |
| Other services, except public administration | 66 | 5.3% |

Source: Maine Department of Labor, Center for Workforce Research and Information

## 3.0 Description of Study Area and Harbor Usage

Blue Hill Harbor contains 428 vessels, of which 50 are commercial fishing vessels and 378 are recreational vessels. Commercial vessels moor at several areas around the harbor, including South Blue Hill, Steamboat Wharf, and East Blue Hill. Facilities to support the commercial fishing fleet are located at South Blue Hill and in the inner harbor. The inner harbor is located in the center of town within the main downtown retail district, in upper Blue Hill Bay. In 2012, the town completely rebuilt the inner harbor wharf, a $300,000 to $400,000 investment, with the long-term goal of relocating commercial fishing loading and offloading operations to a protected location in the center of town. The new wharf has a crane as well as water service and electricity. Currently, the wharf in the inner harbor is used only minimally since it is accessible at only the highest tides, generally 3 hours per day. The natural channel accessing the inner wharf currently has depths of less than -4 feet mean lower low water (MLLW), with some areas exposed at low tide. The harbor has a mean tidal range of 10 feet.

**Figure B-1 – Blue Hill Harbor Aerial View**

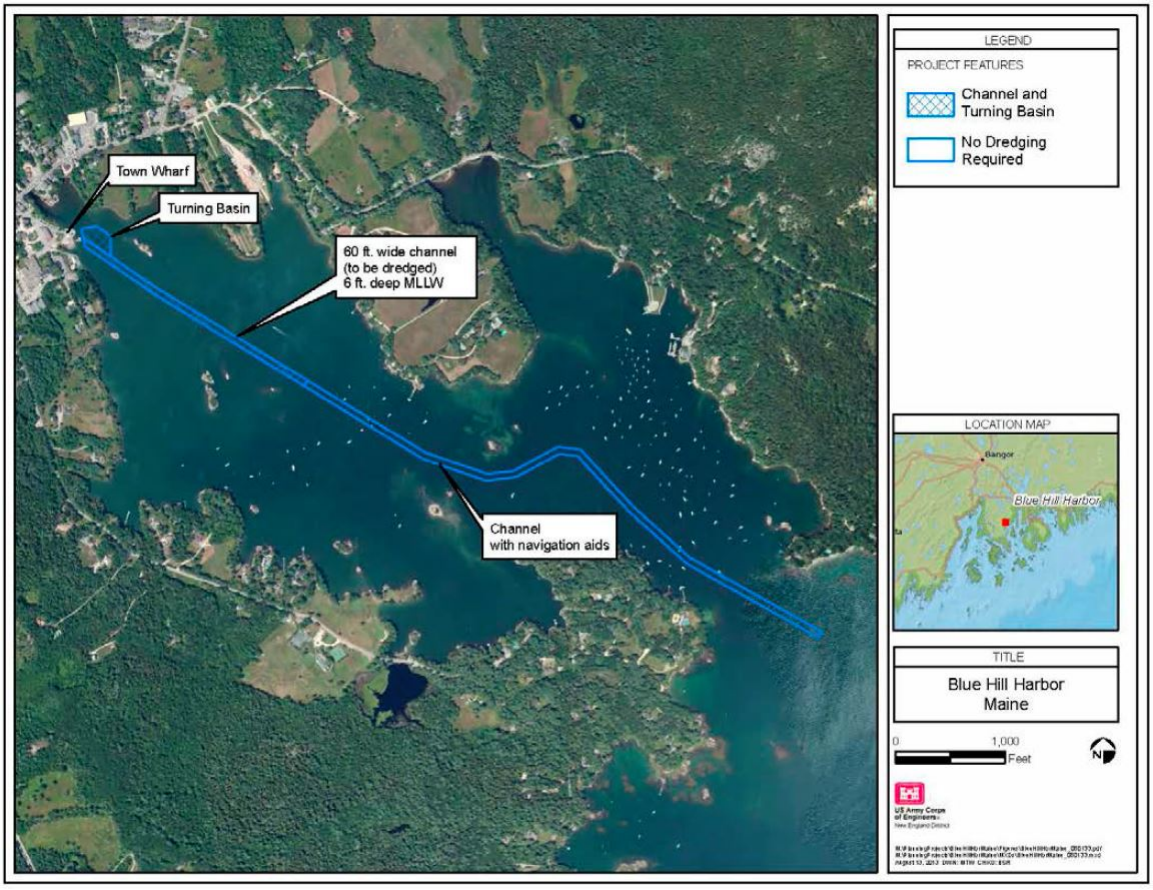
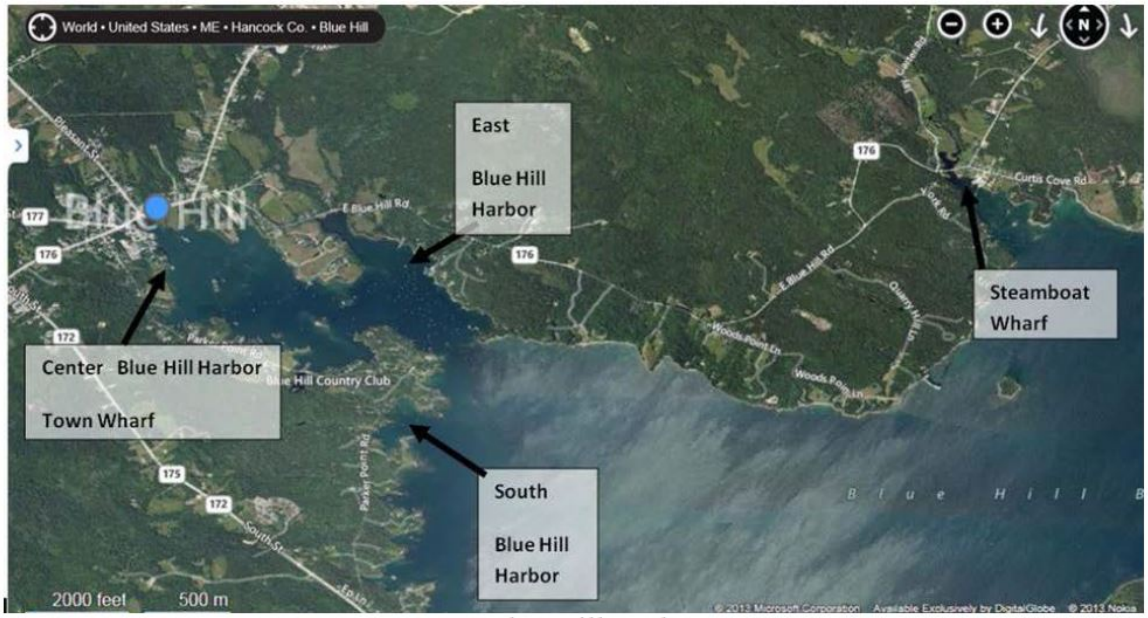



**Figure B-2 – Blue Hill Harbor (Zoomed)**



Currently, commercial vessels load and offload primarily at town facilities at South Blue Hill Harbor, located outside the protected inner harbor to the south. South Blue Hill Harbor contains a municipal wharf, docks and floats, as well as 23 moorings for commercial fishermen. Bait suppliers, fuel suppliers, and fish buyers operate out of trucks at South Blue Hill. Other fishermen are based in East Blue Hill Harbor, located outside the protected inner harbor to the northeast, and at Steamboat Wharf, located inside the protected inner harbor on the eastern shore. In addition to the 23 fishing vessels which moor at South Blue Hill, 8 commercial vessels moor at East Blue Hill, 12 moor at the Steamboat Wharf area in the inner harbor, and 7 moor elsewhere around the harbor. Currently, there is some use of the wharf in the inner harbor, but its use is limited due to the shallow access. There are no slips or moorings in the wharf area of inner Blue Hill Harbor. The draft distribution of the commercial fleet is shown in the table below.

**Table B-5 – Blue Hill Commercial Fishing Fleet**

| Blue Hill Commercial Fishing Vessels by Draft, Total Count | |
|---|---|
| **Loaded Draft** | **#** |
| 10.0' | 1 |
| 5.6' | 1 |
| 4.5' | 2 |
| 4.0' | 30 |
| 3.6' | 1 |
| 3.5' | 2 |
| 3.0' | 5 |
| 2.0' | 1 |
| 2.5' | 1 |
| n/a | 6 |
| Total | 50 |

In 2014, Blue Hill fishermen landed nearly 1.8 million pounds of catch, including 1,547,549 pounds of live lobster valued at nearly $5,600,000 (Blue Hill Harbormaster, December 2015). Other major species landed include eel and scallops. In 2014, total landings were valued at $6,113,000 (Blue Hill Harbormaster, December 2015). Blue Hill fishermen generally fish seven to eight months a year, six days a week, and typically fish full-time. Lobster boats predominate, with generally one or two crew per boat plus captain.

## 4.0 Benefit Methodology

National Economic Development (NED) benefits to dredging a channel into Blue Hill Harbor are calculated based on damages prevented to fishing vessels and town infrastructure, and efficiencies gained by fishermen. NED Benefits are defined as changes in the value of the national output of goods and services. As described in Corps regulation ER-1105-2-100, Appendix E, page E-54, “When no change in aggregate fish catch is expected as a result of a plan…, NED benefits may be measured as cost savings

to existing fish harvests." For Blue Hill Harbor, costs savings are derived from reduced damages and reduced delays. The same regulation, page E-61, states that, "changes in net income to fish harvesters or boat operators is the appropriate measure of NED benefits…Reduction of damage to boats and facilities is frequently a component of commercial fishing benefits. Reduced damages may be a part of the net income analysis or it may proceed as a separate analysis (e.g. damage reduced to public facilities not included in fish harvester's net income)."

Damages and delays in the without project condition are compared to those expected in the with project condition to determine project benefits. Three categories of benefits are calculated: damages prevented to commercial fishing vessels; reduced loading and off-loading delays; reduced tidal delays to the inner harbor wharf, and reduced damages to town infrastructure.

Other benefits which may occur with channel dredging and increased use of the inner harbor wharf include increased business to the suppliers and shops in the Blue Hill area, as well as the potential for new business activity in the area. However, these benefits are typically considered a shift of business activity from one region of the country to another, not increases in national output, and so are considered Regional Economic Development (RED) benefits, not NED benefits. RED benefits are addressed in this analysis but not included in the benefit-cost calculations, since current Corps guidance allows only NED benefits to be counted against project costs.

## 5.0 Existing Conditions

Under existing conditions, fishing vessels based in the various parts of Blue Hill Harbor load and offload their vessels primarily at South Blue Hill Harbor, where suppliers and fish buyers are located. Some also use the inner harbor wharf when it is accessible, at high tide. While South Blue Hill Harbor is the primary commercial fishing area, the South Blue Hill wharf has no power, water, or other services. Fuel trucks deliver fuel directly to vessels pulled up at the dock. Supplies and catch are loaded and off-loaded while vessels are pulled up at either the dock or at barges moored nearby. The wharf at South Blue Hill Harbor is very exposed to winds and waves, particularly from the south and southwest. Loading and offloading delays occur frequently due to both congestion and the exposed conditions. As the only loading and offloading facility in the harbor, South Blue Hill facilities can be congested, requiring vessels to wait for a space to load or offload. Offloading delays of one to two hours are common, particularly in the summer months, with fishing vessels often lined up to offload. Offloading delays also occur during bad weather, when high winds or waves make tying up to the exposed wharf too hazardous. Vessels which do tie up in bad weather are sometimes damaged from banging against the dock. The municipal wharf and floats at South Blue Hill Harbor are also regularly damaged, requiring repairs, as vessels knock against the wharf and floats during rough weather.

Some vessels use the inner harbor wharf periodically, depending on conditions and tides. When using the inner harbor wharf, tidal delays can be significant, with vessels lining up

to wait for the tide. Another concern in the inner harbor is that vessels moored in the Steamboat Wharf area use private land to access their vessels and park vehicles. If this access is no longer allowed, an alternative location for access and parking will be required. Access and parking at South Blue Hill Harbor is already at capacity, particularly in the busy summer months.

## 6.0 Without Project Condition

In the without project condition, South Blue Hill will continue to be the only loading and offloading area with all-tides access for Blue Hill fishermen. The exposure of the South Blue Hill wharf to storms and bad weather conditions will continue to result in damages to vessels, damages to town infrastructure, and delays. The lack of a second wharf with all-tides access will result in continued congestion delays at South Blue Hill facilities. For those vessels which use the inner harbor wharf, extensive tidal delays will continue.

## 7.0 With Project Condition

In the with project condition, a Federal channel would be dredged from deep water to the town wharf in inner Blue Hill Harbor. Channel depths of five, six, and seven feet are evaluated. With channel dredging, all-tides access would be provided to the inner harbor town wharf, and more commercial fishing loading and offloading could occur in the protected inner harbor. Since suppliers and buyers are truck-based, they could also relocate to the inner harbor area. For commercial fishing vessels which relocate their loading and offloading operations, damages and delays currently experienced at South Blue Hill would be prevented. The significant congestion delays currently experienced at South Blue Hill would be greatly reduced. Damages to town infrastructure and congestion delays at South Blue Hill would also be reduced. Tidal delays for vessels which currently use the inner harbor wharf would be reduced. Mooring locations would not be changed, since no new mooring area would be provided.

In the with project condition, fishermen would continue to moor at their current mooring location, since no new mooring space would be created with the project. Only the location of loading and offloading operations would be changed. With channel dredging, a second loading and parking area for fishermen would be available in Blue Hill, which will ensure continued access for vessels currently moored at Steamboat Wharf. With channel dredging, the town may place new moorings in naturally deep water in the inner protected area to provide protected mooring space for commercial fishermen. However the town could do this now, without the channel dredging. There would be no change in fish landings or fish catch with the project, nor would the fishing season be extended, since the fishing season is based on when the lobsters are located in the areas fished, areas close to shore.

## 8.0 Benefit Calculations

Annual benefits to channel dredging are calculated based on information provided by Blue Hill fishermen and town officials. With dredging of a channel to the wharf at inner Blue Hill Harbor, all-water access to the protected town wharf would be provided.

Fishing vessels could load supplies and offload catch well-protected from the weather. Weather-related damages to the town wharf and floats at South Blue Hill would be prevented. Based on information provided by town officials, weather-related damages to the wharf and floats at South Blue Hill that would be prevented with all-tides access to the inner harbor equal $28,000 per year.

Based on information provided by the town, it is estimated that 17 of the 50 commercial vessels would shift all of their loading and offloading operations to the inner harbor with the dredging of a Federal channel, and 15 would shift some of their loading and offloading operations, depending on situational circumstances such as the weather, congestion, or convenience. The remaining 18 vessels would not shift their operations with the project. For the purpose of these benefit calculations, it is assumed that 17 vessels shift to using the inner harbor wharf for all of their loading and offloading, and that of the 15 that would shift partially, they would shift 50% of the time, for the equivalent of 8 additional vessels. This yields an equivalent estimate of 25 vessels shifting their loading and offloading operations in the with-project condition, or half of the 50-vessel fleet.

With all-tides access to the inner harbor wharf in the center of Blue Hill, damages to vessels from loading or offloading at South Blue Hill in poor weather conditions would be prevented, since vessels could choose to load and offload at the more protected inner harbor. Based on information collected by town officials, damages to vessels from banging against the wharf or colliding with other vessels while loading or offloading during adverse weather conditions equal $125,000 per year, or an average of $2,500 per vessel. With an equivalent of half the fleet shifting the location of their loading and operations with the project, it is projected that half of the $125,000 in annual damages to fishing vessels related to loading or offloading in bad weather at South Blue Hill would be prevented with the project, or $62,500.

The efficiency of fishing operations would also be improved with channel dredging, since having all-tides access to the wharf at the inner Blue Hill Harbor would alleviate the significant congestion delays currently experienced at South Blue Hill, and would give fishermen an alternative locations to load and off-load during bad weather, thereby reducing weather-related loading and offloading delays. Delays would be prevented for the 25 vessels projected to relocate their loading and offloading operations to the inner harbor wharf. Blue Hill fishermen make an average of 180 fishing trips per year, and typically have two men per boat, although larger boats may have 3 onboard in the summer. Based on information obtained in discussions with fishermen, delays at South Blue Hill are estimated to occur on roughly one-third of fishing trips and often last at least an hour. These delays would be prevented with the dredging project. The value of time saved for fishermen is estimated using one-third of the average wage of a production worker in manufacturing, to represent the opportunity cost of time, as required for Corps of Engineers small boat harbor analyses. In August, 2018, the average hourly wage of a production worker in manufacturing the state of Maine was $22.30 (US Bureau of Labor Statistics, State and Metro Area Employment, Hours, & Earnings, Table D-4), one-third of which is $7.43.

Fuel costs during offloading and congestion delays at the South Blue Hill wharf are calculated based on four gallons burned per hour for the typical Blue Hill lobster boat and a cost of $3.36 per gallon of diesel fuel in the New England area (Gasoline and Diesel Fuel Update - Energy Information Administration). Annual benefits from the prevention of offloading delays in terms of both time and fuel cost savings are calculated as shown below.

**Table B-6 – Calculation of Offloading Delay Costs - South Blue Hill Harbor**

| Offloading Delay Costs Prevented - South Blue Hill Harbor | | | | | | | |
|---|---|---|---|---|---|---|---|
| | # of vessels | Crew/Boat | Average Delay Time (hours) | Trips/Year | Probability of Delay | Hourly Wage | Annual Value |
| Time Costs | 25 | 2 | 1 | 180 | 33% | $7.43 | $22,100 |
| | # of vessels | Fuel Use (Gallons/Hr) | Average Delay Time (hours) | Trips/Year | Probability of Delay | Fuel Cost/Gallon | Annual Value |
| Fuel Costs | 25 | 4 | 1 | 180 | 33% | $3.36 | $20,000 |

Some vessels use the inner harbor wharf under current conditions and experience significant tidal delays. The vessels based at Steamboat Wharf are most likely to use the inner harbor wharf. Average tidal delays for these vessels were calculated using a mean tide chart based on a 10-foot tidal range, assuming an average 1-foot existing channel depth, and using the drafts of vessels based at Steamboat Wharf. Tidal delay costs were calculated assuming these vessels use the inner harbor wharf 25 percent of the time, or 45 out of 180 trips per year. Tidal delay costs prevented in terms of time and fuel are shown in the tables below. These costs would be prevented with the channel dredging project.

**Table B-7 – Calculation of Tidal Delay Time Costs – Inner Harbor**

| Tidal Delay Time Costs Prevented | | | | | | |
|---|---|---|---|---|---|---|
| draft (feet) | # of vessels | average delay (hours) | trips/year | crew/boat | $/hr | tidal delay time cost |
| 4 | 8 | 1.5 | 45 | 2 | $7.43 | $8,000 |
| 3 | 2 | 1.1 | 45 | 2 | $7.43 | $1,500 |
| Total | | | | | | $9,500 |

**Table B-8 – Calculation of Tidal Delay Fuel Costs – Inner Harbor**

| Tidal Delay Fuel Costs Prevented | | | | | | |
|---|---|---|---|---|---|---|
| draft | # of vessels | average delay (hours) | trips/year | gallons/hour | fuel price/ gallon | tidal delay fuel cost |
| 4 | 8 | 1.5 | 60 | 6 | $3.36 | $14,500 |
| 3 | 2 | 1.1 | 60 | 6 | $3.36 | $2,700 |
| Total | | | | | | $17,200 |

Dredging of the inner harbor would also increase recreational opportunities in Blue Hill Harbor. Currently there are 378 recreational vessels using the harbor. This number would be expected to increase under with-projection conditions (see Section 9 for more discussion on new recreational opportunities).

Recreational activities are evaluated based on five criteria that characterize the quality of the recreational experience. Point values for the existing without-project conditions are compared to the with-project condition. Total point values are converted to dollar values based on current Corps guidance as contained in EGM 16-03 Fiscal Year 2017. Additional recreational benefits of approximately $67,700 would be realized if the project is constructed. The Unit Day Value analysis for Blue Hill Harbor is shown in the table below.

**Table B-9 – Calculation of Tidal Delay Fuel Costs – Inner Harbor**

| UDV CRITERIA | POINT RANGE | POINTS | | JUSTIFICATION |
|---|---|---|---|---|
| | | WITHOUT PROJECT | WITH PROJECT | |
| Recreation Experience | 0 - 30 | 5 | 7 | There are several general activities that increase in number with project. |
| Availability of Opportunity | 0 - 18 | 4 | 6 | There are other harbors in the area but none that offer the same protection or atmosphere. |
| Carrying Capacity | 0 - 14 | 5 | 11 | With the project, the adequate facilities would become optimum. |
| Accessibility | 0 - 18 | 16 | 16 | There is good road access to the harbor and access will not change with the project. |
| Environmental Aesthetic | 0 - 20 | 20 | 20 | The harbor has outstanding aesthetic qualities which will not change after the project is constructed. |
| TOTAL POINTS | | 50 | 60 | |
| UNIT DAY VALUE | | $8.61 | $9.37 | |
| NUMBER OF DAYS | | 72 | 72 | |
| USERS PER BOAT | | 3 | 3 | |
| NUMBER OF BOATS | | 378 | 378 | |
| DOLLAR VALUE | | $702,989 | $765,042 | |
| **RECREATION BENEFIT (Rounded)** | | | **$62,052** | |

Total annual benefits to dredging a Federal channel into Blue Hill Harbor, providing all-tides access to the town wharf in the inner harbor, are summarized below.

**Table B-10 – Benefit Summary**

| Benefit Summary | |
|---|---|
| **Benefit Category** | **Annual Benefits** |
| 1. Damages prevented to South Blue Hill wharf and floats | $28,500 |
| 2. Damages Prevented to Commercial Fishing vessels | $62,500 |
| 3. Offloading Delays Prevented - Time Savings | $22,100 |
| 4. Offloading Delays Prevented - Fuel Cost Savings | $20,000 |
| 5. Tidal Delays Prevented - Time Savings | $9,500 |
| 6. Tidal Delays Prevented - Fuel Cost Savings | $17,200 |
| 7. Recreation Benefits | $62,100 |
| Total Annual Benefits | $221,900 |

In order to determine the optimal channel depth, three channel depths are examined in this analysis, 5-feet, 6-feet, and 7-feet. Benefits are allocated based on the distribution of vessel drafts of the Blue Hill commercial fishing fleet. With sufficient channel depth, vessels which have indicated they would shift their loading and offloading operations to the inner harbor would shift, but with inadequate channel depth, their access would be undependable and they would be less likely to shift. Based on the vessel draft distribution, 96 percent of vessels have drafts of 4.5 feet or below, and 32 percent have drafts of 3.6 feet or below. It is assumed that the vessels which would shift their loading and offloading operations to the inner harbor have a similar draft distribution as the overall fleet. It is also assumed that a 7-foot channel would provide access and therefore full benefits to all vessels, a 6-foot channel would provide full access to the 96 percent of vessels with drafts of 4.5 feet and below, and a 5-foot channel would provide full access to the 32 percent of vessels with drafts of 3.6 feet and below. For the purpose of this analysis, annual benefits are allocated based on these same percentages to determine project optimization, as shown in the table below.

**Table B-11 – Benefit Allocation**

| Channel Depth | Benefit Allocation | Annual Benefits |
|---|---|---|
| 7-foot Channel | 100% | $221,900 |
| 6-foot Channel | 96% | $213,000 |
| 5-foot Channel | 36% | $79,900 |

## 9.0 Regional Economic Development Benefits

With channel dredging to the inner harbor wharf, there would likely be an increase in business revenues for suppliers, shops, and restaurants located in downtown Blue Hill as more commercial fishing activity would occur in the downtown area. Channel dredging would also allow the wharf to be used by other vessels including recreational, charter and tour vessels. With new uses, downtown businesses would likely experience additional increases in traffic and revenues. The town has been contacted by several vessel operators and marine-related businesses which have expressed interest in using the wharf, including a small cruise line and a marine research vessel providing educational tours. Based on information provided by town officials, use of the wharf for educational tours of the marine research vessel would create new business revenues of $75,000 per summer season. Increased use of the inner harbor wharf by kayakers, recreational fishermen, and sailors would generate additional traffic in downtown businesses estimated by the town at $500 per day, or at least $45,000 per summer season. The town also received a letter of interest from a small cruise ship line indicating that they would make Blue Hill a regular port of call if the inner harbor wharf were accessible with channel dredging. There has also been interest expressed regarding operating day sail crewed charter trips, which would generate income estimated at $22,000 per vessel per summer season. This would bring significant additional foot traffic and business revenues to the downtown shops and restaurants. Total increased business revenues with the channel dredging would therefore likely exceed $142,000. This increase in business revenues would also likely generate indirect and induced multiplier effects, further increasing area business revenues. However these increases in local economic activity are considered Regional Economic Development (RED) benefits, not National Economic Development (NED) benefits, because they represent economic activity that would likely occur in another area or region if not at Blue Hill. Based on Corps regulations, only NED benefits can be counted against project costs for economic justification of improvement projects.

## 10.0 Other Social Effects

Other social effects of the proposed channel dredging include a significant increase in safety for commercial fishermen and other boaters who will be able to use the protected inner harbor wharf with the proposed dredging project. The risk of personal injury and loss of life will be greatly reduced for Blue Hill fishermen with the channel dredging, since they would have all-tides access to a fully protected wharf for loading and

offloading. While these safety benefits are not quantified in monetary terms, they are significant benefits to the project.

## 11.0 Project Costs

Contaminated materials are known to exist within the harbor and have been identified within the upper 2 feet of harbor material. The contaminant of concern in this case is PAHs, which are petroleum-based products. Environmental testing has revealed that this material is too hot to dispose of in open water, so two main alternatives are considered: dispose this material in a CAD cell or dispose of it at an upland site. Each alternative was estimated at 3 different dredged channel depths (5-feet, 6-feet, and 7-feet) and each includes 1-foot of allowable overdepth.

**Table B-12 – Project Costs**

| | Alternative 1: CAD Cell Disposal | | | Alternative 2: Upland Location Disposal | | |
|---|---|---|---|---|---|---|
| | 5 ft channel | 6 ft channel | 7 ft channel | 5 ft channel | 6 ft channel | 7 ft channel |
| Project Cost | $ 4,196,713 | $ 4,545,442 | $ 4,911,001 | $ 9,657,231 | $ 10,003,196 | $ 10,364,183 |
| IDC | $ 5,027 | $ 5,445 | $ 5,883 | $ 11,569 | $ (4,995,607) | $ 12,415 |
| Total Cost | $ 4,201,740 | $ 4,550,887 | $ 4,916,884 | $ 9,668,800 | $ 5,007,589 | $ 10,376,598 |
| | | | | | | |
| Annual Cost | $ 159,448 | $ 172,697 | $ 186,586 | $ 366,912 | $ 190,028 | $ 393,772 |

## 12.0 Conclusion

This analysis shows that Alternative 1 at the 6-foot channel depth is the National Economic Development plan as it maximizes net NED benefits at $40,303 and provides the highest benefit-to-cost ratio of 1.23. The 7-foot channel depth is the second favorable alternative with net benefits of $35,300 and a BCR of 1.19 while Alternative 2 at the 6-foot depth comes in third with a BCR of 1.12 and net benefits of $22,972.

**Table B-13 – Benefit-to-Cost Ratios**

| | Alternative 1: CAD Cell Disposal | | | Alternative 2: Upland Location Disposal | | |
|---|---|---|---|---|---|---|
| | 5 ft channel | 6 ft channel | 7 ft channel | 5 ft channel | 6 ft channel | 7 ft channel |
| Annual Benefit | $ 79,900 | $ 213,000 | $ 221,900 | $ 79,900 | $ 213,000 | $ 221,900 |
| Annual Cost | $ 159,448 | $ 172,697 | $ 186,586 | $ 366,912 | $ 190,028 | $ 393,772 |
| Net Benefit | ($79,548) | $40,303 | $35,314 | ($287,012) | $22,972 | ($171,872) |
| BCR | 0.50 | 1.23 | 1.19 | 0.22 | 1.12 | 0.56 |

## 13.0 Economic Update for 2020

Benefits were updated to FY2020 using the most current data available. Recreation benefits were based on EGM #19-03 Unit Day Value for Recreation for Fiscal Year 2019 (Latest available on 7 Nov 2019). Fuel costs were based on average annual fuel prices over the last twelve months available from the Energy Information Administration at http://www.eia.gov/oog/info/wohdp/diesel.asp (accessed 7 Nov 2019). Wages are based on the September 2019 (latest available) average hourly wage of manufacturing workers in the state of Maine; $25.00, one-third of which is $8.33. This information was retrieved

from the US Bureau of Labor Statistics, State and Metro Area Employment, Hours, & Earnings, Table D-4, available at https://data.bls.gov/pdq/SurveyOutputServlet (accessed 7 Nov 2019). Table B-14 below also presents the minor overall change in annual benefits of $1,300, or $300 with only commercial navigation benefits. The 6-foot channel is allocated 96% of these total benefits or $214,300, or $153,100 when only commercial navigation benefits are counted.

**Table B-14 – Benefit Price Level Comparison**

| Benefit Summary | | |
|---|---|---|
| **Benefit Category** | **2018 Annual Benefits** | **2020 Annual Benefits** |
| 1. Damages prevented to South Blue Hill wharf and floats | $28,500 | $27,800 |
| 2. Damages Prevented to Commercial Fishing vessels | $62,500 | $61,000 |
| 3. Offloading Delays Prevented - Time Savings | $22,100 | $24,700 |
| 4. Offloading Delays Prevented - Fuel Cost Savings | $20,000 | $18,900 |
| 5. Tidal Delays Prevented - Time Savings | $9,500 | $10,700 |
| 6. Tidal Delays Prevented - Fuel Cost Savings | $17,200 | $16,400 |
| Total Commercial Benfits | $159,800 | $159,500 |
| 7. Recreation Benefits | $62,100 | $63,700 |
| Total Annual Benefits | $221,900 | $223,200 |

The cost for the preferred alternative for dredging Blue Hill Harbor down to -6 feet MLLW was also updated to FY20 price level and is supported by the Total Project Cost Summary presented in Cost Engineering Appendix (Appendix D). Table B-15 below presents the net annual benefits for commercial navigation and the BCR calculated at the FY20 Federal Discount rate. Annual costs include interest and amortization of the investment cost plus annualized project maintenance.

**Table B-15 – Benefit Cost Analysis Update (FY20 Price Levels)**

| | |
|---|---|
| **Project Cost** | $ 2,916,000 |
| **IDC** | $ 3,000 |
| **Total Cost** | $ 2,919,000 |
| **CRF at 2.75%** | 0.03704 |
| **Annual Costs** | $ 122,700 |
| **Annual Benefit** | $ 153,100 |
| **Net Benefit** | $ 30,400 |
| **BCR** | 1.25 |

The updated annual cost of the NED plan amounts to $122,700 with annual commercial navigation benefits of $153,100. The net annual benefits of dredging Blue Hill Harbor amount to $30,400 yielding a benefit-to-cost ratio of 1.25.

# APPENDIX C

DESIGN

**APPENDIX C**
**ENGINEERING DESIGN AND COST ESTIMATES**

# Contents



# List of Tables and Figures

# 1.0 Existing Conditions

The Town of Blue Hill, Maine is located on the western shore of Blue Hill Bay in Hancock County, Maine. The harbor is located about 30 miles south-southeast of Bangor and 13 miles southwest of Ellsworth. Blue Hill Harbor is located off the northwest end of Blue Hill bay just west-northeast of Long Island and due west of Union River Bay. The harbor is divided into three parts known locally as the outer, middle, and inner harbors. The outer harbor, situated southeast of Parker and Sculpin Points, has depths ranging from 24 to 48 feet and is exposed to easterly and southerly winds. The middle harbor has depths ranging from 6 to 30 feet and is well protected. The outer and middle harbors are connected by a deep natural channel between Parker and Sculpin Points. This channel has a width of about 150 feet and a controlling depth of 20 feet. The middle harbor connects to the inner harbor through a natural channel passing between Parker and Peters Points. This channel has a minimum width of 150 feet and controlling depth of 19 feet. The western half of the inner harbor shallow depths prevail, ranging from 6 feet to +3.5 feet at the Town Wharf. The mean range of the tide is 10.59 feet. At low tide the Town Wharf and docks are dry.

Blue Hill Harbor is home to a sizeable lobster fleet as well as numerous recreational craft and charter fishing boats, and other inshore and offshore commercial fishing craft. All of Blue Hill is served by two public landings, a fish pier, a marina, a boat club, and rental boat facilities. Much of the commercial fleet works year-round and shifts operations with the seasons due to available mooring space, active offloading and servicing facilities, and icing of portions of the harbor. In 2012, the Town of Blue Hill rehabilitated the central harbor wharf, which included a new crane as well as water and electricity service. The wharf improvements provide the facility with year-round support to the town's commercial fishing industry.

# 2.0 Field Explorations

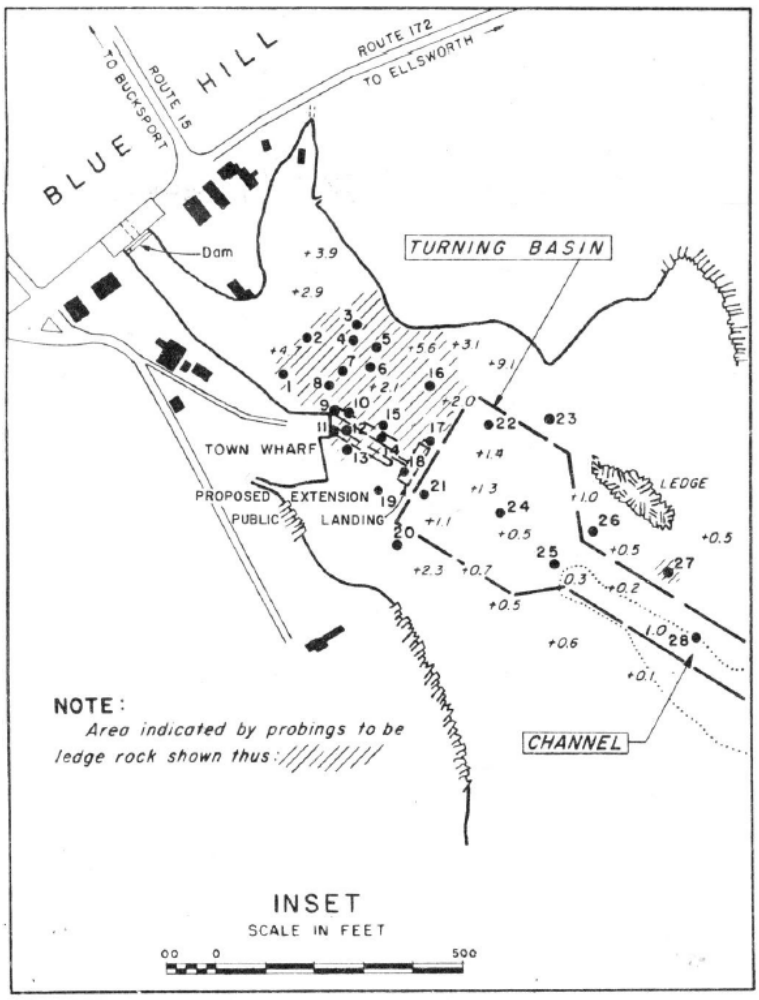
Field explorations included hydrographic surveys of the proposed dredge areas, subsurface explorations to delineate the area of ledge in the harbor and define the nature of the substrate at depth, and sediment sampling to determine the nature of the dredge material to evaluate potential disposal options. The information obtained from these field investigations was used to develop and evaluate alternative plans of improvement.

**Hydrographic Surveys**

A hydrographic survey of the project area conducted in 1951 was supplemented by a May 1970 hydrographic and topographic survey to lay-out and evaluate the proposed project and alternatives included in the 1972 detailed project report. A bathymetric survey of the proposed improvement area was conducted in 2012 and used to re-evaluate the project for this study. The results of the 2012 survey are shown on Attachment A.

**Subsurface Explorations**

In 1948 the U.S. Army Corps of Engineers conducted a hydrograph and topography survey of Central Blue Hill Harbor. Figure 1 lists the probings with their results and locations. The probings were conducted with a 1" diameter pipe drive and an 8 pound hammer. The probings indicate that the inner harbor material was made up mostly of sand, gravel, looser rock and rock. The outer harbor material was made up of mostly sand and mud.




TO SOUTH BLUE HILL

LIST OF PROBINGS

| NUMBER * | ELEVATIONS GROUND | ELEVATIONS LIMIT OF PROBING | MATERIAL |
|---|---|---|---|
| 1 | +2.6 | +1.9 | Sand, Gravel, Loose Rocks, Rock |
| 2 | +2.7 | -0.4 | " " " " " |
| 3 | +2.6 | +0.3 | " " " " " |
| 4 | +2.5 | +0.3 | " " " " " |
| 5 | +2.9 | +1.4 | " " " " " |
| 6 | +2.0 | -2.5 | " " " " " |
| 7 | +2.3 | -0.7 | " " " " " |
| 8 | +2.4 | -0.1 | " " " " " |
| 9 | +2.3 | +0.7 | " " " " " |
| 10 | +2.1 | +0.6 | " " " " " |
| 11 | +2.9 | -5.6 | " " " " " |
| 12 | +2.2 | -0.3 | " " " " " |
| 13 | +1.8 | -4.8 | " " " " " |
| 14 | +1.6 | -4.3 | " " " " " |
| 15 | +1.6 | -4.1 | " " " " " |
| 16 | +3.0 | -3.1 | Gravel, Stones, Rock |
| 17 | +1.2 | -0.9 | " " " |
| 18 | +1.5 | -6.1 | Sand, Gravel, Stones |
| 19 | +0.6 | -6.8 | Gravel, Stones, Rock |
| 20 | +1.5 | -7.8 | Medium Packed Sand, Clay, Gravel |
| 21 | +1.4 | -5.4 | " " " " " |
| 22 | +1.2 | -8.1 | Hard " " " " |
| 23 | +1.8 | -7.8 | Hard Packed Sand And Clay |
| 24 | +1.4 | -8.0 | Medium Packed Sandy Clay |
| 25 | +0.7 | -8.3 | Sand, Clay, Mud |
| 26 | +0.8 | -8.1 | Sand, Clay, Light Gravel, Hard Packed |
| 27 | +0.4 | -4.1 | Sand, Clay, Gravel, Rock |
| 28 | -0.0 | -8.0 | Sand, Clay, Mud |
| 29 | -0.2 | -8.5 | " " " |
| 30 | -0.1 | -8.1 | " " " |
| 31 | -0.0 | -9.8 | Mud |
| 32 | -0.2 | -9.5 | " |
| 33 | -0.2 | -9.2 | " |
| 34 | -0.6 | -9.4 | " |
| 35 | -0.6 | -9.2 | " |
| 36 | -1.0 | -9.3 | " |
| 37 | -0.5 | -9.2 | " |
| 38 | -0.4 | -8.6 | " |
| 39 | -1.4 | -8.7 | " |
| 40 | -0.3 | -8.5 | " |
| 41 | +0.1 | 8.6 | " |
| 42 | -2.0 | -8.2 | " |
| 43 | -2.6 | -8.5 | " |
| 44 | -5.4 | -8.5 | " |
| 45 | -1.9 | -8.6 | " |

* Probings are as shown on Map File No 1045 D-6-2, but are given new key numbers. Map not published.

**Figure 1 - 1948 Probes**

The U.S. Army Corps of Engineers (USACE) went out October 23, 2015 to collect sediment vibracores from seven locations throughout the proposed dredging area identified as Stations A through G on Figure 2.

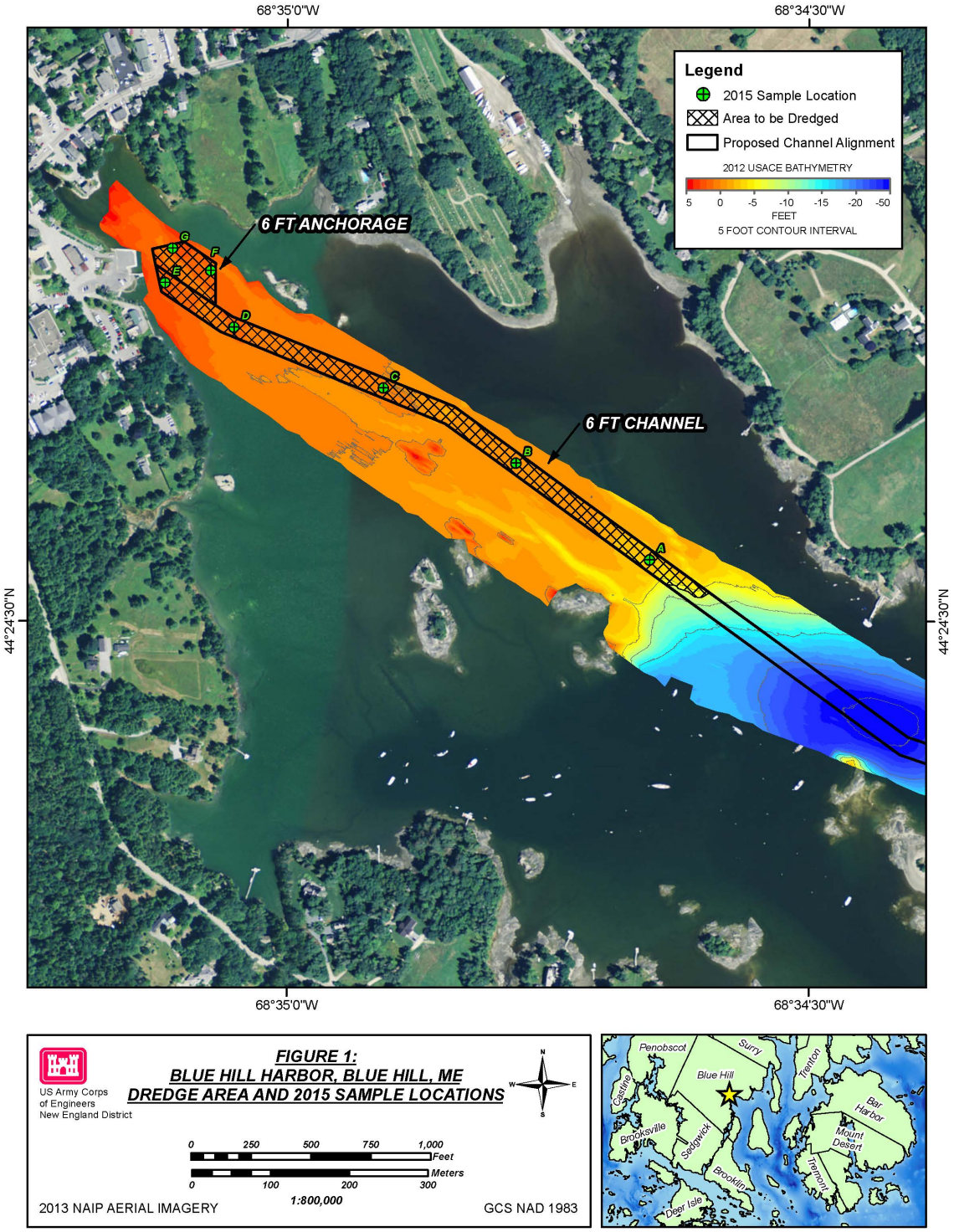



**Figure 2 - 2015 Sampling Locations**

Core penetration at the inner harbor stations (D, E, F, and G) was limited due to gravel and sand deposits near the sediment surface and was 2.0 feet or less at Stations D, F, and G. Due to the inability to penetrate inner harbor sediments to the design depth and determine the vertical extent of the elevated PAH levels, the Town of Blue Hill dug four test pits in October 2016 (Figure 3). The Town's contractor placed timber mats across the harbor at low tide and used an excavator to

dig 4-9 foot deep test pits at predetermined locations. USACE personnel were on-site to describe the lithology of the pit walls and subsample the sediment in two foot horizons for PAH analysis. Results from this analysis are presented in Appendix F and show the extent of PAH contamination is limited to the upper two feet of the harbor sediments.

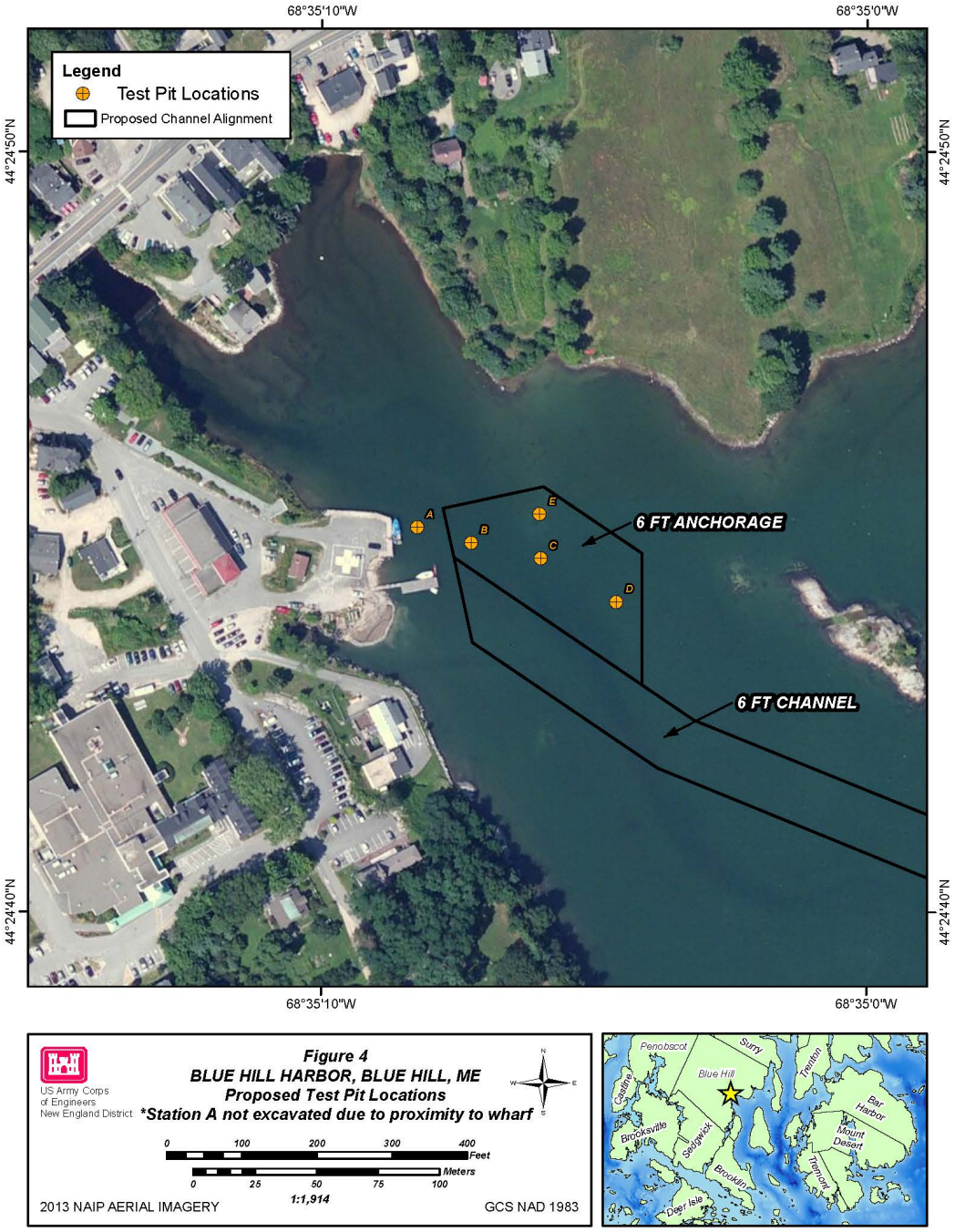



**Figure 3 - 2016 Test Pit Locations**

## Sediment Sampling and Analysis

During the October 23, 2016 sampling event, USACE personnel described each sediment core in the field and composited the length of each individual core for analysis of grain size, total solids, and water content. Additionally, USACE composited the core samples according to the plan

outlined in the SAP for chemical analysis of the contaminants of concern (COC). Grain size results are presented in Table 1. For more information on the chemical analysis, refer to Appendix F.

**Table 1 - Grain Size Analysis**

| Sample ID | % Cobble | % Gravel | % Coarse Sand | % Medium Sand | % Fine Sand | % Total Fines | % Moisture |
|---|---|---|---|---|---|---|---|
| **A** | 0.1 (U) | 0.1 | 2.2 | 6.6 | 21.6 | 69.5 | 55.3 |
| **B** | 0.1 (U) | 0.1 (U) | 1.7 | 3.5 | 7.4 | 87.4 | 51.2 |
| **C** | 0.1 (U) | 1.1 | 1.9 | 4.9 | 12.1 | 80 | 54.5 |
| **D** | 0.1 (U) | 4.4 | 13.2 | 34.8 | 35 | 12.6 | 19.6 |
| **E** | 0.1 (U) | 1.8 | 8.8 | 26.7 | 37.9 | 24.8 | 33.2 |
| **F** | 0.1 (U) | 5 | 14 | 30.6 | 29.8 | 20.6 | 26.8 |
| **G** | 0.1 (U) | 45.9 | 12.4 | 16.7 | 16.2 | 8.8 | 21.4 |

U = Non-detected analytes are reported as the RL and qualified with a "U".

These samples indicate that the unconsolidated materials (non-ledge) in the proposed improvement areas consist of clayey silts, sands, and silty sands with the exception of the small area of ledge found in the proposed 8-foot area, all materials within the areas proposed for dredging are expected to be removable by a typical mechanical bucket dredge.

# 3.0 Channel and Turning Basin Design

The existing commercial fleet consists of 50 boats. The design vessel used for the channel design has a 5 foot draft, 40 foot length, and a 14 foot beam.

**Channel Width**

Until 2006, the U.S. Army Corps of Engineers channel design focused on dividing the channel into a maneuvering lane and a bank clearance lane. Appropriate widths were determined for each lane separately. However, the Engineering Manual, EM 1110-2-1613 was updated in 2006 and suggests this method is no longer appropriate. Rather than break the channel into separate lanes, the Corps now focuses on the channel as a whole. The new method states that the total channel width calculations should incorporate six factors: traffic pattern (one-way or two-way), design ship beam length, channel cross section shape, current speed and direction, quality and accuracy of aids to navigation, and variability of channel and currents. In a harbor with this volume of traffic and boats entering and leaving the channel at the same time of day, design for two-way traffic is essential. The width of a channel is measured at the design depth between the bottoms of the side slopes. This channel is considered to be a "trench" type channel, as opposed to a canal or shallow type channel. The passing of two powered vessels in a generally open waterway with adequate safe clearance between them, and between each boat and the channel boundary or bank, would require a width of about 4 to 6 times the vessel beam. With the largest boats having a beam of 14 feet, this equates to a channel width of about 80 feet. See EM Table 8-3 below.

## EM 1110-2-1613 (dated 31 May 06) Table 8-3 Two-Way Ship Traffic Channel Width Design Criteria

| | Design Ship Beam Multipliers for Maximum Current, Knots | | |
|---|---|---|---|
| | 0.0 to 0.5 | 0.5 to 1.5 | 1.5 to 3.0 |
| **Channel Cross Section** | Constant Cross Section, Best Aids to Navigation | | |
| Shallow | 5.00 | 6.00 | 8.00 |
| Canal | 4.00 | 4.50 | 5.50 |
| Trench | 4.50 | 5.50 | 6.00 |

Applying these factors for Blue Hill, ME resulted in the following channel design.

| | Vessel Beam (ft) | x | Factor | = | Channel Width (ft) |
|---|---|---|---|---|---|
| Trench | 14 | | 5.50 | | 77 |

"Approach Channels: A Guide for Design", a June 1997 report for the Permanent International Association of Navigation Congresses (PIANC) provided another method for determining channel width. This approach was deemed slightly more conservative than the EM 1110-2-1613 approach discussed above. However, due to the location of Blue Hill Harbor and the protection provided within the inner harbor, the EM-1110-2-1613 approach is satisfactory.

**Channel Depth**

Channel depth "should be adequate to safely accommodate ships with the deepest drafts expected to use the waterway" according to the EM 1110-2-1613. This statement not only addresses the physical characteristics of the design vessels, but the future use economic projection. The physical concerns include the draft of the vessel and its operability when underway. Vessels will ride deeper in the water than when at berth. The term for this is "squat." Ships are also impacted by the wave conditions and tend to roll, pitch, or heave. The EM provides technical guidance related to design depth for larger commercial vessels. The Blue Hill Harbor fleet is relatively small and protected within the inner harbor. Therefore, a channel depth between 5 and 8 feet was analyzed with 1-foot of over depth taken into consideration.

**Channel Turn Configuration**

In order to avoid ledge outcrops within the harbor, the channel alignment required a few turns rather than a straight line to the outer harbor. An initial design for a channel turn can be developed from the factors used in Table 8-4 of the EM. These factors are derived from empirical tests and serve as a starting point for the channel turn configurations and are presented below in Table 8-4.

**EM 1110-2-1613 (dated 31 May 06) Table 8-4 Recommended Channel Turn Configurations**

| Defection Angle, Deg | Ratio of Turn Radius/Ship Length | Turn Width Increase Factor (*Ship Beam) | Turn Type |
|---|---|---|---|
| 0-10 | 0 | 0 | Angle |
| 10-25 | 3-5 | 2.0-1.0 | Cutoff |
| 25-35 | 5-7 | 1.0-0.7 | Apex |
| 35-50 | 7-10 | 0.7-0.5 | Curved |
| >50 | >10 | 0.5 | Circle |

The only deflection angle for the inner harbor design greater than 10 is 13.85 degrees and the ratio of turn radius/ship length is 4.5 at that point. Therefore, there was an additional 70 feet added to the channel width (turning area only) to allow for a safe cutoff turn within in the channel.

**Turning Basin**

The EM also provides guidance for turning basins in deep draft navigation projects. The EM recommends providing a turning basin 1.2-1.5 larger than the channel width. However, because this is not a deep draft project and taking into consideration the needs of the town, the proposed turning basin is 160’ long and 80’ wide, shown on Attachment A.

# 4.0 Quantity Estimates

Quantities of material to be dredged from the proposed navigation improvement area were calculated by comparing the existing bottom surface defined by the hydrographic surveys and subsurface explorations to a design bottom surface with side slopes of 1 vertical to 3 horizontal. The data was imported into a MicroStation file and through the InRoads program, a digital terrain model was created for both the existing surface and the design surface. The amount of material to be dredged was then calculated by comparing the two surfaces. A one-foot allowable over depth was calculated for ordinary material to account for dredging tolerance. Table 2 is a summary of that work.

**Table 2 - Channel Quantities**

| Channel Quantities and Areas | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Area (SF)** | **Required Depth (FT)** | **Required Depth Quantity (CY)** | **Over-Depth Quantity (CY)** | **Total Quantity (normal material + over depth), CY)** | **Contaminated Quantity (2FT, CY)** | **Total Material to be Removed (CY)** |
| **Plan A** | 309,970 | 5 | 37,979 | 11,850 | 49,829 | 10,591 | 60,420 |
| **Plan B** | 326,700 | 6 | 49,829 | 12,530 | 62,359 | 10,591 | 72,950 |
| **Plan C** | 346,810 | 7 | 62,359 | 13,220 | 75,579 | 10,591 | 86,170 |
| **Plan D** | 367,490 | 8 | 75,579 | 24,516 | 100,095 | 10,591 | 110,686 |

*If 9ft of material are dredged due to 1ft of over depth, the area to be dredged rises to 389,670ft$^2$.

# 5.0 CAD Cell for Contaminated Material

Results from the sediment analysis are presented in Appendix X and show the extent of PAH contamination is limited to the upper two feet of the harbor sediments, which is approximately 10,591 cubic yards of material, however, a 15% factor has been added to account for bulking and any anticipated additional unpaid dredge quantity bringing the unsuitable quantity to 12,200 cubic yards. This information prompted the team to design a 525' by 150' CAD cell (bottom footprint is 470' by 140') to relocate and consolidate the contaminated material. The CAD cell depth design is -9 feet MLLW and the top of the 3-foot wide cap will be -3-feet MLLW. Due to the limits of the 2012 bathymetric survey, the existing surface to be dredged to accommodate the CAD cell was estimated to be -2-feet MLLW. The quantity of material to be removed to create the CAD cell is approximately 15,500 cubic yards. Refer to Attachment A for CAD cell placement within Blue Hill Harbor.

# 6.0 Disposal Area

Knowledge of the nature of the material to be removed and the quantity of material enables an examination of potential disposal alternatives for the dredged material. The mixed nature of the dredged material, including cobbles, sands, silt and clay, the potential for small boulders, make use of a cutterhead pipeline dredge or other form of hydraulic plant such as a hopper dredge, impractical. The distance from shore to the dredge areas precludes use of a land-based dragline. Use of a barge-mounted bucket dredge and scows is the only feasible option for removal of the material.

A potential new site was investigated in State waters close to Bass Harbor near the mouth of Blue Hill Bay in the Eastern Passage. The site in the Eastern Passage is located about 6 miles from Bass Harbor in about 330 feet of water. The site in the Eastern Passage is close enough to Blue Hill to enable the work to be completed within the allowable dredging and disposal window in a single dredging season with only one scow.

# 7.0 Future Maintenance Costs

Project annual costs must include an annualized estimate of the cost of maintaining the project over the period of analysis. Since the proposed project is limited to dredging, the only annual maintenance cost is periodic maintenance dredging of the improved areas to their recommended depth. It is estimated that maintenance dredging of the improved areas would be required once during the project life, if at all. For purposes of this study, an annual shoaling rate of 0.5 percent has been incorporated into the annual cost of the alternatives.

## PROPOSED NAVIGATION CHANNEL QUANTITIES

| PROPOSED DEPTH (FT) | REQUIRED DEPTH QUANTITY (CY) | OVERDEPTH QUANTITY (CY) |
|---|---|---|
| 5 | 48,570 | 11,850 |
| 6 | 60,420 | 12,530 |
| 7 | 72,950 | 13,220 |
| 8 | 86,170 | 24,516 |

BLUE HILL

EXISTING TOWN WHARF

PROPOSED 6'TURNING BASIN (0.4 AC)

80'

150'

PROPOSED 6' FEDERAL CHANNEL

525' x 150' FOOTPRINT FOR POTENTIAL CAD CELL LOCATION (12,500 CY CAPACITY)

PETERS PT.

APPROXIMATE LIMITS OF DREDGING (PENDING DEPTH DECISION)

BLUE HILL HARBOR

N

## GENERAL NOTES:

1. SOUNDINGS ARE IN FEET AND TENTHS AND REFER TO THE PLANE OF MEAN LOWER LOW WATER (MLLW) 1983-2001 TIDAL EPOCH.
2. BENCH MARK DATA: BM KYC (2012) IS A 1/4" DRILL HOLE IN THE CONCRETE BASE FOR THE FLAGPOLE AT THE KOLLEGEWIDGWORK YACHT CLUB LOCATED ALONG THE NE SHORE OF BLUE HILL HARBOR. KYC LANE IS LOCATED 1.2 MILES FROM RT 172 WHEN HEADING SE ALONG ROUTE 176 AND ONCE ON KYC LANE BEAR RIGHT AT THE Y JUNCTION AND TAKE IT TO THE END. ELEVATION IS 16.45 FEET ABOVE MLLW.
3. COORDINATES SHOWN ARE BASED ON TRANSVERSE MERCATOR GRID SYSTEM FOR THE STATE MAINE (EAST ZONE 1801) & NAD 1983.
4. SURVEY WAS PERFORMED USING AN ODUM MK2 ECHOTRAC ECHOSOUNDER. HORIZONTAL POSITIONING WAS OBTAINED UTILIZING A LEICA 1200 GPS SYSTEM. AN RTK BASE STATION WAS SET UP ON BM KYC (2012).
5. THE SOUNDING INFORMATION SHOWN ON THIS MAP REPRESENTS THE SHOALEST SOUNDINGS OF THOSE OBTAINED FROM HYDROGRAPHIC SURVEYS CONDUCTED IN JULY 2012.
6. THE SOUNDING INFORMATION ON THIS MAP SHOULD NOT BE USED TO DETERMINE VOLUMES. VOLUMES ARE DETERMINED FROM MORE SOUNDING INFORMATION THAN SHOWN. ADDITIONAL SOUNDING INFORMATION IS AVAILABLE UPON REQUEST.
7. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED, AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
8. FIELD BOOK: R&H 2980
   SURVEY BY: PAUL K. O'BRIEN AND CREW
   REFER TO SURVEY NO. 12-1167-REP

GRAPHIC SCALE:

200 0 200 400
1" = 200'

US Army Corps of Engineers®
New England District

| MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|
| | | | |

| MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|
| | | | |

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
CONCORD, MASSACHUSETTS

DESIGNED BY: L.JACOBS
DRN BY: L.JACOBS
SUBMITTED BY:
PLOT SCALE: 1:1
SIZE: ANSI D
DATE: NA
CKD BY:
PLOT DATE:
FILE NAME: BLU-PTR_C-101.dgn
SOLICITATION NO.: W912WJ-XX-X-XXXX
CONTRACT NO.:
DRAWING CODE: BLU2716

NAVIGATION IMPROVEMENT STUDY
BLUE HILL HARBOR
BLUE HILL, MAINE

SITE PLAN

SHEET IDENTIFICATION
C-101

SHEET 1 OF 1

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# APPENDIX D

COST

## COST ESTIMATE

The cost estimate is based on dredge quantities developed by the Civil Engineering Section. The tentatively selected plan (TSP) includes constructing a new 80-ft wide, 6-ft deep channel along with a new turning basin. There is no pre-existing federal navigation project in this area.

Environmental testing in the harbor indicates that the top 2-ft of sediment are contaminated with PAHs; thus, the TSP also includes construction of a new CAD cell to place and cap this material.

Numerous alternatives were considered for this project, including different channel depths (5-ft and 7-ft), as well as overland disposal for the contaminated material. The TSP was selected through an economic analysis.

### Assumptions

- Construction methodology for clean material: the CEDEP estimate assumes that mechanical dredging equipment will be used throughout the project. The estimate assumes an 8-cy bucket will place clean material directly into two 1,500-cy bottom dump scows which will be towed 14-miles to the Eastern Passage Disposal Site (EPDS) and disposed of. Some of the clean material is to be used as a cap for the CAD cell, and will therefore only be hauled for ¼-mile. The estimate assumes one 3000 HP tug will haul the scows to/from the dredge site and the disposal areas.
- Construction methodology for contaminated material: the CEDEP estimate assumes that mechanical dredging equipment will be used throughout the project. The estimate assumes an 8-cy bucket will place contaminated material directly into a 1,500-cy bottom dump scow which will be towed ¼-mile to the CAD cell and disposed of. The estimate assumes one 3000 HP tug will haul the scows to/from the dredge site and the CAD cell area. It should be noted that, due to the substantial tide changes at this site, it's assumed that there will be a "dedicated" scow for storing the contaminated material. That way, the contractor will be able to continue excavating both material types, even if he can't access the CAD cell area due to the tides.
- Estimate assumes the prime contractor will self-perform all work.
- Estimate assumes that the prime contractor will mobilize from Maine, based on historic information of available contractors in the area.
- Estimate assumes that contractor will pay Davis Bacon wage rates for Hancock County in Maine. If the winning contractor ends up coming from outside of Maine, this could cause a rise in costs due to potentially higher wage rates.
- Estimate assumes open competition and invitation for bid procurement method.

## RISK ANALYSIS

Risk Mitigation was conducted through an Abbreviated Risk Analysis (ARA) of the project as it is currently presented in addition to the acknowledgement of risk in the scope and estimated quantities. The District has mitigated this risk through a conservative approach to the excavation and hauling of dredge material as well as utilizing a conservative cost of fuel. The values included in the project cost provide an amount that the PDT is confident will provide substantive costs to mitigate any issues. The District will continue to monitor and include all risks in continuing assessment of contingency and amend as necessary as an essential element to the continued development of the project. The potential risk areas identified through formal risk and sensitivity analysis were mobilization & demobilization, dredge & disposal of clean material to the EPDS and dredge & disposal of contaminated material to the CAD cell.

The ARA was developed relying on local District staff to provide expertise and information gathering. The cost engineer facilitated a risk assessment meeting with the PDT in addition to a qualitative analysis to produce a risk register that served as the framework for the risk analysis.

The ARA assumes the Project Development Stage/Alternative is “Feasibility (Recommended Plan)” with a “Low Risk” risk category based on the experience of the cost engineer and vetted with the PDT. The resultant contingencies are 15.07% for the Total Construction Estimate, 13.62% for Total Planning, Engineering & Design, and 16.83% for Total Construction Management. These contingency percentages were then utilized in the Total Project Cost Summary. It should be noted that no Lands and Damages are anticipated for this project.

There is no one significant risk factor for this project that stands above the rest. The risks associated with the project are typical for improvement dredging and are derived from the district’s standard practices for developing quantities, acquisition strategy, and cost estimate assumptions regarding what equipment will be utilized to construct the project.

## TOTAL PROJECT COST SUMMARY (TPCS)

The Total Project Cost Summary (TPCS) was then computed to summarize the construction cost, project first cost, and the Total Project Cost or the Fully Funded Cost. The TPCS was utilized to calculate the construction cost estimate applied contingency and escalated to the midpoints of the features of work and the remaining work breakdown structure to include Planning, Engineering & Design (PED) and Construction Management. The inputs of the TPCS, to include percentages for the PED phase and Construction Management were obtained from the project manager.

The resultant TPCS from the cost estimate, risk analysis, and escalation is $3,122,000 with an estimated federal cost of $2,498,000 and non-federal cost of $624,000 utilizing a 80%/20% federal/non-federal cost of project split. Including feasibility study costs of $308,000, the total estimated cost of the project is $3,430,000.

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: **Blue Hill Section 107**
PROJECT NO: **328230**
LOCATION: **Blue Hill, Maine**

DISTRICT: **New England District**
PREPARED: **########**
POC: **CHIEF, COST ENGINEERING, Andy Jordan**

This Estimate reflects the scope and schedule in report; Blue Hill Harbor, Section 107 Navigation Improvement Study

| Civil Works Work Breakdown Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Program Year (Budget EC): | | | | 2020 | | | | | |
| | | | | | | Effective Price Level Date: | | | | 1-Oct- 19 | | | | | |
| WBS NUMBER | Civil Works Feature & Sub-Feature Description | COST ($K) | CNTG ($K) | CNTG (%) | TOTAL ($K) | ESC (%) | COST ($K) | CNTG ($K) | REMAINING COST ($K) | Spent Thru: 1-Oct-18 ($K) | TOTAL FIRST COST ($K) | ESC (%) | COST ($K) | CNTG ($K) | FULL ($K) |
| **12** | NAVIGATION PORTS & HARBORS | $2,243 | $337 | 15% | $2,581 | | $2,243 | $337 | $2,581 | | $2,581 | 7.1% | $2,403 | $361 | $2,764 |
| | | | - | | | - | | | | | | - | | | |
| | | | - | | | - | | | | | | - | | | |
| | | | - | | | - | | | | | | - | | | |
| | **CONSTRUCTION ESTIMATE TOTALS:** | $2,243 | $337 | | $2,581 | | $2,243 | $337 | $2,581 | | $2,581 | 7.1% | $2,403 | $361 | $2,764 |
| 01 | LANDS AND DAMAGES | | - | | | - | | | | | | - | | | |
| 30 | PLANNING, ENGINEERING & DESIGN | $182 | $25 | 14% | $207 | | $182 | $25 | $207 | | $207 | 5.6% | $192 | $26 | $218 |
| 31 | CONSTRUCTION MANAGEMENT | $110 | $19 | 17% | $129 | | $110 | $19 | $129 | | $129 | 8.9% | $120 | $20 | $140 |
| | **PROJECT COST TOTALS:** | $2,535 | $381 | 15% | $2,916 | | $2,535 | $381 | $2,916 | | **$2,916** | 7.1% | $2,715 | $408 | $3,122 |

| | |
|---|---|
| | CHIEF, COST ENGINEERING, Andy Jordan |
| | PROJECT MANAGER, Bill Barlett |
| | CHIEF, REAL ESTATE, Anne Kosel |
| | CHIEF, PLANNING, John Kennelly |
| | CHIEF, ENGINEERING, Dave Margolis |
| | CHIEF, OPERATIONS, Eric Pedersen |
| | CHIEF, CONSTRUCTION, Sean Dolan |
| | CHIEF, CONTRACTING, Sheila Winston-Vincuilla |
| | CHIEF, PM-PB, Janet Harrington |
| | CHIEF, DPM, Scott Acone |

| | | |
|---|---|---|
| **ESTIMATED TOTAL PROJECT COST:** | | **$3,122** |
| ESTIMATED FEDERAL COST: | **80%** | $2,498 |
| ESTIMATED NON-FEDERAL COST: | **20%** | $624 |
| **22 - FEASIBILITY STUDY (CAP studies):** | | **$308** |
| ESTIMATED FEDERAL COST: | 66% | $204 |
| ESTIMATED NON-FEDERAL COST: | 34% | $104 |
| **ESTIMATED FEDERAL COST OF PROJECT** | | **$2,702** |

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Blue Hill Section 107
LOCATION: Blue Hill, Maine
This Estimate reflects the scope and schedule in report; Blue Hill Harbor, Section 107 Navigation Improvement Study

DISTRICT: New England District
POC: CHIEF, COST ENGINEERING, Andy Jordan

PREPARED: 10/15/2019

| WBS Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Estimate Prepared: 15-Oct-19<br>Estimate Price Level: 1-Oct-19 | | | | Program Year (Budget EC): 2020<br>Effective Price Level Date: 1 -Oct-19 | | | | | | | | |
| | | | | RISK BASED | | | | | | | | | | |
| WBS NUMBER<br>*A* | Civil Works Feature & Sub-Feature Description<br>*B* | COST ($K)<br>*C* | CNTG ($K)<br>*D* | CNTG (%)<br>*E* | TOTAL ($K)<br>*F* | ESC (%)<br>*G* | COST ($K)<br>*H* | CNTG ($K)<br>*I* | TOTAL ($K)<br>*J* | Mid-Point Date<br>*P* | ESC (%)<br>*L* | COST ($K)<br>*M* | CNTG ($K)<br>*N* | FULL ($K)<br>*O* |
| | **PHASE 1 or CONTRACT 1** | | | | | | | | | | | | | |
| **12** | NAVIGATION PORTS & HARBORS | $2,243 | $337 | 15.0% | $2,581 | | $2,243 | $337 | $2,581 | 2022Q2 | 7.1% | $2,403 | $361 | $2,764 |
| | **CONSTRUCTION ESTIMATE TOTALS:** | $2,243 | $337 | 15.0% | $2,581 | | $2,243 | $337 | $2,581 | | | $2,403 | $361 | $2,764 |
| **01** | LANDS AND DAMAGES | | | | | | | | | | | | | |
| **30** | PLANNING, ENGINEERING & DESIGN | | | | | | | | | | | | | |
| *2.5%* | Project Management | $17 | $2 | 13.6% | $19 | | $17 | $2 | $19 | 2021Q2 | 4.8% | $18 | $2 | $20 |
| *1.0%* | Planning & Environmental Compliance | $13 | $2 | 13.6% | $15 | | $13 | $2 | $15 | 2021Q2 | 4.8% | $14 | $2 | $15 |
| *15.0%* | Engineering & Design | $82 | $11 | 13.6% | $93 | | $82 | $11 | $93 | 2021Q2 | 4.8% | $86 | $12 | $98 |
| *1.0%* | Reviews, ATRs, IEPRs, VE | $26 | $4 | 13.6% | $30 | | $26 | $4 | $30 | 2021Q2 | 4.8% | $27 | $4 | $31 |
| *1.0%* | Life Cycle Updates (cost, schedule, risks) | | | 13.6% | | | | | | | | | | |
| *1.0%* | Contracting & Reprographics | $9 | $1 | 13.6% | $10 | | $9 | $1 | $10 | 2022Q2 | 8.9% | $10 | $1 | $11 |
| *3.0%* | Engineering During Construction | $4 | $1 | 13.6% | $5 | | $4 | $1 | $5 | 2022Q2 | 8.9% | $4 | $1 | $5 |
| *2.0%* | Planning During Construction | $9 | $1 | 13.6% | $10 | | $9 | $1 | $10 | 2021Q2 | 4.8% | $9 | $1 | $11 |
| *3.0%* | Adaptive Management & Monitoring | | | 13.6% | | | | | | | | | | |
| *1.0%* | Project Operations | $22 | $3 | 13.6% | $25 | | $22 | $3 | $25 | 2022Q2 | 8.9% | $24 | $3 | $27 |
| **31** | CONSTRUCTION MANAGEMENT | | | | | | | | | | | | | |
| *10.0%* | Construction Management | $70 | $12 | 16.8% | $82 | | $70 | $12 | $82 | 2022Q2 | 8.9% | $76 | $13 | $89 |
| *2.0%* | Project Operation: | | | 16.8% | | | | | | | | | | |
| *2.5%* | Project Management | $40 | $7 | 16.8% | $47 | | $40 | $7 | $47 | 2022Q2 | 8.9% | $44 | $7 | $51 |
| | **CONTRACT COST TOTALS:** | $2,535 | $381 | | $2,916 | | $2,535 | $381 | **$2,916** | | | $2,715 | $408 | **$3,122** |

This estimate captures costs for the preferred alternative for dredging Blue Hill Harbor down to 6-ft below existing depth. The top 2-ft of the harbor sediments are contaminated with petroleum-based products in the tidal reaches and are is to be disposed of in the CAD cell. Alternative assumes that all clean materials will be disposed of in the Eastern Passage Disposal Site (EPDS). CEDEP was used in conjunction with MII to develop this alternative. All work is assumed to be self-performed by the prime contractor.

Escalation for non-CEDEP items taken from Q1FY16 to Q1FY20 for "Navigation Ports & Harbors". No escalation applied to CEDEP items as they are priced using Q1FY20 pricing. Note that the escalation applied in MII is intended to bring all costs to Q1FY20; the remaining escalation is applied in the TPCS report. Contingency set at 0% because it will be applied in TPCS report.

Estimated by J Masey
Designed by L. Jacobs
Prepared by Jeremiah Masey
Preparation Date 10/15/2019
Effective Date of Pricing 10/15/2019
Estimated Construction Time 60 Days

| Description | Quantity | UOM | DirectCost | SubCMU | PrimeCMU | Escalation | Contingency | ProjectCost |
|---|---|---|---|---|---|---|---|---|
| **Project Cost Summary Report v4** | | | **1,687,770** | **0** | **539,864** | **15,818** | **0** | **2,243,452** |
| **1 Project Summary** | **1** | **EA** | **1,687,770** | **0** | **539,864** | **15,818** | **0** | **2,243,452** |
| **1.1 TSP: 6-ft Channel & CAD Cell** | **72,950** | **CY** | **1,687,770** | **0** | **539,864** | **15,818** | **0** | **2,243,452** |
| **1.1.1 General Requirements** | **2** | **MO** | **69,678** | **0** | **22,288** | **15,818** | **0** | **107,785** |
| (Note: Assumed 1.03-month of dredging (from CEDEP) and 0.75-month of initial mob/demob.) | | | | | | | | |
| **1.1.2 Mobilization / Demobilization** | **1** | **EA** | **286,231** | **0** | **91,556** | **0** | **0** | **377,787** |
| **1.1.3 Mechanical Dredging** | **72,950** | **CY** | **1,331,860** | **0** | **426,020** | **0** | **0** | **1,757,880** |
| (Note: Total CEDEP assumed duration = 0.5 + 0.154 + 0.376 = 1.03-mo.) | | | | | | | | |
| **1.1.3.1 Dredge Channel & Dispose in EPDS** | **53,416** | **CY** | **656,483** | **0** | **209,988** | **0** | **0** | **866,470** |
| (Note: Dredging costs developed using CEDEP. This dredging item is for clean material disposal in the EPDS. Quantity includes the total "clean" materials from channel (62,359-cy), minus the material that is placed in for the CAD cell cap (8,943-cy).) | | | | | | | | |
| **1.1.3.2 Dredge CAD Cell** | **19,534** | **CY** | **228,548** | **0** | **73,105** | **0** | **0** | **301,653** |
| (Note: Dredging costs developed using CEDEP. This dredging item is for clean material disposal in the EPDS. KTR will need to dredge a CAD cell to house contaminated material. It's assumed that pre-construction CAD area is non-contaminated and is disposed of in EPDS.) | | | | | | | | |
| **1.1.3.3 Fill CAD Cell w/ Contaminated Material** | **10,591** | **CY** | **370,367** | **0** | **118,469** | **0** | **0** | **488,836** |
| (Note: Dredging costs developed using CEDEP. This dredging item is for placing contaminated material in the CAD cell.) | | | | | | | | |
| **1.1.3.4 Cap CAD Cell** | **8,943** | **CY** | **76,463** | **0** | **24,458** | **0** | **0** | **100,921** |
| (Note: Dredging costs developed using CEDEP. This item captures placing clean material for the CAD cell cap.) | | | | | | | | |

Currency in US dollars

**Abbreviated Risk Analysis**

Project (less than $40M): **Blue Hill Harbor Section 107 Navigation Improvement Study** **Alternative: 1b**

Project Development Stage/Alternative: **Feasibility (Recommended Plan)**

Risk Category: **Low Risk: Typical Construction, Simple** **Meeting Date: 2/7/2019**

Total Estimated Construction Contract Cost = **$ 2,243,452**

| | CWWBS | Feature of Work | Estimated Cost | | % Contingency | $ Contingency | Total |
|---|---|---|---|---|---|---|---|
| | 01 LANDS AND DAMAGES | Real Estate | $ - | | 0% | $ - | $ - |
| 1 | 12 02 HARBORS | **Mobilization & Demobilization** | $ 377,787 | | 14% | $ 52,115 | $ 429,902 |
| 2 | 12 02 HARBORS | **Dredge Channel & Dispose in EPDS** | $ 1,168,123 | | 17% | $ 194,824 | $ 1,362,947 |
| 3 | 12 02 HARBORS | **Dredge Contam Matl & Place in CAD Cell** | $ 589,757 | | 15% | $ 91,076 | $ 680,833 |
| 4 | | | | | 0% | $ - | $ - |
| 5 | | | | | 0% | $ - | $ - |
| 6 | | | | | 0% | $ - | $ - |
| 7 | | | | | 0% | $ - | $ - |
| 8 | | | | | 0% | $ - | $ - |
| 9 | | | | | 0% | $ - | $ - |
| 10 | | | | | 0% | $ - | $ - |
| 11 | | | | | 0% | $ - | $ - |
| 12 | All Other | **Remaining Construction Items** | $ 107,785 | *5.0%* | 0% | $ - | $ 107,785 |
| 13 | 30 PLANNING, ENGINEERING, AND DESIGN | **Planning, Engineering, & Design** | $ 182,000 | | 14% | $ 24,793 | $ 206,793 |
| 14 | 31 CONSTRUCTION MANAGEMENT | **Construction Management** | $ 110,000 | | 17% | $ 18,515 | $ 128,515 |
| XX | FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW) | | | | | $ - | |

| **Totals** | | | | | |
|---|---|---|---|---|---|
| Real Estate | $ - | 0% | $ - | $ - | |
| Total Construction Estimate | $ 2,243,452 | 15.07% | $ 338,016 | $ 2,581,468 | |
| Total Planning, Engineering & Design | $ 182,000 | 13.62% | $ 24,793 | $ 206,793 | |
| Total Construction Management | $ 110,000 | 16.83% | $ 18,515 | $ 128,515 | |
| Total Excluding Real Estate | **$ 2,535,452** | **15.04%** | **$ 381,324** | **$ 2,916,776** | |

| **Confidence Level Range Estimate ($000's)** | **Base** | **50%** | **80%** |
|---|---|---|---|
| | $2,535k | $2,764k | $2,917k |

* 50% based on base is at 5% CL.

| **Fixed Dollar Risk Add:** (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate. | |
|---|---|

**Blue Hill Harbor Section 107 Navigation Improvement Study 1b**
Feasibility (Recommended Plan)
Abbreviated Risk Analysis

## Risk Evaluation

| WBS | Potential Risk Areas | Project Management & Scope Growth | Acquisition Strategy | Construction Elements | Specialty Construction or Fabrication | Technical Design & Quantities | Cost Estimate Assumptions | External Project Risks | Cost in Thousands |
|---|---|---|---|---|---|---|---|---|---|
| **01 LANDS AND DAMAGES** | **Real Estate** | | | | | | | | $0 |
| **12 02 HARBORS** | **Mobilization & Demobilization** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | $378 |
| 12 02 HARBORS | Dredge Channel & Dispose in EPDS | **0** | **0** | **2** | **0** | **0** | **1** | **1** | $1,168 |
| 12 02 HARBORS | Dredge Contam Matl & Place in CAD Cell | **0** | **0** | **1** | **0** | **0** | **1** | **1** | $590 |
| 0 | 0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| 0 | 0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| 0 | 0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| **0** | **0** | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| **0** | **0** | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| **0** | **0** | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| **0** | **0** | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| **0** | **0** | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $0 |
| All Other | Remaining Construction Items | N/A | N/A | N/A | N/A | N/A | N/A | N/A | $108 |
| 30 PLANNING, ENGINEERING, AND DESIGN | Planning, Engineering, & Design | **0** | **0** | **1** | **0** | **0** | **1** | **0** | $182 |
| 31 CONSTRUCTION MANAGEMENT | Construction Management | **0** | **1** | **2** | **0** | **0** | **1** | **0** | $110 |
| | | | | | | | | | **$2,535** |
| **Risk** | | $ - | $ 131 | $ 172 | $ - | $ - | $ 39 | $ 39 | **$381** |
| **Fixed Dollar Risk Allocation** | | $ - | $ - | $ - | $ - | $ - | $ - | $ - | **$0** |
| | Risk | $ - | $ 131 | $ 172 | $ - | $ - | $ 39 | $ 39 | **$381** |
| | | | | | | | | **Total** | **$2,917** |

**Blue Hill Harbor Section 107 Navigation Improvement Study**

Feasibility (Recommended Plan)
Abbreviated Risk Analysis
**Meeting Date:** 7-Feb-19

**Risk Level**

| | Negligible | Marginal | Moderate | Significant | Critical |
|---|---|---|---|---|---|
| Very Likely | 2 | 3 | 4 | 5 | 5 |
| Likely | 1 | 2 | 3 | 4 | 5 |
| Possible | 0 | 1 | 2 | 3 | 4 |
| Unlikely | 0 | 0 | 1 | 2 | 3 |

# Risk Register

| Risk Element | Feature of Work | Concerns | PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact) | Impact | Likelihood | Risk Level |
|---|---|---|---|---|---|---|
| **Project Management & Scope Growth** | | | | **Maximum Project Growth** | | **40%** |
| PS-1 | Mobilization & Demobilization | n/a | | Negligible | Unlikely | 0 |
| PS-2 | Dredge Channel & Dispose in EPDS | There is a concern that the customer, Town of Blue Hill, may request a design change to the size of the turning basin. | To date, there have been no requests to alter the existing design or to add new design components. As such, the PDT is confident that there is negligible risk associated with this concern. | Negligible | Unlikely | 0 |
| PS-3 | Dredge Contam Matl & Place in CAD Cell | There is a concern that the customer, Town of Blue Hill, may request a design change to the size of the turning basin. | To date, there have been no requests to alter the existing design or to add new design components. As such, the PDT is confident that there is negligible risk associated with this concern. | Negligible | Unlikely | 0 |
| PS-13 | Planning, Engineering, & Design | There is a concern that the customer, Town of Blue Hill, may request a design change to the size of the turning basin. | To date, there have been no requests to alter the existing design or to add new design components. As such, the PDT is confident that there is negligible risk associated with this concern. | Negligible | Unlikely | 0 |
| PS-14 | Construction Management | n/a | | Negligible | Unlikely | 0 |
| **Acquisition Strategy** | | | | **Maximum Project Growth** | | **30%** |
| AS-1 | Mobilization & Demobilization | It's possible that this project will be awarded using the 8(a) or small business set aside. Setting the project aside will limit the number of contractors available to dredge (dredging is already a fairly limited market on the East Coast; dredging in Maine is an even smaller pool of contractors. A small contractor may have difficulty securing the proper equipment necessary to complete the job, thereby impeding their ability to mobilize to the site. | Professional experience indicates that, even if we were to set this project aside, USACE would likely include a DRC in the contract which requires the KTR to demonstrate they have the correct equipment and have performed similar work in the past. This DRC has been successful in the past for weeding out unqualified KTRs. | Moderate | Unlikely | 1 |
| AS-2 | Dredge Channel & Dispose in EPDS | It's possible that this project will be awarded using the 8(a) or small business set aside. Setting the project aside will limit the number of contractors available to dredge (dredging is already a fairly limited market on the East Coast; dredging in Maine is an even smaller pool of contractors. A small contractor may have difficulty securing the proper equipment necessary to complete the dredging of non-contaminated material and disposing in the Eastern Passage Disposal Site. | Professional experience indicates that, even if we were to set this project aside, USACE would likely include a DRC in the contract which requires the KTR to demonstrate they have the correct equipment and have performed similar work in the past. This DRC has been successful in the past for weeding out unqualified KTRs. | Marginal | Unlikely | 0 |
| AS-3 | Dredge Contam Matl & Place in CAD Cell | It's possible that this project will be awarded using the 8(a) or small business set aside. Setting the project aside will limit the number of contractors available to dredge (dredging is already a fairly limited market on the East Coast; dredging in Maine is an even smaller pool of contractors. A small contractor may not have experience constructing CAD cells. | CAD construction is a fairly straight-forward task (essentially, it's just a large hole in the ground). As such, the PDT is not concerned with a lack of experience on the part of the winning KTR. Professional experience indicates that if the KTR can dredge a channel, they can build a CAD cell. | Marginal | Unlikely | 0 |
| AS-13 | Planning, Engineering, & Design | n/a | | Negligible | Unlikely | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| AS-14 | Construction Management | It's possible that this project will be awarded using the 8(a) or small business set aside. Setting the project aside will limit the number of contractors available to dredge (dredging is already a fairly limited market on the East Coast; dredging in Maine is an even smaller pool of contractors. A small contractor may not be familiar with USACE pre-construction submittal requirements, leading to complications in effective construction management. | Professional/historical experience indicates that many of NAE's dredging projects in Maine have been awarded to competent small businesses. It's a fair assumption that these same businesses would win the contract for this work and thus, NAE would have a KTR onsite who is familiar with USACE processes. | Moderate | Unlikely | 1 |
| **Construction Elements** | | | | **Maximum Project Growth** | | **15%** |
| CE-1 | Mobilization & Demobilization | n/a | | Negligible | Unlikely | 0 |
| CE-2 | Dredge Channel & Dispose in EPDS | The KTR may encounter ledge/bedrock during dredging operations. Such an encounter would either require the KTR to conduct underwater blasting operations (along with rock removal) or USACE to alter the layout of the channel/anchorage. Both alternatives would represent a delay to the contract and a significant construction contract modification for differing site conditions. | The PDT performed a thorough set of geotechnical investigations in the areas where the channel is to be built, which indicate that the material is primarily sand. In the unlikely case that ledge is encountered, it's possible that the channel or anchorage could be relocated to circumvent blasting. | Significant | Unlikely | 2 |
| CE-3 | Dredge Contam Matl & Place in CAD Cell | The KTR may encounter ledge/bedrock during dredging operations. Such an encounter would either require the KTR to conduct underwater blasting operations (along with rock removal) or USACE to alter the layout of the channel/anchorage. Both alternatives would represent a delay to the contract and a significant construction contract modification for differing site conditions. | The PDT performed a thorough set of geotechnical investigations in the area where the CAD cell is to be built, which indicate the material is primarily sand. If ledge was encountered, the CAD cell could easily be resized to accommodate the required dredge volume. | Moderate | Unlikely | 1 |
| CE-13 | Planning, Engineering, & Design | The KTR may encounter ledge/bedrock during dredging operations. Such an encounter would either require the KTR to conduct underwater blasting operations (along with rock removal) or USACE to alter the layout of the channel/anchorage. Both alternatives would represent a delay to the contract and a significant construction contract modification for differing site conditions. | The PDT performed a thorough geotechnical investigation in the project areas, which indicate that the material is primarily sand. In the unlikely case that ledge is encountered, the design team is confident that a change could be completed quickly, such as CAD resizing or channel/anchorage relocation. | Moderate | Unlikely | 1 |
| CE-14 | Construction Management | The KTR may encounter ledge/bedrock during dredging operations. Such an encounter would either require the KTR to conduct underwater blasting operations (along with rock removal) or USACE to alter the layout of the channel/anchorage. Both alternatives would represent a delay to the contract and a significant construction contract modification for differing site conditions. | The PDT performed a thorough geotechnical investigation in the project areas, which indicate that the material is primarily sand. If ledge was encountered, a construction contract mod would need to be processed; however, the team is confident that the geotech investigation has reduced this risk sufficiently. | Significant | Unlikely | 2 |
| **Specialty Construction or Fabrication** | | | | **Maximum Project Growth** | | **50%** |
| SC-1 | Mobilization & Demobilization | n/a | | Negligible | Unlikely | 0 |
| SC-2 | Dredge Channel & Dispose in EPDS | The PDT does not have concerns regarding any "special" aspects of this feature of work. | Dredging is a rather straight-forward task and NAE has had great historical success designing, awarding, and managing these types of contracts. | Negligible | Unlikely | 0 |
| SC-3 | Dredge Contam Matl & Place in CAD Cell | The KTR may not have an environment bucket on hand with which to dredge contaminated materials in the top 2-ft of the project. | The PDT intends to the use a DRC to screen out unqualified bidders. As part of the DRC, bidders will be required to submit an equipment list to demonstrate their qualifications. | Negligible | Unlikely | 0 |
| SC-13 | Planning, Engineering, & Design | The PDT does not have concerns regarding any "special" aspects of this feature of work. | Dredging is a rather straight-forward task and NAE has had great historical success designing, awarding, and managing these types of contracts. | Negligible | Unlikely | 0 |
| SC-14 | Construction Management | The PDT does not have concerns regarding any "special" aspects of this feature of work. | Dredging is a rather straight-forward task and NAE has had great historical success designing, awarding, and managing these types of contracts. | Negligible | Unlikely | 0 |
| **Technical Design & Quantities** | | | | **Maximum Project Growth** | | **20%** |
| T-1 | Mobilization & Demobilization | n/a | | Negligible | Unlikely | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| T-2 | Dredge Channel & Dispose in EPDS | The design is based on a 2012 dredge survey and there is a concern that a significant amount of deposition from the tributary rivers will increase the quantity of material to be dredged between the feasibility study and contract award. | USACE has already completed multiple surveys within the harbor, which demonstrate that the rate of deposition is very low to negligible. As such, the PDT has confidence that the quantities developed during this study will be representative of field conditions at time of award. | Marginal | Unlikely | 0 |
| T-3 | Dredge Contam Matl & Place in CAD Cell | The design is based on a 2012 dredge survey and there is a concern that a significant amount of deposition from the tributary rivers will increase the quantity of material to be dredged between the feasibility study and contract award. | USACE has already completed multiple surveys within the harbor, which demonstrate that the rate of deposition is very low to negligible. As such, the PDT has confidence that the quantities developed during this study will be representative of field conditions at time of award. Even if this were not the case, the USACE has authorization to dig a deeper CAD, if needed, to accomodate additional contaminated material. | Negligible | Unlikely | 0 |
| T-13 | Planning, Engineering, & Design | The design is based on a 2012 dredge survey and there is a concern that a significant amount of deposition from the tributary rivers will increase the quantity of material to be dredged between the feasibility study and contract award. | USACE has already completed multiple surveys within the harbor, which demonstrate that the rate of deposition is very low to negligible. As such, the PDT has confidence that the quantities developed during this study will be representative of field conditions at time of award. Even if this were not the case, the impact to the Design of the contract would be negligible. | Negligible | Unlikely | 0 |
| T-14 | Construction Management | n/a | | Negligible | Unlikely | 0 |
| **Cost Estimate Assumptions** | | | | **Maximum Project Growth** | | **25%** |
| EST-1 | Mobilization & Demobilization | The Mobilization & Demobilization distances used in the CEDEP file may not be sufficient to capture the winning contractor's costs for this feature of work. | The PDT is confident, based on similar dredging jobs in Maine, that a Maine-based contractor will win the work. The estimate has assumed a New York-based contractor, so it's unlikely that these costs are insufficient. | Marginal | Unlikely | 0 |
| EST-2 | Dredge Channel & Dispose in EPDS | The cost estimate might not carry an adequate set of assumptions in the CEDEP file to capture the project's constraints. | The assumptions contained within the CEDEP files have been reviewed by the PDT members; no significant disagreements or concern were raised by the PDT at that time. Further reviews to be conducted in-house will be completed by both the local district and the CX, reducing the risk that a major oversight on the part of the estimator won't be found prior to PED phase. | Moderate | Unlikely | 1 |
| EST-3 | Dredge Contam Matl & Place in CAD Cell | The cost estimate might not carry an adequate set of assumptions in the CEDEP file to capture the project's constraints. | The assumptions contained within the CEDEP files have been reviewed by the PDT members; no significant disagreements or concern were raised by the PDT at that time. Further reviews to be conducted in-house will be completed by both the local district and the CX, reducing the risk that a major oversight on the part of the estimator won't be found prior to PED phase. | Moderate | Unlikely | 1 |
| EST-13 | Planning, Engineering, & Design | The PED phase has been estimated at $182,000; there is a concern that this number is too low because it is not based on a detailed fee estimate created by individual team members. | The FS report is to be reviewed in-house by experienced section chiefs, so, while it is possible that the budget is too low, the impacts are mitigated by this layer of review. | Marginal | Possible | 1 |
| EST-14 | Construction Management | The Construction Management feature of work has been estimated at $110,000; there is a concern that this number is too low because it is not based on a detailed fee estimate created by individual team members. | The FS report is to be reviewed in-house by experienced section chiefs, so, while it is possible that the budget is too low, the impacts are mitigated by this layer of review. | Marginal | Possible | 1 |
| **External Project Risks** | | | | **Maximum Project Growth** | | **20%** |
| EX-1 | Mobilization & Demobilization | It's possible that the contractor will encounter significant weather-related delays that will impede his ability to mobilize to the site. The project is in Maine, meaning there is potential for ice dams in the channel which may obstruct contractor access. | The PDT finds there to be a credible risk of cost growth related to harsh winter conditions. However, the team intends to mitigate these risks by requiring bidders to demonstrate their ability to achieve a suitable dredging production rate via the DRC. | Marginal | Possible | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| EX-2 | Dredge Channel & Dispose in EPDS | It's possible that the contractor will encounter significant weather-related delays that will impede his dredging productivity. The project is in Maine, meaning there is potential for ice dams in the channel which may obstruct contractor access. | The PDT finds there to be a credible risk of cost growth related to harsh winter conditions. However, the team intends to mitigate these risks by requiring bidders to demonstrate their ability to achieve a suitable dredging production rate via the DRC. | Marginal | Possible | 1 |
| EX-3 | Dredge Contam Matl & Place in CAD Cell | It's possible that the contractor will encounter significant weather-related delays that will impede his dredging productivity. The project is in Maine, meaning there is potential for ice dams in the channel which may obstruct contractor access. | The PDT finds there to be a credible risk of cost growth related to harsh winter conditions. However, the team intends to mitigate these risks by requiring bidders to demonstrate their ability to achieve a suitable dredging production rate via the DRC. | Marginal | Possible | 1 |
| EX-13 | Planning, Engineering, & Design | n/a | | Negligible | Unlikely | 0 |
| EX-14 | Construction Management | n/a | | Negligible | Unlikely | 0 |

# APPENDIX E

REAL ESTATE

# REAL ESTATE PLAN

(Appendix E)

**BLUE HILL HARBOR**
**BLUE HILL IN HANCOCK COUNTY, MAINE**
**NAVIGATION IMPROVEMENT PROJECT—SECTION 107**
**OF THE RIVER AND HARBOR ACT OF 1960 (PL 86-645)**

**PREPARED FOR:**

**U.S. ARMY CORPS OF ENGINEERS**
**REAL ESTATE DIVISION**
**NEW ENGLAND DISTRICT**
**696 VIRGINIA ROAD**
**CONCORD, MASSACHUSETTS 01742-2751**

**PREPARED BY:**

**U.S. ARMY CORPS OF ENGINEERS**
**New England District**

**EFFECTIVE DATE:**

**November 15, 2018**

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## 1. PROJECT PURPOSE:

The purpose of the Blue Hill Harbor Project is to alleviate navigation delays and congestion issues, this investigation considers dredging a waterfront turning basin and Federal Channel from the town's public landing 1.6 miles southeast into deep water past Sculpin Point. Improvements to the channel would allow for safe passage of both commercial and recreational craft. The Harbormaster, fishermen and vessel owners, reported the danger of groundings and potential vessel damages due to shallow conditions within the inner and middle Blue Hill Harbor, the project is designed to correct the issues. In addition, the Real Estate Plan is to support the Section 107 Navigation Improvement Study Project Management Plan, Blue Hill Bay, Blue Hill, ME.

**Figure 1: Location Map Blue Hill, ME & indicating Bay Area.**

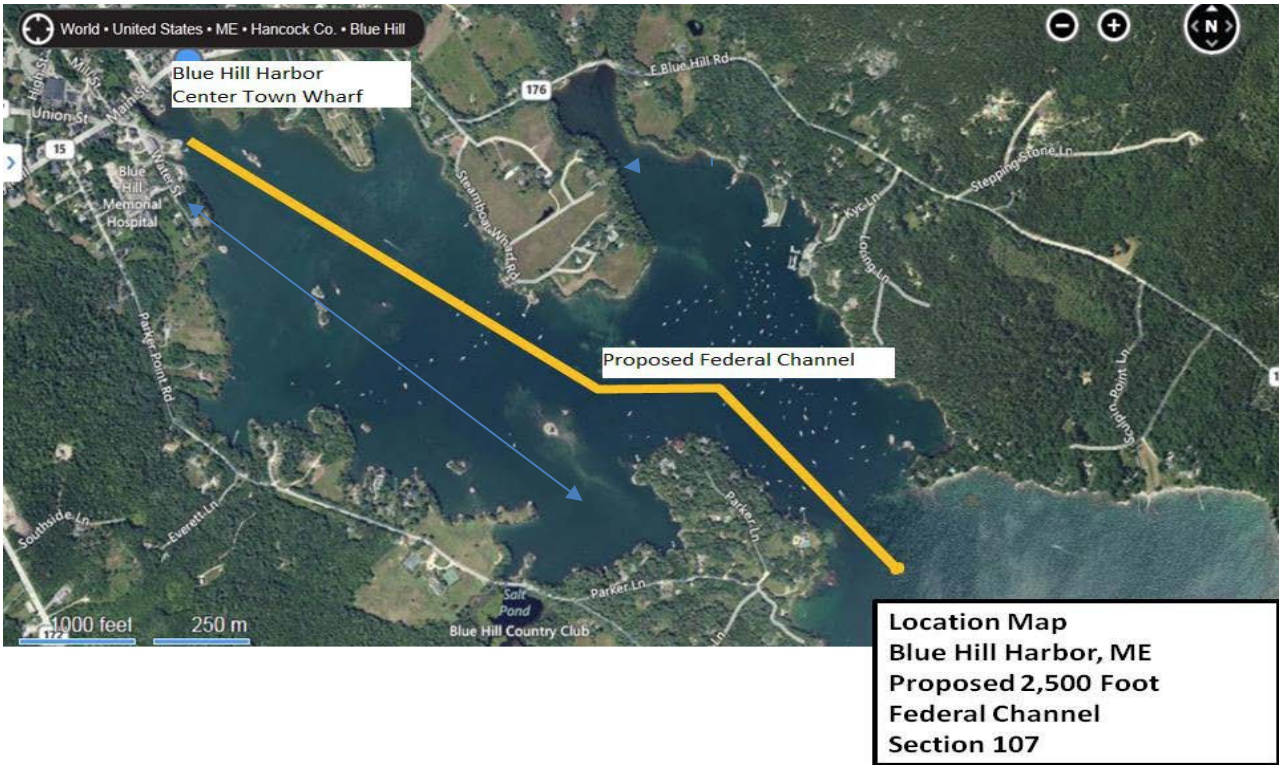

## 2. PROJECT AREA DESCRIPTION:

This study will investigate the feasibility of Federal participation in providing improvements to navigation at Blue Hill Harbor, in partnership with the town of Blue Hill. Blue Hill Harbor, is comprised of several small coves hosting a mix of inshore commercial fishing and lobster boats and seasonal recreational craft. Much of the commercial fleet works year around and shifts operations seasonally, due to available mooring space, active offloading and servicing facilities and icing of portions of the harbor, as shown in Figure 1.

Blue Hill Harbor is the principal commercial fishing harbor of the Town of Blue Hill, located on the western shore of Blue Hill Bay in Hancock County, Maine. The harbor is located about 30 miles southeast of Bangor and 13 miles southwest of Ellsworth, Maine, see Figure 1.

**Figure 2: Project Overview.**

The study was requested by the town of Blue Hill, the non-Federal Sponsor. The construction method will be mechanical bucket dredge with off-shore placement of the dredged material 13 miles southeast of Blue Hill Harbor. Shore facilities needed would be limited to survey vessel and work boat landing access and parking. This is mostly an off shore project (barge/excavation/disposal dredge operation) with minimal real estate requirements, involving parking on town wharf property.



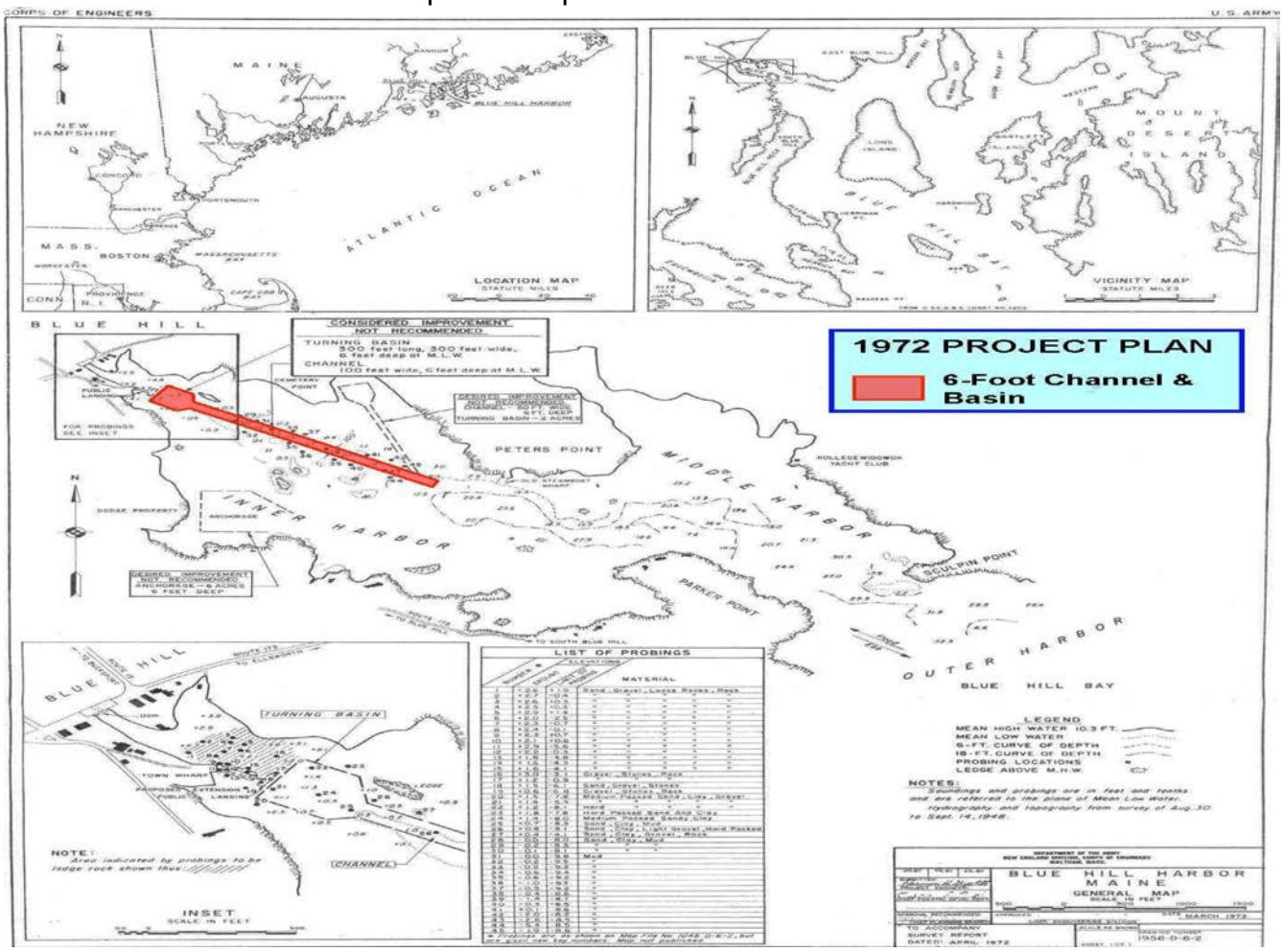

## 3. RECOMMENDED PLAN:

The proposed navigation improvement would dredge a 2,500 foot long Federal Channel and a 38,000 sf turning basin near the Town Landing. Both the turning basin and the new channel would be dredged to depth of -6 feet at MLLW. Quantity estimates include a 1-foot over depth allowance, please refer to Figure 2.
The dredged material would be loaded in scows and towed to the Eastern Passage disposal site—placed in the Bay and capped, approximately 13 miles to the southeast of Blue Hill Harbor.

Blue Hill Harbor sediments have been subjected to extensive physical and chemical testing over many years. No significant adverse environmental impacts are expected from the proposed dredging and disposal.

## 4. REAL ESTATE MAPPING:

The 1972 Proposed Map of Construction Area




## 5. RECOMMENDED ESTATES:

The project footprint and associated LEERDs—Land, Easements, Rights-Of-Way, Relocation, and Disposal Areas are still being identified/refined. It is anticipated that temporary work area easements for access, staging and storage areas may be required, mainly for parking purposes on Town property. Accordingly, the non-Federal sponsor has agreed to a temporary work area easement, (USACE Standard Estate No. 15). The Project does not require the use of any non-standard estates.

TEMPORARY WORK AREA EASEMENT (Standard Estate No. 15)

*A temporary easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts Nos. _____ , _____ and _____ ), for a period not to exceed_____, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a work area, including the right to move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the*

_____ *Project, together with the right to trim, cut, fell and remove there from all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.*

## 6. EXISTING FEDERAL PROJECTS:

No Federal Projects noted.

## 7. EXISTING FEDERALLY OWNED LANDS:

There are no existing federal lands included within the required LEERDs for this project.

## 8. LANDS OWNED BY THE NON-FEDERAL SPONSOR:

All lands within the proposed project footprint are owned and/or controlled by the non-Federal sponsor.

## 9. NAVIGATION SERVITUDE:

Navigation Servitude applies to this project, due to the project's nexus to a navigation purpose. It's anticipated that all construction areas would be subject to Navigation Servitude.

## 10. INDUCED FLOODING:

There is nothing to indicate that the proposed project features will induce flooding in new areas or increase flooding in existing flood prone areas.

The non-Federal sponsor's LEERDs (including incidental administrative expenses) associated with the parcels/tracts of land that support the facilities regarding this project is presented in the Project Task Budget for this phase. The Real Estate associated with the Project will include parking and access over town property.

| ***PROJECT TASK BUDGETS:*** | ***Total*** |
|---|---|
| Evaluation Branch Efforts: | |
| Real Estate Branch Efforts: | |
| ▪ Staging/Laydown/Access (Town Property) | $ 3,000 |
| ▪ Real Estate Branch: | |
| Real Estate Study Cost = | $ 5,000 |
| Total Study Costs-Federal and Sponsor | $ 8,000 |

## 12. PUBLIC LAW 91-646 RELOCATIONS

The displacement of residences and/or businesses is not anticipated at this time.

## 13. MINERAL ACTIVITY:

There is no present or anticipated mining and drilling activity in the vicinity of the project that may affect project purposes and the operation thereof.

## 14. TIMBER RIGHTS:

No timber harvesting activities are anticipated to occur within the proposed project footprint.

## 15. ASSESSMENT OF NON-FEDERAL SPONSOR ACQUISITION CAPABILITY:

The Non-Federal Project Partner Capability Assessment Checklist is provided in the Addendum. It has been provided to and coordinated with the non-Federal sponsor.

## 16. ZONING:

There are no zoning ordinances currently proposed in lieu of or to facilitate any LEERDs in connection with this project.

## 17. ACQUISITION SCHEDULE:

A projected schedule has been developed based on the assumption that Federal and non-Federal funds will be available. The tentative schedule for project completion is represented as follows:

**ESTIMATED DATES**
**(Milestones)**

| | |
|---|---|
| Initial Meeting Project Start-up | Fall 2012 |
| Signed Federal Cost Share Agreement (FCSA) | Spring 2015 |
| Real Estate Process REP/LEERD | Not Required |
| Initiate Design Plans & Specifications | Spring 2020 |
| Prepare PMP | Spring 2020 |
| Completion of Detailed Plans and Specifications | Winter 2021 |
| Obtain State & Local Permits & Easements | Winter 2019-2020 |
| Bid and Award | Summer 2021 |
| Initiate Construction | Fall 2021 |
| Completion of Construction | Spring 2022 |

## 18. UTILITY AND FACILITY RELOCATIONS:

There are no utility or facility relocations anticipated or currently required within the proposed project footprint.

## 19. HAZARDOUS, TOXIC AND RADIOACTIVE WASTE:

No significant adverse environmental impacts are expected from the proposed dredging and disposal. Blue Hill Harbor sediments have been subjected to extensive physical and chemical testing over many years.

The sponsor fully understands its responsibilities for assessing the properties for any potential or presence of hazardous waste materials as defined and regulated under CERCLA—Comprehensive Environmental Response, Compensation, and Liability Act -- otherwise known as CERCLA or Superfund. There is no known “Superfund” sites or sites presently under CERCLA remediation or response orders identified in the project area. There are no known presences of any substances in the project area that are regulated under CERCLA or other environmental statutes or regulations.

The PPA conditions contain specific terms and conditions governing the sponsor’s responsibility for environmental cleanup for CERCLA regulated substances.

## 13. ATTITUDES OF THE LANDOWNERS:

The non-Federal sponsor reports overall community support for this project. The record does not indicate any known opposition or public concerns, which cannot be overcome.

## 14. NOTIFICATION TO NON-FEDERAL SPONSOR:

The non-Federal sponsor executed the FCSA in June 2015.

## 15. ADDENDUM:

This section includes supplemental information required for the report, which includes the copy of the ASSESSMENT OF NON-FEDERAL SPONSOR’S REAL ESTATE ACQUISITION CAPABILITY. As stated above, the Checklist in the addendum has been provided to and coordinated with the non-Federal sponsor.

Project Name: USACE Section 107 Blue Hill Harbor Improvements

Project Location: Blue Hill Harbor, Maine

Project Sponsor: Town of Blue Hill, Maine

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

The preliminary real estate acquisition information is attached to this document.

Legal Authority: -

Name and title of sponsor's representative providing answers to this section.
Mr. James Shatz, Chair Select Board, Town of Blue Hill

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? Yes, list the basis for the legal authority: Town Charter/Maine State Law
*b.* Does the sponsor have the power of eminent domain for this project? *NIA*
*c.* Does the sponsor have "quick-take" authority for this project? *NIA*
*d.* Are any of the lands/interests in land required for the project located outside the sponsor's political boundary? *NIA*
*e.* Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? *NIA*

II. Human Resource Requirements:

Name and title of sponsor's representative providing answers to this section.
*SIA*

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended? (No)
b. If the answer to II. a. is "yes," has a reasonable plan been developed to provide such training? N/A
c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? (yes)
d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? (yes)
e. Can the sponsor obtain contractor support, if required in a timely fashion? *NIA*
f. Will the sponsor likely request USACE assistance in acquiring real estate? No, however USACE will provide guidance regarding required project documentation.

Project Name: USACE Section 107 Blue Hill Harbor Improvements

Project Location: Blue Hill Harbor, Maine

Project Sponsor: Town of Blue Hill, Maine

III. Other Project Variables:

Name and title of sponsor's representative providing answers to this section.
*SIA*

a. Will the sponsor's staff be located within reasonable proximity to the project site?
(Yes)

b. Has the sponsor approved the project/real estate schedule/milestones? The project is still in feasibility planning stages therefore it is umealistic to accurately estimate project acquisition milestones, at this time. Once the project is approved an acquisition strategy plan will be developed and this document updated, accordingly.

N/A: If the answer is no, please fill in the length of time it will take to complete these milestones after the New England District provides the appropriate real estate maps and estates. Some of milestones will overlap. When this happens the number of months needed to complete the next task should only include the additional months to complete that milestone. For example, you may order the title policies and the survey at the same time. If the survey will be completed in two months and the title policies will take three months you would put "2 months" in the survey milestone and "1 month" in the preliminary title policy milestone.

Survey legal interests and prepare legal descriptions:_____months

Obtain preliminary title policies or other form of title information:_____months.

Appraise all of the property:_____months

Have the appraisals reviewed by New England District ---------- months

Negotiate with the landowners:_____months

Clear up title issues and close on the property or condemn the property ---------- months

Take possession of the property interests: __ __ __ __ __ __ __ months

Sponsor signs the Authorization For Entry For Construction:_____

IV. Overall Assessment:

a. Has the sponsor performed satisfactorily on other USACE projects?
*NIA*

b. With regard to this project, the sponsor is anticipated to be: Highly Capable

Project Name: USACE Section 107 Blue Hill Harbor hnprovements

Project Location: Blue Hill Harbor, Maine

Project Sponsor: Town of Blue Hill, Maine

V. Coordination:

a. Has this assessment been coordinated with the sponsor? (Yes)
b. Does the sponsor concur with this assessment? (Yes)

VI. NOTES:

Prepared by:

JALBERT.DANIEL.E.1473775120

Digitally signed by JALBERT.DANIEL.E.1473775120
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=JALBERT.DANIEL.E.1473775120
Date: 2018.12.19 09:43:39 -05'00'

_____ (date)_____

R. Jeffrey Teller
LEAD Appraiser
New England District

_____(date) 8/21/18

James Shatz
Chairman, S **Sc.tt1rft-**
T elect Board
own Hill Maine

Reviewed by:

_____(date) 19 DEC 18

~~Deborah Hopkinson~~ Jonathan Belmont
Acting Chief, Real Estate Division

# APPENDIX F

SEDIMENT SAMPLING AND TESTING

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# TABLES



# FIGURES



# APPENDICES

## 1.0 INTRODUCTION

Blue Hill Harbor is the principal commercial fishing harbor of the Town of Blue Hill, located on the western shore of Blue Hill Bay in Hancock County, Maine. The harbor is located in the northwest end of Blue Hill Bay west-northwest of Long Island. The inner harbor contains the Town Wharf and docks which are dry at mean low water.

The Town of Blue Hill, as part of its waterfront economic plan, requested that the New England District (NAE) of the U.S. Army Corps of Engineers (USACE) investigate the potential of establishing a federal channel and turning basin to allow full time vessel traffic to the inner harbor. The results of this study determined that a 1 acre turning basin and a 60 to 80 foot wide waterfront channel extending from the central Town Wharf approximately 2,500 feet southeast into deep water would be required to meet the project objectives. Both the turning basin/anchorage and channel would be dredged to a depth of 6 feet at mean lower low water (MLLW) plus 1 foot of allowable over depth. This would produce approximately 62,500 cubic yards of mixed gravel, sand, and silt. It is expected that this material would be mechanically dredged and placed at either the Tupper Ledge Disposal Site (TLDS) or Eastern Passage Disposal Site (EPDS).

The purpose of the sampling effort described in this report was to collect sediment cores from 7 locations within the proposed dredge area in order to evaluate suitable disposal options. The sampling effort was conducted in accordance with the sampling and analysis plan (SAP) (Appendix A) dated October 23, 2015 that was developed by the Environmental Resources Section (ERS) of NAE, and coordinated with Maine Department of Environmental Protection (ME DEP), the National Marine Fisheries Service (NMFS), and the United States Environmental Protection Agency (EPA) Region 1. This report describes the field methods employed, site conditions encountered, and results of physical and chemical analysis.

## 2.0 MATERIALS AND METHODS

Sediment sampling efforts were conducted on October 28, 2015. Work was carried out onboard the R/V Gloria H., a 24 foot pontoon style workboat outfitted with an a-frame and electric winch for sampling through a moon pool located in the center of the vessel. A three point anchor system was used to hold the boat in position while sampling. Positioning was achieved using a WAAS enabled Simrad NSS7 sonar/chart plotter with external LGC-4000 GPS receiver antenna, and verified with a Trimble GeoXM Differential Global Positioning System (DGPS), both with an accuracy of 3 meters or less. Depth measurements were made using the Simrad unit and 50/200 kHz transducer with lead line verification. Tidal corrections to Mean Lower Low Water (MLLW) were made using data for the Blue Hill Harbor tide station, accessed in the field through the tides and currents feature of Navionics Mobile software.

### 2.1 Sample Collections

Sediment cores were collected to project depth (proposed depth plus one foot of overdepth) or refusal from all 7 sample stations (Figure 1) using a Navco pneumatic vibracorer and 2.75" i.d. polycarbonate tubing. Upon collection the cores were secured in an upright position until transport to the onshore staging area for processing. Sampling equipment was cleaned with a brush and alconox solution then rinsed with site water prior to sampling and between each sample station. The core liners were assumed to be clean as-received from the supplier but were rinsed in site water prior to use.

Corrected water depths in the vicinity of the sample locations ranged from +1.3 to -2.6 feet MLLW. No significant deviations from the 2012 project conditions survey were noted. Sediments in the outer portion of the proposed channel (stations A-C) were predominantly gray, poorly graded medium to coarse sands overlying marine clay deposits. Fine woody organic debris was noted in the cores from all stations in this area. Station A, in the outermost portion of the proposed channel, contained a 1 foot thick layer of fine wood chips approximately 1 foot below the water sediment interface. Sediment core penetration decreased significantly in the inner harbor (stations D-G) where marine clay and coarse fluvial deposits were encountered closer to the surface. Surficial deposits in these areas were generally medium to coarse sands overlain by a thin layer of loose fine sand and silt. The area surrounding the town dock was composed of mixed sand, gravel, and silt, generally 6 inches thick, over a cobble and gravel substrate. Sediment collection data is summarized in Table 1. Sampling logs are presented in Appendix B.

**Table 1: Summary of Blue Hill Harbor Sediment Collection Data**

| Station ID | Latitude (NAD 83) | Longitude (NAD 83) | Time (EDT) | Corrected Water Depth (FT MLLW) | Penetration/ Recovery (FT) | # Attempts |
|---|---|---|---|---|---|---|
| A | -68.577540 | 44.409033 | 9:49 | -2.6 | 4.2 | 2 |
| B | -68.579677 | 44.410136 | 10:17 | -0.3 | 3.1 | 3 |
| C | -68.581801 | 44.410997 | 10:45 | -0.4 | 5.9 | 3 |
| D | -68.584183 | 44.411691 | 11:09 | 0.2 | 2.0 | 4 |
| E | -68.585284 | 44.412200 | 11:34 | 1.2 | 3.2 | 5 |
| F | -68.584558 | 44.412338 | 11:50 | 1.3 | 1.8 | 5 |
| G | -68.585163 | 44.412593 | 12:16 | 0.9 | 0.5 | 6 |

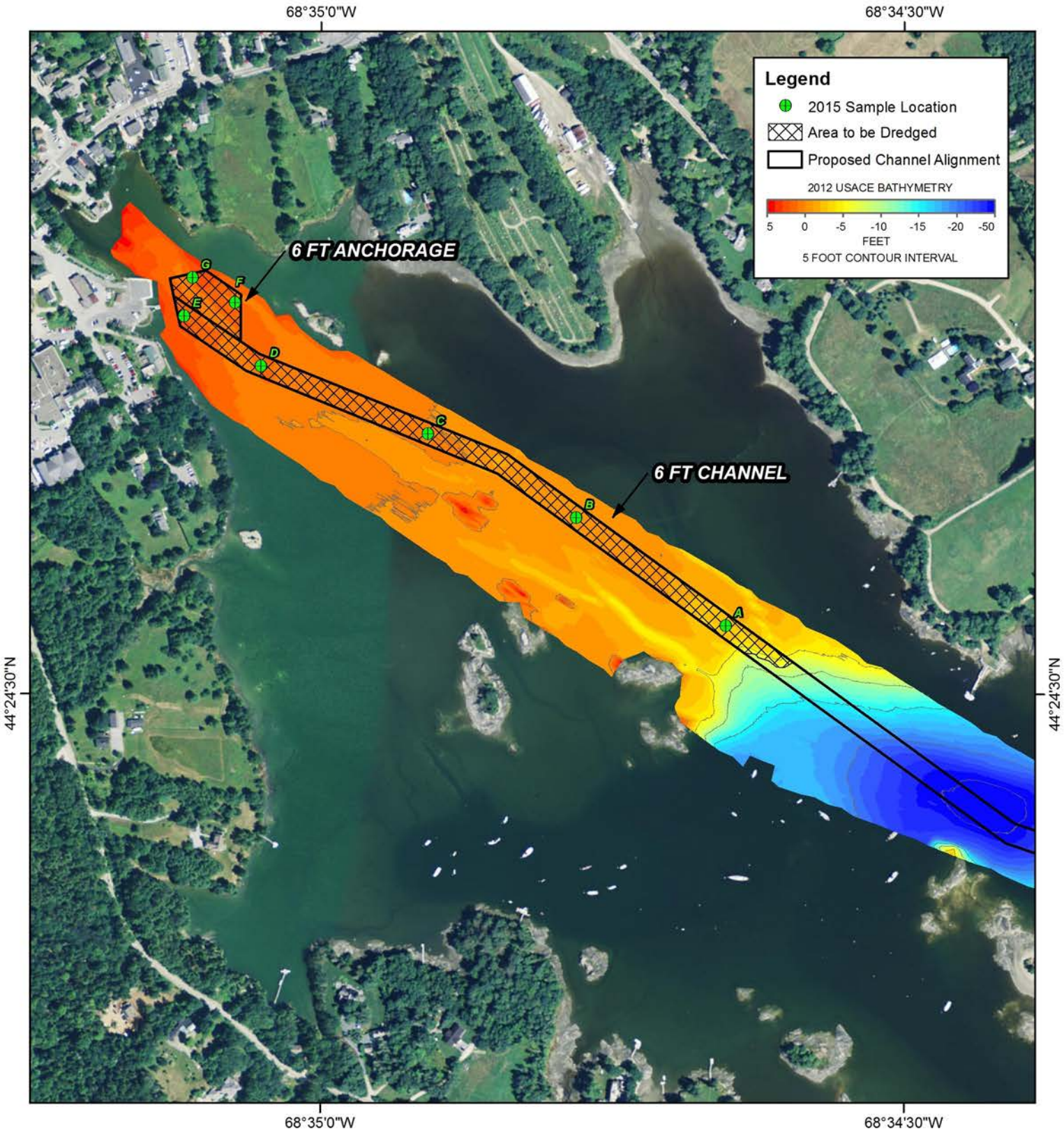


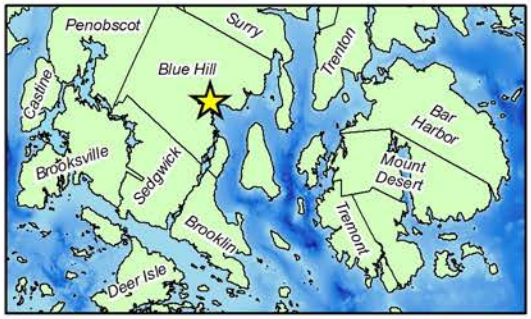

**FIGURE 1:**
**BLUE HILL HARBOR, BLUE HILL, ME**
**2015 SAMPLE LOCATIONS**

US Army Corps of Engineers
New England District

0 250 500 750 1,000 Feet
0 100 200 300 Meters
1:8,000

2013 NAIP AERIAL IMAGERY

GCS NAD 1983



## 2.2 Sample Processing

Sample processing took place at an on-shore staging area located adjacent to the town dock in the innermost portion of the harbor. Sediment cores were transported to the processing area upon completion of the sampling effort. Upon arrival the cores were secured in an upright position and allowed to settle. After settling, the cores were measured, and clear excess water was carefully drained from the top of the core tube by drilling a small hole in the liner above the water/sediment interface. Measured cores were placed horizontally into a PVC trough and secured by hand. Each core liner was cut lengthwise using electric shears in two places, approximately 180° apart, and clean stainless steel wire was then used to slice the length of the core into two halves. Immediately after a core was split and exposed to the atmosphere, it was photographed, described, and transferred into a stainless steel pan for sampling. Sample processing equipment was cleaned with a brush and alconox solution then rinsed with deionized water prior to sampling and between each sample.

Each split core was photographed before undergoing the description process. All core photos included a stadia rod for scale and for referencing the depth below surface. A photograph of the complete core was taken, as well as close-ups of discrete layering down core, and sediment strata horizons/transitions of interest.

Cores were examined from the top of the core, downward to the bottom, using a stadia rod to define sediment layer thicknesses and depth below the surface (top of core at sediment–water interface). Each core was classified in accordance with ASTM D 2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), and notes on relative grain sizes, color, odor, strata, and other pertinent observations were recorded in the environmental sampling logs (Appendix B).

After being described, the material from each core was transferred into a stainless steel pan and homogenized using stainless steel spatulas and spoons. Representative portions from all 7 core samples were placed in clean zip-loc bags to be analyzed for grain size, total solids, and percent moisture. The remaining material from samples that were determined to be visually and texturally similar during the classification process were composited according to the preliminary compositing plan (Table 2) developed by ERS. Material from samples to be composited was combined in a stainless steel pan and re-homogenized using clean stainless steel spatulas and spoons. Representative portions from each composite were placed into appropriate sample containers to be analyzed for the parameters listed in Table 3.

One equipment blank was collected as part of this sampling effort. The blank was collected by pouring several liters of deionized water through a length of clean core tube and into a sample processing pan containing a spoon and spatula used for sample homogenization and transfer. This water was then decanted into the appropriate sample jars.

All samples were maintained in coolers on ice for the duration of sampling activities and delivered to Alpha Analytical Laboratory in Mansfield, MA upon conclusion of the field sampling effort. The Chain of Custody forms are presented in Appendix C.

**Table 2: Sample Compositing Plan for Chemical Analysis**

| Station ID | Composite Group |
|---|---|
| A | 1 |
| B | 2 |
| C | 2 |
| D | 3 |
| E | 3 |
| F | 4 |
| G | 4 |

## 3.0 PHYSICAL AND CHEMICAL TESTING

This section summarizes the analytical methods used for physical and chemical testing of the samples collected from the proposed Blue Hill Harbor navigation improvement project in Blue Hill, ME. All testing was performed by Alpha Analytical Laboratory in Mansfield, MA. Physical testing included grain size analysis, total solids, and percent moisture measurements. Chemical analysis included total organic carbon (TOC), metals analyses, polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), and pesticides. A complete list of parameters and target detection limits is provided in Table 3. A routine set of quality control (QC) samples was prepared with each set of samples, by parameter and media, to monitor data quality in terms of accuracy and precision. The frequency and type of QC samples and QC acceptance criteria is discussed in the laboratory report (Appendix C).

**Table 3: Analytical Methods and Reporting Limits**

| Parameter | Method Reference | Method Number | Project Required RL | RL Units |
|---|---|---|---|---|
| **Physical Tests** | | | | |
| Total Solids/Water Content | ASTM | D-2216 | 1.0 | % |
| Grain Size (#4, 10, 40, 200) | ASTM | D-422 | N/A | % |
| **Total Organic Carbon (TOC)** | | | | |
| Total Organic Carbon | SW-846 | 9060 | 0.1 | % |
| **Metals** | | | | |
| Arsenic | SW 846 | 6020A | 0.4 | ppm |
| Cadmium | SW 846 | 6020A | 0.07 | ppm |
| Chromium | SW 846 | 6020A | 0.5 | ppm |
| Copper | SW 846 | 6020A | 0.5 | ppm |
| Lead | SW 846 | 6020A | 0.5 | ppm |
| Mercury | SW 846 | 7474 | 0.02 | ppm |
| Nickel | SW 846 | 6020A | 0.5 | ppm |
| Zinc | SW 846 | 6020A | 1.0 | ppm |
| **Polychlorinated Biphenyls (PCBs)** | | | | |
| Congeners 8, 18, 28, 44, 49, 52, 66, 87, 101, 105, 118, 128, 138, 153, 170, 180, 183, 184, 187, 195, 206, 209 | SW-846 | 8082 | 0.001 | ppm |
| **Semivolatiles** | | | | |
| Poly-Aromatic Hydrocarbons | SW-846 | 8270C-SIM | 0.01 | ppm |
| **Organochlorine Pesticides** | | | | |
| Pesticides | SW-846 | 8081B | 0.001 | ppm |

## 3.1 Quality Assurance/Quality Control Procedures

All field and analytical activities used in the collection and analysis of sediments for physical and chemical testing followed approved SOPs, referenced approved agency methods, or are detailed in the project SAP (Appendix A).

### 3.1.1 Measurement Quality Objectives

Project specific Measurement Quality Objectives (MQOs), against which all data from this project were evaluated, are presented in Table 4. Physical and chemical data were evaluated against the MQOs and the laboratory based reporting limits. Organic compounds and metals analyzed for but not detected above the laboratory Practical Quantitation Limit (PQL) were recorded as the Reporting Limit (RL) and flagged with the qualifier "U".

**Table 4: Measurement Quality Objectives**

| QC Parameter | Measure of Acceptance Criteria[a] | Corrective Action |
|---|---|---|
| Sediment and Water Chemistry | *Blank*: <5xMDL (or<5xMDL for metals) | Reextract, reanalyze, and/or document and justify corrective actions |
| Accuracy: Lab Control Sample (LCS) | *Organics:* 30-130% Recovery<br>*Metals:*80-120% Recovery | As above |
| Accuracy: Matrix Spike/Matrix spike Duplicate | *Organics:* 50-120% Recovery<br><br>*Metals:* 75 to 125% Recovery | As above |
| Accuracy: Standard Reference Material (SRM) | Must be within limits provided by the vendor (i.e. for organics, 40-140% recovery from certified concentrations for SRM 1944) | Evaluate LCS, MS/MSD & surrogates in sample, reanalyze if necessary, qualify data and issue narrative |
| Accuracy: Surrogate Internal Standard (SIS) | *Organics:* 30-150% Recovery | Reextract, reanalyze, and/or document and justify corrective actions |
| Precision | *Replicates:* MS/MSD: ≤30% RPD[b] between % recoveries<br>*Sample Duplicate*: ≤30% RPD[c] between values<br>*TOC*: RPD ≤25%<br>Grain Size: RPD <25% | As Above |

MDL = method detection limit: RPD = relative percent difference
[a] Quality control samples are based on analytical batch size of 20
[b] Analyte concentration in MS must be >5x background concentration to be used for data quality assessment

### 3.1.2 Chain of Custody

Sample custody forms accompanied all samples from the field to the laboratory. Copies of sample chain of custody forms are provided in the laboratory report (Appendix C).

### 3.1.3 Data Audits/ QA Review

All data received internal verification and validation following established procedures at the laboratory where the data were generated. QA/QC narratives are provided in the laboratory report (Appendix C). These narratives include a discussion of the chemistry QC results, a description of MQO exceedances, and the impact, if any, the exceedances may have on the overall field sample data.

### 3.1.4 Protocol Deviations

There were no deviations from the established laboratory testing protocols.

## 4.0 RESULTS AND DISCUSSION

This section summarizes results obtained from physical and chemical testing of sediments and a rinsate blank sample collected from the proposed Blue Hill Harbor navigation improvement project in Blue Hill, ME in October of 2015. Sediment samples from 7 individual stations were analyzed for grain size, total solids, and percent moisture. Based on the results of this physical analysis, the 4 composite groups described in section 2.2 as well as the rinsate blank were analyzed for metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides. A summary of the results of physical and chemical analysis are presented in Tables 5 through 10. Complete testing results for are provided in the laboratory report (Appendix C).

**Table 5: Summary of Grain Size and Moisture Content Results**

| Sample ID | % Cobble | % Gravel | % Coarse Sand | % Medium Sand | % Fine Sand | % Total Fines | % Moisture |
|---|---|---|---|---|---|---|---|
| **A** | 0.1 (U) | 0.1 | 2.2 | 6.6 | 21.6 | 69.5 | 55.3 |
| **B** | 0.1 (U) | 0.1 (U) | 1.7 | 3.5 | 7.4 | 87.4 | 51.2 |
| **C** | 0.1 (U) | 1.1 | 1.9 | 4.9 | 12.1 | 80 | 54.5 |
| **D** | 0.1 (U) | 4.4 | 13.2 | 34.8 | 35 | 12.6 | 19.6 |
| **E** | 0.1 (U) | 1.8 | 8.8 | 26.7 | 37.9 | 24.8 | 33.2 |
| **F** | 0.1 (U) | 5 | 14 | 30.6 | 29.8 | 20.6 | 26.8 |
| **G** | 0.1 (U) | 45.9 | 12.4 | 16.7 | 16.2 | 8.8 | 21.4 |

U = Non-detected analytes are reported as the RL and qualified with a "U".

**Table 6: Summary of TOC and Total Solids Results**

| Sample ID | % TOC Average Value | % Total Solids |
|---|---|---|
| **A** | 8.32 | 44.7 |
| **COMP BC** | 3.735 | 48 |
| **COMP DE** | 1.76 | 73.3 |
| **COMP FG** | 0.883 | 71.7 |

## Table 7: Summary of Total Metals Results

| Parameter | A | COMP BC | COMP DE | COMP FG |
|---|---|---|---|---|
| Arsenic, Total | 4.51 | 7.69 | 5.24 | 6.32 |
| Cadmium, Total | 0.644 | 0.833 | 0.12 | 0.161 |
| Chromium, Total | 21.1 | 30.9 | 12.3 | 10.8 |
| Copper, Total | 17.6 | 16.5 | 14.3 | 6.9 |
| Lead, Total | 21.7 | 21.8 | 23 | 10.5 |
| Mercury, Total | 0.033 | 0.029 | 0.017 | 0.015 (U) |
| Nickel, Total | 15.6 | 23.6 | 10.3 | 9.4 |
| Zinc, Total | 54.2 | 64.1 | 40.6 | 37.9 |

U = Non-detected analytes are reported as the RL and qualified with a "U".
All concentrations are presented as mg/kg
Results are reported as dry weight

## Table 8: Summary of PAH Results

| Parameter | A | COMP BC | COMP DE | COMP FG |
|---|---|---|---|---|
| Acenaphthene | 10.4 (U) | 9.99 (U) | 7.9 | 83.4 |
| Acenaphthylene | 26.8 | 16.1 | 108 | 448 |
| Anthracene | 17 | 10.6 | 78.3 | 1250 |
| Benz(a)anthracene | 102 | 68.9 | 532 | 2760 |
| Benzo(a)pyrene | 119 | 84 | 526 | 2090 |
| Benzo(b)fluoranthene | 116 | 88.5 | 537 | 2340 |
| Benzo(ghi)perylene | 86.5 | 61.8 | 345 | 1170 |
| Benzo(k)fluoranthene | 127 | 80.6 | 402 | 1850 |
| Chrysene | 136 | 101 | 604 | 2880 |
| Dibenz(a,h)anthracene | 22.5 | 14.5 | 87.7 | 529 |
| Fluoranthene | 257 | 191 | 1010 | 7090 |
| Fluorene | 10.4 (U) | 9.99 (U) | 27 | 789 |
| Indeno(1,2,3-cd)Pyrene | 95.2 | 66.8 | 363 | 1380 |
| Naphthalene | 10.4 (U) | 9.99 (U) | 17.6 | 37.9 |
| Phenanthrene | 121 | 96.7 | 407 | 4780 |
| Pyrene | 242 | 170 | 943 | 4740 |

U = Non-detected analytes are reported as the RL and qualified with a "U".
All concentrations are presented as µg/kg
Results are reported as dry weight

## Table 9: Summary of PCB Results

| Parameter | A | COMP BC | COMP DE | COMP FG |
|---|---|---|---|---|
| Cl2-BZ#8* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl3-BZ#18* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl3-BZ#28* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl4-BZ#44* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl4-BZ#49 | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl4-BZ#52* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl4-BZ#66* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl5-BZ#87 | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl5-BZ#101* | 1.04 (U) | 0.999 (U) | 0.757 | 0.658 (U) |
| Cl5-BZ#105* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl5-BZ#118* | 1.04 (U) | 0.999 (U) | 0.809 | 0.658 (U) |
| Cl6-BZ#128* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl6-BZ#138* | 1.04 (U) | 0.999 (U) | 1.06 | 0.658 (U) |
| Cl6-BZ#153* | 1.04 (U) | 0.999 (U) | 0.679 | 0.658 (U) |
| Cl7-BZ#170* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl7-BZ#180* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl7-BZ#183 | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl7-BZ#184 | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl7-BZ#187* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl8-BZ#195* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl9-BZ#206* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Cl10-BZ#209* | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Total PCBs[1] | 17.68 (U) | 11.322 (U) | 14.442 | 11.645 (U) |

U = Non-detected analytes are reported as the RL and qualified with a "U".
All concentrations are presented as µg/kg
Results are reported as dry weight
[1] Total PCBs calculated by summing the 18 PCB congeners marked with a "*" (using ½ the RL for non-detects) and multiplying the total by 2

## Table 10: Summary of Pesticides Results

| Parameter | A | COMP BC | COMP DE | COMP FG |
|---|---|---|---|---|
| 4,4'-DDD | 0.523 (U) | 0.499 (U) | 0.814 | 0.329 (U) |
| 4,4'-DDE | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| 4,4'-DDT | 0.523 (U) | 0.499 (U) | 0.592 (IP) | 0.329 (U) |
| Aldrin | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| cis-Chlordane | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| cis-Nonachlor | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| Dieldrin | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| Endosulfan I | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| Endosulfan II | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| Endrin | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| gamma-BHC | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| Heptachlor | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| Heptachlor epoxide | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Hexachlorobenzene | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Methoxychlor | 5.23 (U) | 4.99 (U) | 3.64 (P) | 3.29 (U) |
| Oxychlordane | 1.04 (U) | 0.999 (U) | 0.675 (U) | 0.658 (U) |
| Toxaphene | 26.2 (U) | 25.1 (U) | 17 (U) | 16.5 (U) |
| trans-Chlordane | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |
| trans-Nonachlor | 0.523 (U) | 0.499 (U) | 0.338 (U) | 0.329 (U) |

U = Non-detected analytes are reported as the RL and qualified with a “U”.
P - The RPD between the results for the two columns exceeds the method-specified criteria.
I P = The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported due to obvious interference
All concentrations are presented as µg/kg
Results are reported as dry weight

## 4.1 Rinsate Blank

One rinsate blank sample consisting of deionized water that was exposed to an unused section of core liner and the decontaminated sample processing equipment was analyzed for metals, PAHs, PCBs, and pesticides. Concentrations of the PAH Naphthalene (0.017 µg/l) were present in the rinsate blank. This concentration was several orders of magnitude lower than what was found in the sediments from Blue Hill Harbor, therefore no corrective action was taken. No other target analytes were detected in the rinsate blank sample.

# APPENDIX A SAMPLING AND ANALYSIS PLAN

CENAE–EPV 23 October 2015

**MEMORANDUM FOR:** William Bartlett, Project Manager, CENAE-EPP

**SUBJECT:** Sampling and Analysis Plan for the Blue Hill Harbor Section 107 Navigation Improvement Project in Blue Hill, Maine.

1. **Background:** Blue Hill Harbor is the principal commercial fishing harbor of the Town of Blue Hill, located on the western shore of Blue Hill Bay in Hancock County, Maine. Blue Hill Harbor is located off the northwest end of Blue Hill Bay just west-northwest of Long Island and due west of Union River Bay. The inner harbor contains the Town Wharf and docks which are dry at mean low water.

The Town of Blue Hill, as part of its waterfront economic plan, requested that the New England District (NAE) of the U.S. Army Corps of Engineers (USACE) investigate the potential of establishing a federal channel and turning basin to allow full time vessel traffic to the inner harbor. The results of this study determined that a 1 acre turning basin and a 60 to 80 foot wide waterfront channel extending from the central Town Wharf approximately 2,500 feet southeast into deep water would be required to meet the project objectives. Both the turning basin/anchorage and channel would be dredged to a depth of 6 feet at mean lower low water (MLLW) plus 1 foot of allowable over depth. This would produce approximately 62,500 cubic yards of mixed gravel, sand, and silt. It is expected that this material would be mechanically dredged and placed at either the Tupper Ledge Disposal Site (TLDS) or Eastern Passage Disposal Site (EPDS).

The purpose of the sampling and analysis plan described below is to gather information to support a suitability determination for the proposed disposal option(s). Sediment from the proposed dredge area will be collected and shall undergo physical and chemical analysis. The results of analysis will be evaluated against recently collected samples from the TLDS and EPDS reference areas.

2. **Methodology:** All sampling and analysis activities shall follow the requirements set forth in the “Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters" (RIM) dated May 6, 2004. All laboratories used for this project must have an approved Laboratory Quality Assurance Plan (LQAP) on file with NAE. Any data produced from a lab without an approved LQAP will not be accepted. The RIM, a list of laboratories with approved LQAPs, and the reporting format and requirements for electronic submission of data are available for download through the NAE website:

http://www.nae.usace.army.mil/Missions/Regulatory/DredgedMaterialProgram/RegionalImplementationManual.aspx

3. **Known Sources of Contamination:** Based on a review of historic data and communication with local officials it has been determined that there have been no recent spills in the vicinity of the proposed project. There is one storm water outfall that runs from the Town Wharf to a point approximately 2000 feet to the south where it empties into Mellos Cove. This is not expected to have an impact on the sediments to be dredged.

4. **Sample Collection:** Sediment cores shall be taken from the area to be dredged at the seven locations specified in Table 1 (also see Figures 1). Core samples shall be taken to the proposed dredge depth plus the overdepth amount or refusal. The cores shall be inspected in the field for stratification. If the cores show significant stratification, in the opinion of the sampling crew, subsamples shall be made of each layer. Sufficient material shall be collected for grain size and bulk sediment chemistry analyses as described in the sections below.

All sediment and water being held for testing shall be stored in accordance with the requirements in Table 2 (from Table 8-2 in Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual, 1991).

5. **Positioning:** The latitude and longitude for each sample location shall be reported in the Geographic NAD 83 coordinate system in decimal degree format. The horizontal accuracy of each sample location shall be ten feet or less. The horizontal accuracy at each sample location shall be reported along with the coordinates.

6. **Grain Size:** Each core or core layer shall be individually analyzed for grain size and the results reported to the Environmental Resources Section (ERS) project technical manager before any compositing is performed. The final compositing plan will be determined based on sample proximity, sediment type, and physical characteristics. Grain size analysis shall also be performed on the reference site sample. The results of physical analysis may be used to support compliance with one or more of the three exclusionary criteria in 40 CFR 227.13(b) for ocean disposal or support a determination that the material is not a carrier of contaminants under 40 CFR 230.60(a) for other open water disposal.

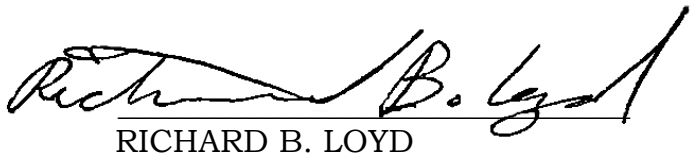
7. **Sediment Chemistry**: Bulk sediment chemistry shall be performed on the individual or composite sediment samples from the dredge area according to the final compositing plan. Testing parameters, analytical methods, and

reporting limits to be used are outlined in Table 2 (Extracted from Tables 1, 2, and 3 of the RIM). The listed analytical methods are recommended but can be replaced by other methods that will give the required reporting limits. The Total Organic Carbon analysis (TOC) shall be performed in duplicate on each composited sample and a TOC Standard Reference Material (SRM) shall be run with the sample batch. Additional guidance on the physical and chemical analysis of sediments can be found in Chapter 5 of the RIM.

8. **Reporting:** All sediment testing data is required to be submitted electronically in the electronic data deliverable (EDD) format available on the RIM website. Hard copy data submission is also required but may be substituted with a printer friendly, easy-to-read format (e.g., PDF, MS Word). Any analytes not detected shall be reported as the reporting limit and qualified with a "U". Non-detects shall not be reported as the method detection limit (MDL). RIM quality control summary tables are required to be submitted with each project dataset. These tables are found in Appendix II of the RIM and are available on the RIM website

9. Any questions should be directed to Richard Loyd (978-318-8048)

Prepared by:



RICHARD B. LOYD
Marine Ecologist
Environmental Resources Section

**TABLE 1: SAMPLE LOCATIONS AND ESTIMATED PENETRATION**

| Station | X (NAD 83) | Y (NAD 83) | Survey Depth (Feet MLLW) | Project Depth (Feet MLLW) | Allowable Overdepth (Feet) | Estimated Core Length (Feet) |
|---|---|---|---|---|---|---|
| A | -68.577540 | 44.409033 | -3.5 | -6 | -1 | 3.5 |
| B | -68.579677 | 44.410136 | -0.6 | -6 | -1 | 6.4 |
| C | -68.581801 | 44.410997 | 0.1 | -6 | -1 | 7.1 |
| D | -68.584183 | 44.411691 | 1.0 | -6 | -1 | 8.0 |
| E | -68.585284 | 44.412200 | 1.9 | -6 | -1 | 8.9 |
| F | -68.584558 | 44.412338 | 1.1 | -6 | -1 | 8.1 |
| G | -68.585163 | 44.412593 | 1.8 | -6 | -1 | 8.8 |

**Table 2: RECOMMENDED PROCEDURES FOR SAMPLE COLLECTION, PRESERVATION, AND STORAGE**

| Analyses | Collection Method | Sample Volume | Container | Preservation Technique | Storage Conditions | Holding Time[d] |
|---|---|---|---|---|---|---|
| **Sediment** | | | | | | |
| **Chemical/Physical Analyses** | | | | | | |
| Metals | Grab/corer | 200 mL | Precleaned polyethylene jar[c] | Dry ice[c] | ≤ 20° C[c] | Hg - 30 days Others - 6 Months[d] |
| Organic Compounds | Grab/corer | 475 mL | Solvent-rinsed glass jar with Teflon lid[c] | Dry ice[c] | ≤ 20° C/dark[d] | 10 days[d] |
| Particle Size | Grab/corer | 75 mL | Whirl-pac bag[c] | Dry ice[c] | ≤ 20° C[c] | Undetermined |
| Total Organic Carbon | Grab/corer | 3 L | Heat treated glass vial with Teflon lined lid[c] | Dry ice or freezer storage for extended storages; otherwise refrigerate | ≤ 20° C[c] | Undetermined |
| Sediment From Which Elutriate is Prepared | Grab/corer | Dependant on tests performed | Glass with Teflon lined lid | Completely fill and Refrigerate | ≤ 4° C/dark/airtight | Undetermined |

[a] *This table contains only a summary of collection, preservation, and storage procedures for samples. The cited references should be consulted for a more detailed description of these procedures.*

[b] *These holding times are for sediment, water, and tissue based on guidance that is sometimes administrative rather than technical in nature. There are no promulgated, scientifically based holding time criteria for sediments, tissues, or elutriates. References should be consulted if holding times for sample extracts are desired. Holding times are from the time of sample collection.*

[c] *NOAA (1989).*

[d] *Tetra Tech (1986a)*

**TABLE 3: BULK SEDIMENT TESTING PARAMETERS**

| Parameter | Analytical Method | Reporting Limit (ppm) |
|---|---|---|
| Metals | | |
| Arsenic | 6010B, 6020, 7060, 7061 | 0.4 |
| Cadmium | 6010B, 6020, 7130, 7131 | 0.07 |
| Chromium | 6010B, 6020, 7190, 7191 | 0.5 |
| Copper | 6010B, 6020, 7210 | 0.5 |
| Lead | 6010B, 6020, 7420, 7421 | 0.5 |
| Mercury | 7471 | 0.02 |
| Nickel | 6010B, 6020, 7520 | 0.5 |
| Zinc | 6010B, 6020, 7950 | 1.0 |
| PCBs (total by NOAA summation of congeners) | | |
| See next page | 8082A | 0.001 |
| Pesticides | NOAA (1993), 8081B | 0.001 |
| Aldrin | Heptachlor epoxide | |
| cis- & trans-Chlordane | Hexachlorobenzene | |
| 4,4'-DDT, DDD, DDE | Lindane | |
| Dieldrin | Methoxychlor | |
| α & β Endosulfan | cis- & trans-Nonachlor | |
| Endrin | Oxychlordane | |
| Heptachlor | Toxaphene | 0.025 |
| Polycyclic Aromatic Hydrocarbons (PAHs) | 8270C-SIM | 0.01 |
| Acenaphthene | Chrysene | |
| Acenaphthylene | Dibenzo(a,h)anthracene | |
| Anthracene | Fluoranthene | |
| Benzo(a)anthracene | Fluorene | |
| Benzo(a)pyrene | Indeno(1, 2, 3-cd)pyrene | |
| Benzo(b)fluoranthene | Naphthalene | |
| Benzo(k)fluoranthene | Phenanthrene | |
| Benzo(g, h, i)perylene | Pyrene | |
| Total Organic Carbon | Plumb (1981), APHA (1995) | 0.1% |
| Percent Moisture | Plumb (1981), EPA (1992), PSEP (1986) | 1.0% |
| Grain Size | Wet Sieve (#4, 10, 40, 200) | |

**TABLE 3: BULK SEDIMENT TESTING PARAMETERS (CONTINUED)**

PCB CONGENERS

Analytical Method: NOAA (1993), 8082A

Reporting Limit: 1 ppb

Congeners:

| | |
|---|---|
| 8* | 2,4' diCB |
| 18* | 2,2',5 triCB |
| 28* | 2,4,4' triCB |
| 44* | 2,2',3,5' tetraCB |
| 49 | 2,2',4',5 tetraCB |
| 52* | 2,2',5,5' tetraCB |
| 66* | 2,3',4,4' tetraCB |
| 87 | 2,2',3,4,5' pentaCB |
| 101* | 2,2',4,5,5' pentaCB |
| 105* | 2,3,3',4,4' pentaCB |
| 118* | 2,3',4,4',5 pentaCB |
| 128* | 2,3,3',4,4' hexaCB |
| 138* | 2,2',3,4,4',5' hexaCB |
| 153* | 2,2',4,4',5,5' hexaCB |
| 170* | 2,2',3,3',4,4',5 heptaCB |
| 180* | 2,2',3,4,4',5,5' heptaCB |
| 183 | 2,2',3,4,4',5',6 heptaCB |
| 184 | 2,2',3,4,4',6,6' heptaCB |
| 187* | 2,2',3,4',5,5',6 heptaCB |
| 195* | 2,2',3,3',4,4',5,6 octaCB |
| 206* | 2,2',3,3',4,4',5,5',6 nonaCB |
| 209* | 2,2',3,3',4,4',5,5',6,6' decaCB |

* denotes a congener to be used in estimating Total PCB. To calculate Total PCB, sum the concentrations of all eighteen congeners marked with a "*" and multiply by 2.

The specified methods are recommendations only. Other acceptable methodologies capable of meeting the Reporting Limits can be used. Sample preparation methodologies (e.g. extraction and cleanup) and sample size may need to be modified to achieve the required Reporting Limits.

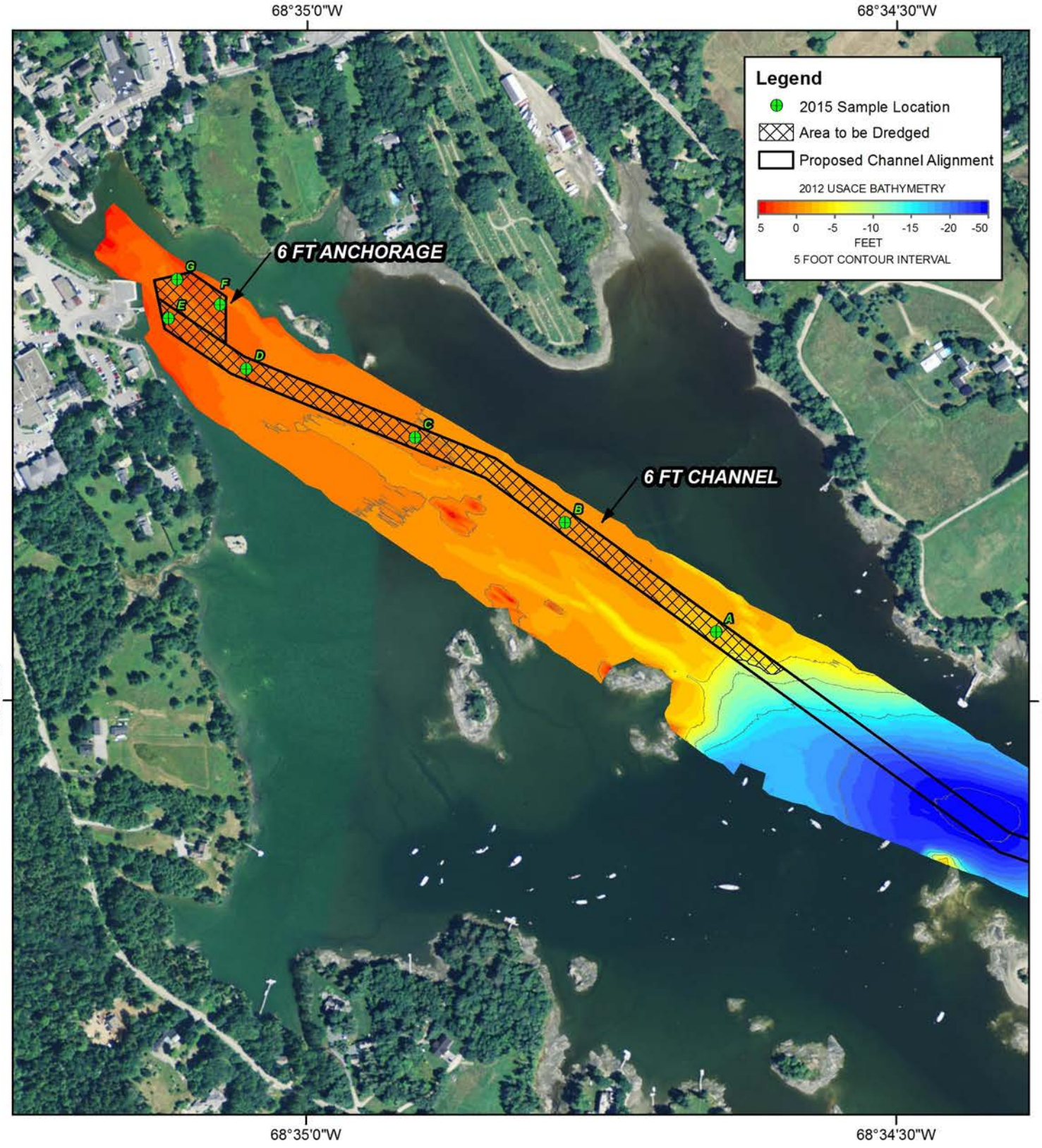


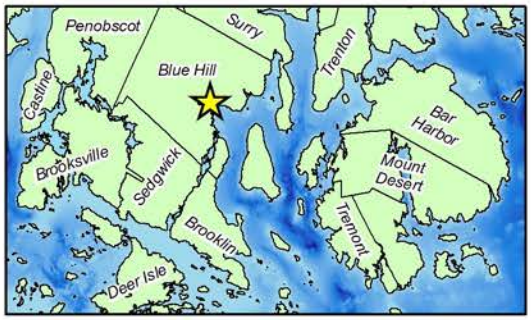

**FIGURE 1:**
**BLUE HILL HARBOR, BLUE HILL, ME**
**2015 SAMPLE LOCATIONS**

US Army Corps
of Engineers
New England District

0 250 500 750 1,000 Feet
0 100 200 300 Meters
1:8,000

2013 NAIP AERIAL IMAGERY

GCS NAD 1983



# APPENDIX B SAMPLING LOGS

PROJECT: Blue Hill Harbor DATE: 10/28/2015

SAMPLING PERSONNEL: RBL, ADH, TAR

SEA STATE: Calm WEATHER CODE: Overcast

LOCATION METHOD: DGPS

---

SAMPLE ID: B SAMPLER TYPE: Vibracore

TIME: 10:17

SOUNDING: - CORRECTED DEPTH: -0.3'MLLW

COORDINATES: N 44.410136 E -68.579677

PENETRATION/RECOVERY: 3.1' NO. OF ATTEMPTS: 3

MATERIAL DESCRIPTION: Fine sand and marine clay with shell fragments and woody organic debris

| CORE PHOTO: | NOTES: |
|---|---|
|  | Core taken to refusal in clay.<br><br>0-0.3: SP/SM – Dark gray, poorly graded fine sand and silt. Loose and wet.<br><br>0.3-3.1: CL - Olive gray sandy clay with scattered shell fragments and woody organic debris. Moist. Increasing firmness with depth (soft to very firm)<br><br>H2S odor.<br><br>Sample interval from 0-3.1' at 14:46 |

PROJECT: Blue Hill Harbor DATE: 10/28/2015

SAMPLING PERSONNEL: RBL, ADH, TAR

SEA STATE: Calm WEATHER CODE: Overcast

LOCATION METHOD: DGPS

---

SAMPLE ID: C SAMPLER TYPE: Vibracore

TIME: 10:12

SOUNDING: -13.3’ CORRECTED DEPTH: -0.4’ MLLW

COORDINATES: N 44.410997 E -68.581801

PENETRATION/RECOVERY: 5.9’ NO. OF ATTEMPTS: 3

MATERIAL DESCRIPTION: Fine sand and marine clay with shell fragments and woody organic debris

| CORE PHOTO: | NOTES: |
|---|---|
|  | Core taken to refusal in clay.<br><br>Multiple attempts with variable penetration. Longest core retained for sample.<br><br>0-0.5: SP/SM - Dark gray, poorly graded fine sand and silt. Loose and wet.<br><br>0.5-2.4: SP - Dark gray clayey sand with scattered shell fragments. Layer of packed woody debris from 1.2-1.3. Soft and moist.<br><br>2.4-5.9: CL – Olive gray sandy clay with scattered shell fragments and woody organic debris. Firm and moist.<br><br>H2S odor.<br><br>Sample interval from 0-5.9’ at 14:33 |

PROJECT: Blue Hill Harbor DATE: 10/28/2015

SAMPLING PERSONNEL: RBL, ADH, TAR

SEA STATE: Calm WEATHER CODE: Overcast

LOCATION METHOD: DGPS

---

SAMPLE ID: D SAMPLER TYPE: Vibracore

TIME: 11:09

SOUNDING: -12.6’ CORRECTED DEPTH: +0.2’ MLLW

COORDINATES: N 43.001885 E -70.751137

PENETRATION/RECOVERY: 2.0’ NO. OF ATTEMPTS: 4

MATERIAL DESCRIPTION: Poorly graded M/C sand with shell fragments and woody organic debris

| CORE PHOTO: | NOTES: |
|---|---|
|  | Core taken to refusal in clayey sand. Plug was lost at water surface.<br><br>0-0.4: SP/SM - Dark gray, poorly graded fine sand and silt. Loose and wet.<br><br>0.4-2.0: SP- Gray, poorly graded medium to coarse sand with scattered shell fragments and woody organic debris. Increasingly coarse with depth. Very firm and moist.<br><br>H2S odor.<br><br>Sample interval from 0-2.0’ at 14:22 |

PROJECT: Blue Hill Harbor DATE: 10/28/2015

SAMPLING PERSONNEL: RBL, ADH, TAR

SEA STATE: Calm WEATHER CODE: Overcast

LOCATION METHOD: DGPS

---

SAMPLE ID: E SAMPLER TYPE: Vibracore

TIME: 11:34

SOUNDING: -11.3 CORRECTED DEPTH: +1.2' MLLW

COORDINATES: N 44.412200 E -68.585284

PENETRATION/RECOVERY: 3.2 NO. OF ATTEMPTS: 5

MATERIAL DESCRIPTION: Poorly graded medium to coarse sand with woody organic debris

| CORE PHOTO: | NOTES: |
|---|---|
|  | Core taken to refusal on hard packed sand.<br><br>0-1.7: SP/SM – Gray, poorly graded fine sand and silt with scattered shell fragments and woody debris. Soft and moist. Top 0.1 is loose and wet.<br><br>1.7-3.1: SP – Dark gray, poorly graded medium to coarse sand with scattered shell fragments and woody organic debris. Increasingly coarse with depth. A lense of clam shell fragments is present from 2.2-2.4. Firm and moist.<br><br>3.1-3.2: SP – Dark gray, poorly graded coarse sand mixed with woody debris. Firm and moist.<br><br>H2S odor.<br><br>Sample interval from 0-3.2' at 14:13 |

PROJECT: Blue Hill Harbor DATE: 10/28/2015

SAMPLING PERSONNEL: RBL, ADH, TAR

SEA STATE: Calm WEATHER CODE: Overcast

LOCATION METHOD: DGPS

---

SAMPLE ID: F SAMPLER TYPE: Vibracore

TIME: 11:50

SOUNDING: -10.8’ CORRECTED DEPTH: +1.3’ MLLW

COORDINATES: N 44.412338 E -68.584558

PENETRATION/RECOVERY: 1.8’ NO. OF ATTEMPTS: 5

MATERIAL DESCRIPTION: Poorly graded medium to coarse sand over marine clay

| CORE PHOTO: | NOTES: |
|---|---|
|  | Core taken to refusal in clay.<br><br>Multiple attempts in vicinity of station with poor penetration. Longest core retained for sample.<br><br>0-0.1: SP/SM - Dark gray, poorly graded fine sand and silt. Loose and wet.<br><br>0.1-1.2: SP - Dark gray poorly graded medium to coarse sand with scattered shell fragments. Firm and moist.<br><br>1.2-1.8: CL – Olive gray clay with scattered woody organic debris. Very firm and moist.<br><br>H2S odor.<br><br>Sample interval from 0-1.8’ at 14:00 |

PROJECT: Blue Hill Harbor DATE: 10/28/2015

SAMPLING PERSONNEL: RBL, ADH, TAR

SEA STATE: Calm WEATHER CODE: Overcast

LOCATION METHOD: DGPS

---

SAMPLE ID: G SAMPLER TYPE: Vibracore

TIME: 12:16

SOUNDING: -10.3 CORRECTED DEPTH: +0.9' MLLW

COORDINATES: N 44.412593 E -68.585163

PENETRATION/RECOVERY: 0.5 NO. OF ATTEMPTS: 6

MATERIAL DESCRIPTION:

| CORE PHOTO: | NOTES: |
|---|---|
|  | Multiple attempts in vicinity of station with less than 6 inches of penetration.<br><br>Sediment at this location consists of mixed sand, gravel, silt, and shell fragments over cobble and gravel deposits.<br><br>Sample taken from multiple 6" long cores at 13:45. |

# APPENDIX C LABORATORY REPORT

# ANALYTICAL REPORT

| | |
|---|---|
| Lab Number: | L1527873 |
| Client: | U.S. Army Corps of Engineers<br>696 Virginia Road<br>Concord, MA 01742-2751 |
| ATTN: | Richard Loyd |
| Phone: | (978) 318-8048 |
| Project Name: | BLUE HILL HARBOR |
| Project Number: | Not Specified |
| Report Date: | 11/19/15 |



Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), ME (MA00030), PA (68-02089), VA (460194), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), USFWS (Permit #LE2069641), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Alpha Sample ID | Client ID | Matrix | Sample Location | Collection Date/Time | Receive Date |
|---|---|---|---|---|---|
| L1527873-01 | A | SOIL | BLUE HILL, ME | 10/28/15 14:53 | 10/29/15 |
| L1527873-02 | B | SOIL | BLUE HILL, ME | 10/28/15 14:46 | 10/29/15 |
| L1527873-03 | C | SOIL | BLUE HILL, ME | 10/28/15 14:33 | 10/29/15 |
| L1527873-04 | COMP BC | SOIL | BLUE HILL, ME | 10/28/15 14:46 | 10/29/15 |
| L1527873-05 | D | SOIL | BLUE HILL, ME | 10/28/15 14:22 | 10/29/15 |
| L1527873-06 | E | SOIL | BLUE HILL, ME | 10/28/15 14:13 | 10/29/15 |
| L1527873-07 | COMP DE | SOIL | BLUE HILL, ME | 10/28/15 14:22 | 10/29/15 |
| L1527873-08 | F | SOIL | BLUE HILL, ME | 10/28/15 14:00 | 10/29/15 |
| L1527873-09 | G | SOIL | BLUE HILL, ME | 10/28/15 13:43 | 10/29/15 |
| L1527873-10 | COMP FG | SOIL | BLUE HILL, ME | 10/28/15 14:00 | 10/29/15 |
| L1527873-11 | DUP(C) | SOIL | BLUE HILL, ME | 10/28/15 14:33 | 10/29/15 |
| L1527873-12 | BLANK | WATER | BLUE HILL, ME | 10/28/15 14:53 | 10/29/15 |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873
**Project Number:** Not Specified **Report Date:** 11/19/15

**Case Narrative (continued)**

Semivolatile Organics
L1527873-10 was re-analyzed on dilution in order to quantify the sample within the calibration range. The results should be considered estimated, and are qualified with an E flag, for any compounds that exceeded the calibration range in the initial analysis. The re-analysis was performed only for the compounds that exceeded the calibration range.

The WG836995-6 Laboratory Duplicate RPDs, performed on L1527873-04, are outside the acceptance criteria for Acenaphthylene (31%), Phenanthrene (46%), Anthracene (106%), Fluoranthene (37%), Pyrene (40%), Benz(a)anthracene (53%), Chrysene (38%), Benzo(b)fluoranthene (31%), Benzo(k)fluoranthene (36%), Benzo(a)pyrene (39%) and Dibenz(a,h)anthracene (33%). The elevated RPD's have been attributed to the non-homogeneous nature of the native sample.

WG836995-4/-5 MD/MSD performed on L1527873-07: Fluoranthene response exceeded the calibration range. The concentrations are considered estimated and qualified with an (E) flag. The percent recoveries for Fluoranthene met the acceptance criteria therefore no further action was taken.

The continuing calibration standard, associated with the 25X dilution of L1527873-10 had the response for DBOB (20.2%D) above the acceptance criteria for the method.

Pesticides
Samples L1527873-01 and -10 had the surrogate BZ198 (186%/490%) recovered above the acceptance criteria for column A. The surrogate recoveries for column B were within acceptance criteria as were the recoveries for the surrogate DBOB. No further action was taken.

The opening continuing calibration WG838057-1, associated with L1527873-12 and the extraction QC WG836523-1, -2 and -3, had the response for 4,4'-DDD (23.9%D column A) above the acceptance criteria. This represents a potential high bias and the associated sample was non-detect; therefore no further action was taken.

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873
**Project Number:** Not Specified **Report Date:** 11/19/15

**Case Narrative (continued)**

The WG836523-1 (Method Blank) and WG836523-3 (LCSD), associated with sample L1527873-12, had the surrogate BZ198 (164%/166%) recovered above the acceptance criteria for column A. The surrogate recoveries for column B were within acceptance criteria as were the recoveries for the surrogate DBOB. No further action was taken.

The WG836998-3 (LCSD), associated with samples L1527873-01, -04, -07 and -10, had the surrogate BZ198 (199%) recovered above the acceptance criteria for column A. The surrogate recovery for column B was within acceptance criteria as were the recoveries for the surrogate DBOB. No further action was taken.

The WG836998-4/-5 (MS/MSD), performed on sample L1527873-07, had the surrogate BZ198 (242%/492%) recovered above the acceptance criteria for column A. The surrogate recoveries for column B were within acceptance criteria as were the recoveries for the surrogate DBOB. No further action was taken.

The WG836998-7 (SRM), recovered trans-Nonachlor (449%) and the surrogate BZ198 (240%) above the acceptance criteria due to matrix interference. All other monitered compounds and surrogates recovered within the acceptance criteria. No further action was taken.

Metals
L1527873-12: The Field Blank has a concentration above the reporting limit for Arsenic. The results were confirmed.

The low level calibration check (LLC), associated with WG840344, has a concentration above the reporting limit for Copper and Lead. Since the associated sample concentrations are greater than 10x the low level calibration check concentration for this analyte, no corrective action is required.

The WG839678-6 Laboratory Duplicate RPD, performed on L1527873-04, is outside the acceptance criteria for Mercury (91%). The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

**Case Narrative (continued)**

Total Organic Carbon

The WG842407-4 MS recoveries for Total Organic Carbon (Rep1) (37%) and Total Organic Carbon (Rep2) (161%), performed on L1527873-07, are outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted.

Grain Size

The WG842455-1 Laboratory Duplicate RPD, performed on L1527873-03, is outside the acceptance criteria for %Coarse Sand.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Peter Henriksen

Title: Technical Director/Representative Date: 11/19/15

# ORGANICS

# SEMIVOLATILES

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873

**Project Number:** Not Specified **Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-01
Client ID: A
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/05/15 20:15
Analyst: SF
Percent Solids: 45%

Date Collected: 10/28/15 14:53
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | | | | | | |
| Naphthalene | ND | | ug/kg | 10.4 | -- | 1 |
| Acenaphthylene | 26.8 | | ug/kg | 10.4 | -- | 1 |
| Acenaphthene | ND | | ug/kg | 10.4 | -- | 1 |
| Fluorene | ND | | ug/kg | 10.4 | -- | 1 |
| Phenanthrene | 121 | | ug/kg | 10.4 | -- | 1 |
| Anthracene | 17.0 | | ug/kg | 10.4 | -- | 1 |
| Fluoranthene | 257 | | ug/kg | 10.4 | -- | 1 |
| Pyrene | 242 | | ug/kg | 10.4 | -- | 1 |
| Benz(a)anthracene | 102 | | ug/kg | 10.4 | -- | 1 |
| Chrysene | 136 | | ug/kg | 10.4 | -- | 1 |
| Benzo(b)fluoranthene | 116 | | ug/kg | 10.4 | -- | 1 |
| Benzo(k)fluoranthene | 127 | | ug/kg | 10.4 | -- | 1 |
| Benzo(a)pyrene | 119 | | ug/kg | 10.4 | -- | 1 |
| Indeno(1,2,3-cd)Pyrene | 95.2 | | ug/kg | 10.4 | -- | 1 |
| Dibenz(a,h)anthracene | 22.5 | | ug/kg | 10.4 | -- | 1 |
| Benzo(ghi)perylene | 86.5 | | ug/kg | 10.4 | -- | 1 |
| Cl2-BZ#8 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl3-BZ#18 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl3-BZ#28 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl4-BZ#44 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl4-BZ#49 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl4-BZ#52 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl4-BZ#66 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl5-BZ#87 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl5-BZ#101 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl5-BZ#105 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl5-BZ#118 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl6-BZ#128 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl6-BZ#138 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl6-BZ#153 | ND | | ug/kg | 1.04 | -- | 1 |

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873

**Project Number:** Not Specified **Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-01 Date Collected: 10/28/15 14:53

Client ID: A Date Received: 10/29/15

Sample Location: BLUE HILL, ME Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab** | | | | | | |
| Cl7-BZ#170 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl7-BZ#180 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl7-BZ#183 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl7-BZ#184 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl7-BZ#187 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl8-BZ#195 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl9-BZ#206 | ND | | ug/kg | 1.04 | -- | 1 |
| Cl10-BZ#209 | ND | | ug/kg | 1.04 | -- | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 62 | | 30-150 |
| Pyrene-d10 | 60 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 61 | | 30-150 |
| DBOB | 75 | | 30-150 |
| BZ 198 | 69 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-04
Client ID: COMP BC
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/05/15 20:49
Analyst: SF
Percent Solids: 48%

Date Collected: 10/28/15 14:46
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | | | | | | |
| Naphthalene | ND | | ug/kg | 9.99 | -- | 1 |
| Acenaphthylene | 16.1 | | ug/kg | 9.99 | -- | 1 |
| Acenaphthene | ND | | ug/kg | 9.99 | -- | 1 |
| Fluorene | ND | | ug/kg | 9.99 | -- | 1 |
| Phenanthrene | 96.7 | | ug/kg | 9.99 | -- | 1 |
| Anthracene | 10.6 | | ug/kg | 9.99 | -- | 1 |
| Fluoranthene | 191 | | ug/kg | 9.99 | -- | 1 |
| Pyrene | 170 | | ug/kg | 9.99 | -- | 1 |
| Benz(a)anthracene | 68.9 | | ug/kg | 9.99 | -- | 1 |
| Chrysene | 101 | | ug/kg | 9.99 | -- | 1 |
| Benzo(b)fluoranthene | 88.5 | | ug/kg | 9.99 | -- | 1 |
| Benzo(k)fluoranthene | 80.6 | | ug/kg | 9.99 | -- | 1 |
| Benzo(a)pyrene | 84.0 | | ug/kg | 9.99 | -- | 1 |
| Indeno(1,2,3-cd)Pyrene | 66.8 | | ug/kg | 9.99 | -- | 1 |
| Dibenz(a,h)anthracene | 14.5 | | ug/kg | 9.99 | -- | 1 |
| Benzo(ghi)perylene | 61.8 | | ug/kg | 9.99 | -- | 1 |
| Cl2-BZ#8 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl3-BZ#18 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl3-BZ#28 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl4-BZ#44 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl4-BZ#49 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl4-BZ#52 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl4-BZ#66 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl5-BZ#87 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl5-BZ#101 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl5-BZ#105 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl5-BZ#118 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl6-BZ#128 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl6-BZ#138 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl6-BZ#153 | ND | | ug/kg | 0.999 | -- | 1 |

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873

**Project Number:** Not Specified **Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-04 Date Collected: 10/28/15 14:46

Client ID: COMP BC Date Received: 10/29/15

Sample Location: BLUE HILL, ME Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | | | | | | |
| Cl7-BZ#170 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl7-BZ#180 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl7-BZ#183 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl7-BZ#184 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl7-BZ#187 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl8-BZ#195 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl9-BZ#206 | ND | | ug/kg | 0.999 | -- | 1 |
| Cl10-BZ#209 | ND | | ug/kg | 0.999 | -- | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 72 | | 30-150 |
| Pyrene-d10 | 72 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 73 | | 30-150 |
| DBOB | 88 | | 30-150 |
| BZ 198 | 86 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-07
Client ID: COMP DE
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/05/15 21:56
Analyst: SF
Percent Solids: 73%

Date Collected: 10/28/15 14:22
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | | | | | | |
| Naphthalene | 17.6 | | ug/kg | 6.75 | -- | 1 |
| Acenaphthylene | 108 | | ug/kg | 6.75 | -- | 1 |
| Acenaphthene | 7.90 | | ug/kg | 6.75 | -- | 1 |
| Fluorene | 27.0 | | ug/kg | 6.75 | -- | 1 |
| Phenanthrene | 407 | | ug/kg | 6.75 | -- | 1 |
| Anthracene | 78.3 | | ug/kg | 6.75 | -- | 1 |
| Fluoranthene | 1010 | | ug/kg | 6.75 | -- | 1 |
| Pyrene | 943 | | ug/kg | 6.75 | -- | 1 |
| Benz(a)anthracene | 532 | | ug/kg | 6.75 | -- | 1 |
| Chrysene | 604 | | ug/kg | 6.75 | -- | 1 |
| Benzo(b)fluoranthene | 537 | | ug/kg | 6.75 | -- | 1 |
| Benzo(k)fluoranthene | 402 | | ug/kg | 6.75 | -- | 1 |
| Benzo(a)pyrene | 526 | | ug/kg | 6.75 | -- | 1 |
| Indeno(1,2,3-cd)Pyrene | 363 | | ug/kg | 6.75 | -- | 1 |
| Dibenz(a,h)anthracene | 87.7 | | ug/kg | 6.75 | -- | 1 |
| Benzo(ghi)perylene | 345 | | ug/kg | 6.75 | -- | 1 |
| Cl2-BZ#8 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl3-BZ#18 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl3-BZ#28 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl4-BZ#44 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl4-BZ#49 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl4-BZ#52 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl4-BZ#66 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl5-BZ#87 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl5-BZ#101 | 0.757 | | ug/kg | 0.675 | -- | 1 |
| Cl5-BZ#105 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl5-BZ#118 | 0.809 | | ug/kg | 0.675 | -- | 1 |
| Cl6-BZ#128 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl6-BZ#138 | 1.06 | | ug/kg | 0.675 | -- | 1 |
| Cl6-BZ#153 | 0.679 | | ug/kg | 0.675 | -- | 1 |

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873

**Project Number:** Not Specified **Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-07 Date Collected: 10/28/15 14:22

Client ID: COMP DE Date Received: 10/29/15

Sample Location: BLUE HILL, ME Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab** | | | | | | |
| Cl7-BZ#170 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl7-BZ#180 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl7-BZ#183 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl7-BZ#184 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl7-BZ#187 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl8-BZ#195 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl9-BZ#206 | ND | | ug/kg | 0.675 | -- | 1 |
| Cl10-BZ#209 | ND | | ug/kg | 0.675 | -- | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 79 | | 30-150 |
| Pyrene-d10 | 79 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 79 | | 30-150 |
| DBOB | 100 | | 30-150 |
| BZ 198 | 97 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-10
Client ID: COMP FG
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/05/15 23:37
Analyst: SF
Percent Solids: 72%

Date Collected: 10/28/15 14:00
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab** | | | | | | |
| Naphthalene | 37.9 | | ug/kg | 6.58 | -- | 1 |
| Acenaphthylene | 448 | | ug/kg | 6.58 | -- | 1 |
| Acenaphthene | 83.4 | | ug/kg | 6.58 | -- | 1 |
| Fluorene | 789 | | ug/kg | 6.58 | -- | 1 |
| Phenanthrene | 4590 | E | ug/kg | 6.58 | -- | 1 |
| Anthracene | 1250 | | ug/kg | 6.58 | -- | 1 |
| Fluoranthene | 6940 | E | ug/kg | 6.58 | -- | 1 |
| Pyrene | 4550 | E | ug/kg | 6.58 | -- | 1 |
| Benz(a)anthracene | 2980 | E | ug/kg | 6.58 | -- | 1 |
| Chrysene | 3000 | E | ug/kg | 6.58 | -- | 1 |
| Benzo(b)fluoranthene | 2450 | E | ug/kg | 6.58 | -- | 1 |
| Benzo(k)fluoranthene | 1880 | E | ug/kg | 6.58 | -- | 1 |
| Benzo(a)pyrene | 2190 | E | ug/kg | 6.58 | -- | 1 |
| Indeno(1,2,3-cd)Pyrene | 1550 | E | ug/kg | 6.58 | -- | 1 |
| Dibenz(a,h)anthracene | 529 | | ug/kg | 6.58 | -- | 1 |
| Benzo(ghi)perylene | 1380 | E | ug/kg | 6.58 | -- | 1 |
| Cl2-BZ#8 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl3-BZ#18 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl3-BZ#28 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl4-BZ#44 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl4-BZ#49 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl4-BZ#52 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl4-BZ#66 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl5-BZ#87 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl5-BZ#101 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl5-BZ#105 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl5-BZ#118 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl6-BZ#128 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl6-BZ#138 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl6-BZ#153 | ND | | ug/kg | 0.658 | -- | 1 |

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873

**Project Number:** Not Specified **Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-10 Date Collected: 10/28/15 14:00

Client ID: COMP FG Date Received: 10/29/15

Sample Location: BLUE HILL, ME Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab** | | | | | | |
| Cl7-BZ#170 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl7-BZ#180 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl7-BZ#183 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl7-BZ#184 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl7-BZ#187 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl8-BZ#195 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl9-BZ#206 | ND | | ug/kg | 0.658 | -- | 1 |
| Cl10-BZ#209 | ND | | ug/kg | 0.658 | -- | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 79 | | 30-150 |
| Pyrene-d10 | 78 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 75 | | 30-150 |
| DBOB | 94 | | 30-150 |
| BZ 198 | 92 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-10 D
Client ID: COMP FG
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/06/15 11:40
Analyst: SF
Percent Solids: 72%

Date Collected: 10/28/15 14:00
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | | | | | | |
| Phenanthrene | 4780 | | ug/kg | 164 | -- | 25 |
| Fluoranthene | 7090 | | ug/kg | 164 | -- | 25 |
| Pyrene | 4740 | | ug/kg | 164 | -- | 25 |
| Benz(a)anthracene | 2760 | | ug/kg | 164 | -- | 25 |
| Chrysene | 2880 | | ug/kg | 164 | -- | 25 |
| Benzo(b)fluoranthene | 2340 | | ug/kg | 164 | -- | 25 |
| Benzo(k)fluoranthene | 1850 | | ug/kg | 164 | -- | 25 |
| Benzo(a)pyrene | 2090 | | ug/kg | 164 | -- | 25 |
| Indeno(1,2,3-cd)Pyrene | 1380 | | ug/kg | 164 | -- | 25 |
| Benzo(ghi)perylene | 1170 | | ug/kg | 164 | -- | 25 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 71 | | 30-150 |
| Pyrene-d10 | 72 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 69 | | 30-150 |
| DBOB | 92 | | 30-150 |
| BZ 198 | 94 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-12
Client ID: BLANK
Sample Location: BLUE HILL, ME
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/15 16:08
Analyst: SF

Date Collected: 10/28/15 14:53
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 11/02/15 13:00

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | | | | | | |
| Naphthalene | 11.7 | | ng/l | 10.8 | -- | 1 |
| Acenaphthylene | ND | | ng/l | 10.8 | -- | 1 |
| Acenaphthene | ND | | ng/l | 10.8 | -- | 1 |
| Fluorene | ND | | ng/l | 10.8 | -- | 1 |
| Phenanthrene | ND | | ng/l | 10.8 | -- | 1 |
| Anthracene | ND | | ng/l | 10.8 | -- | 1 |
| Fluoranthene | ND | | ng/l | 10.8 | -- | 1 |
| Pyrene | ND | | ng/l | 10.8 | -- | 1 |
| Benz(a)anthracene | ND | | ng/l | 10.8 | -- | 1 |
| Chrysene | ND | | ng/l | 10.8 | -- | 1 |
| Benzo(b)fluoranthene | ND | | ng/l | 10.8 | -- | 1 |
| Benzo(k)fluoranthene | ND | | ng/l | 10.8 | -- | 1 |
| Benzo(a)pyrene | ND | | ng/l | 10.8 | -- | 1 |
| Indeno(1,2,3-cd)Pyrene | ND | | ng/l | 10.8 | -- | 1 |
| Dibenz(a,h)anthracene | ND | | ng/l | 10.8 | -- | 1 |
| Benzo(ghi)perylene | ND | | ng/l | 10.8 | -- | 1 |
| Cl2-BZ#8 | ND | | ng/l | 1.08 | -- | 1 |
| Cl3-BZ#18 | ND | | ng/l | 1.08 | -- | 1 |
| Cl3-BZ#28 | ND | | ng/l | 1.08 | -- | 1 |
| Cl4-BZ#44 | ND | | ng/l | 1.08 | -- | 1 |
| Cl4-BZ#49 | ND | | ng/l | 1.08 | -- | 1 |
| Cl4-BZ#52 | ND | | ng/l | 1.08 | -- | 1 |
| Cl4-BZ#66 | ND | | ng/l | 1.08 | -- | 1 |
| Cl5-BZ#87 | ND | | ng/l | 1.08 | -- | 1 |
| Cl5-BZ#101 | ND | | ng/l | 1.08 | -- | 1 |
| Cl5-BZ#105 | ND | | ng/l | 1.08 | -- | 1 |
| Cl5-BZ#118 | ND | | ng/l | 1.08 | -- | 1 |
| Cl6-BZ#128 | ND | | ng/l | 1.08 | -- | 1 |
| Cl6-BZ#138 | ND | | ng/l | 1.08 | -- | 1 |
| Cl6-BZ#153 | ND | | ng/l | 1.08 | -- | 1 |

**Project Name:** BLUE HILL HARBOR **Lab Number:** L1527873

**Project Number:** Not Specified **Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-12 Date Collected: 10/28/15 14:53

Client ID: BLANK Date Received: 10/29/15

Sample Location: BLUE HILL, ME Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | | | | | | |
| Cl7-BZ#170 | ND | | ng/l | 1.08 | -- | 1 |
| Cl7-BZ#180 | ND | | ng/l | 1.08 | -- | 1 |
| Cl7-BZ#183 | ND | | ng/l | 1.08 | -- | 1 |
| Cl7-BZ#184 | ND | | ng/l | 1.08 | -- | 1 |
| Cl7-BZ#187 | ND | | ng/l | 1.08 | -- | 1 |
| Cl8-BZ#195 | ND | | ng/l | 1.08 | -- | 1 |
| Cl9-BZ#206 | ND | | ng/l | 1.08 | -- | 1 |
| Cl10-BZ#209 | ND | | ng/l | 1.08 | -- | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 65 | | 30-150 |
| Pyrene-d10 | 85 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 84 | | 30-150 |
| DBOB | 73 | | 30-150 |
| BZ 198 | 77 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/15 10:30
Analyst: SF

Extraction Method: EPA 3510C
Extraction Date: 11/02/15 13:00

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 12 Batch: WG836522-1 | | | | | |
| Naphthalene | ND | | ng/l | 10.0 | -- |
| Acenaphthylene | ND | | ng/l | 10.0 | -- |
| Acenaphthene | ND | | ng/l | 10.0 | -- |
| Fluorene | ND | | ng/l | 10.0 | -- |
| Phenanthrene | ND | | ng/l | 10.0 | -- |
| Anthracene | ND | | ng/l | 10.0 | -- |
| Fluoranthene | ND | | ng/l | 10.0 | -- |
| Pyrene | ND | | ng/l | 10.0 | -- |
| Benz(a)anthracene | ND | | ng/l | 10.0 | -- |
| Chrysene | ND | | ng/l | 10.0 | -- |
| Benzo(b)fluoranthene | ND | | ng/l | 10.0 | -- |
| Benzo(k)fluoranthene | ND | | ng/l | 10.0 | -- |
| Benzo(a)pyrene | ND | | ng/l | 10.0 | -- |
| Indeno(1,2,3-cd)Pyrene | ND | | ng/l | 10.0 | -- |
| Dibenz(a,h)anthracene | ND | | ng/l | 10.0 | -- |
| Benzo(ghi)perylene | ND | | ng/l | 10.0 | -- |
| Cl2-BZ#8 | ND | | ng/l | 1.00 | -- |
| Cl3-BZ#18 | ND | | ng/l | 1.00 | -- |
| Cl3-BZ#28 | ND | | ng/l | 1.00 | -- |
| Cl4-BZ#44 | ND | | ng/l | 1.00 | -- |
| Cl4-BZ#49 | ND | | ng/l | 1.00 | -- |
| Cl4-BZ#52 | ND | | ng/l | 1.00 | -- |
| Cl4-BZ#66 | ND | | ng/l | 1.00 | -- |
| Cl5-BZ#87 | ND | | ng/l | 1.00 | -- |
| Cl5-BZ#101 | ND | | ng/l | 1.00 | -- |
| Cl5-BZ#105 | ND | | ng/l | 1.00 | -- |
| Cl5-BZ#118 | ND | | ng/l | 1.00 | -- |
| Cl6-BZ#128 | ND | | ng/l | 1.00 | -- |
| Cl6-BZ#138 | ND | | ng/l | 1.00 | -- |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/15 10:30
Analyst: SF

Extraction Method: EPA 3510C
Extraction Date: 11/02/15 13:00

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 12 Batch: WG836522-1 | | | | | |
| Cl6-BZ#153 | ND | | ng/l | 1.00 | -- |
| Cl7-BZ#170 | ND | | ng/l | 1.00 | -- |
| Cl7-BZ#180 | ND | | ng/l | 1.00 | -- |
| Cl7-BZ#183 | ND | | ng/l | 1.00 | -- |
| Cl7-BZ#184 | ND | | ng/l | 1.00 | -- |
| Cl7-BZ#187 | ND | | ng/l | 1.00 | -- |
| Cl8-BZ#195 | ND | | ng/l | 1.00 | -- |
| Cl9-BZ#206 | ND | | ng/l | 1.00 | -- |
| Cl10-BZ#209 | ND | | ng/l | 1.00 | -- |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 86 | | 30-150 |
| Pyrene-d10 | 96 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 104 | | 30-150 |
| DBOB | 75 | | 30-150 |
| BZ 198 | 78 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/05/15 18:01
Analyst: SF

Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01,04,07,10 Batch: WG836995-1 | | | | | |
| Naphthalene | ND | | ug/kg | 5.00 | -- |
| Acenaphthylene | ND | | ug/kg | 5.00 | -- |
| Acenaphthene | ND | | ug/kg | 5.00 | -- |
| Fluorene | ND | | ug/kg | 5.00 | -- |
| Phenanthrene | ND | | ug/kg | 5.00 | -- |
| Anthracene | ND | | ug/kg | 5.00 | -- |
| Fluoranthene | ND | | ug/kg | 5.00 | -- |
| Pyrene | ND | | ug/kg | 5.00 | -- |
| Benz(a)anthracene | ND | | ug/kg | 5.00 | -- |
| Chrysene | ND | | ug/kg | 5.00 | -- |
| Benzo(b)fluoranthene | ND | | ug/kg | 5.00 | -- |
| Benzo(k)fluoranthene | ND | | ug/kg | 5.00 | -- |
| Benzo(a)pyrene | ND | | ug/kg | 5.00 | -- |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 5.00 | -- |
| Dibenz(a,h)anthracene | ND | | ug/kg | 5.00 | -- |
| Benzo(ghi)perylene | ND | | ug/kg | 5.00 | -- |
| Cl2-BZ#8 | ND | | ug/kg | 0.500 | -- |
| Cl3-BZ#18 | ND | | ug/kg | 0.500 | -- |
| Cl3-BZ#28 | ND | | ug/kg | 0.500 | -- |
| Cl4-BZ#44 | ND | | ug/kg | 0.500 | -- |
| Cl4-BZ#49 | ND | | ug/kg | 0.500 | -- |
| Cl4-BZ#52 | ND | | ug/kg | 0.500 | -- |
| Cl4-BZ#66 | ND | | ug/kg | 0.500 | -- |
| Cl5-BZ#87 | ND | | ug/kg | 0.500 | -- |
| Cl5-BZ#101 | ND | | ug/kg | 0.500 | -- |
| Cl5-BZ#105 | ND | | ug/kg | 0.500 | -- |
| Cl5-BZ#118 | ND | | ug/kg | 0.500 | -- |
| Cl6-BZ#128 | ND | | ug/kg | 0.500 | -- |
| Cl6-BZ#138 | ND | | ug/kg | 0.500 | -- |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/05/15 18:01
Analyst: SF

Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01,04,07,10 Batch: WG836995-1 | | | | | |
| Cl6-BZ#153 | ND | | ug/kg | 0.500 | -- |
| Cl7-BZ#170 | ND | | ug/kg | 0.500 | -- |
| Cl7-BZ#180 | ND | | ug/kg | 0.500 | -- |
| Cl7-BZ#183 | ND | | ug/kg | 0.500 | -- |
| Cl7-BZ#184 | ND | | ug/kg | 0.500 | -- |
| Cl7-BZ#187 | ND | | ug/kg | 0.500 | -- |
| Cl8-BZ#195 | ND | | ug/kg | 0.500 | -- |
| Cl9-BZ#206 | ND | | ug/kg | 0.500 | -- |
| Cl10-BZ#209 | ND | | ug/kg | 0.500 | -- |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Methylnaphthalene-d10 | 86 | | 30-150 |
| Pyrene-d10 | 80 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 82 | | 30-150 |
| DBOB | 98 | | 30-150 |
| BZ 198 | 95 | | 30-150 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 12 Batch: WG836522-2 WG836522-3 | | | | | | | | |
| Naphthalene | 83 | | 82 | | 50-120 | 1 | | 30 |
| Acenaphthylene | 79 | | 78 | | 50-120 | 1 | | 30 |
| Acenaphthene | 81 | | 80 | | 50-120 | 1 | | 30 |
| Fluorene | 82 | | 80 | | 50-120 | 2 | | 30 |
| Phenanthrene | 87 | | 87 | | 50-120 | 0 | | 30 |
| Anthracene | 76 | | 73 | | 50-120 | 4 | | 30 |
| Fluoranthene | 87 | | 82 | | 50-120 | 6 | | 30 |
| Pyrene | 85 | | 81 | | 50-120 | 5 | | 30 |
| Benz(a)anthracene | 88 | | 84 | | 50-120 | 5 | | 30 |
| Chrysene | 86 | | 83 | | 50-120 | 4 | | 30 |
| Benzo(b)fluoranthene | 91 | | 95 | | 50-120 | 4 | | 30 |
| Benzo(k)fluoranthene | 99 | | 84 | | 50-120 | 16 | | 30 |
| Benzo(a)pyrene | 86 | | 82 | | 50-120 | 5 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 79 | | 74 | | 50-120 | 7 | | 30 |
| Dibenz(a,h)anthracene | 86 | | 82 | | 50-120 | 5 | | 30 |
| Benzo(ghi)perylene | 86 | | 81 | | 50-120 | 6 | | 30 |
| Cl2-BZ#8 | 86 | | 93 | | 50-120 | 8 | | 30 |
| Cl3-BZ#18 | 88 | | 93 | | 50-120 | 6 | | 30 |
| Cl3-BZ#28 | 88 | | 94 | | 50-120 | 7 | | 30 |
| Cl4-BZ#44 | 93 | | 97 | | 50-120 | 4 | | 30 |
| Cl4-BZ#49 | 87 | | 90 | | 50-120 | 3 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 12 Batch: WG836522-2 WG836522-3 | | | | | | | | |
| Cl4-BZ#52 | 95 | | 102 | | 50-120 | 7 | | 30 |
| Cl4-BZ#66 | 91 | | 96 | | 50-120 | 5 | | 30 |
| Cl5-BZ#87 | 92 | | 96 | | 50-120 | 4 | | 30 |
| Cl5-BZ#101 | 94 | | 98 | | 50-120 | 4 | | 30 |
| Cl5-BZ#105 | 91 | | 96 | | 50-120 | 5 | | 30 |
| Cl5-BZ#118 | 92 | | 95 | | 50-120 | 3 | | 30 |
| Cl6-BZ#128 | 88 | | 92 | | 50-120 | 4 | | 30 |
| Cl6-BZ#138 | 90 | | 94 | | 50-120 | 4 | | 30 |
| Cl6-BZ#153 | 93 | | 94 | | 50-120 | 1 | | 30 |
| Cl7-BZ#170 | 88 | | 90 | | 50-120 | 2 | | 30 |
| Cl7-BZ#180 | 89 | | 93 | | 50-120 | 4 | | 30 |
| Cl7-BZ#183 | 86 | | 89 | | 50-120 | 3 | | 30 |
| Cl7-BZ#184 | 91 | | 95 | | 50-120 | 4 | | 30 |
| Cl7-BZ#187 | 88 | | 93 | | 50-120 | 6 | | 30 |
| Cl8-BZ#195 | 88 | | 92 | | 50-120 | 4 | | 30 |
| Cl9-BZ#206 | 89 | | 92 | | 50-120 | 3 | | 30 |
| Cl10-BZ#209 | 95 | | 100 | | 50-120 | 5 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 12 Batch: WG836522-2 WG836522-3 | | | | | | | | |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| 2-Methylnaphthalene-d10 | 80 | | 78 | | 30-150 |
| Pyrene-d10 | 90 | | 87 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 96 | | 92 | | 30-150 |
| DBOB | 74 | | 78 | | 30-150 |
| BZ 198 | 87 | | 88 | | 30-150 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 Batch: WG836995-2 WG836995-3 | | | | | | | | |
| Naphthalene | 75 | | 78 | | 50-120 | 4 | | 30 |
| Acenaphthylene | 72 | | 73 | | 50-120 | 1 | | 30 |
| Acenaphthene | 74 | | 74 | | 50-120 | 0 | | 30 |
| Fluorene | 76 | | 75 | | 50-120 | 1 | | 30 |
| Phenanthrene | 76 | | 72 | | 50-120 | 5 | | 30 |
| Anthracene | 69 | | 65 | | 50-120 | 6 | | 30 |
| Fluoranthene | 74 | | 72 | | 50-120 | 3 | | 30 |
| Pyrene | 70 | | 66 | | 50-120 | 6 | | 30 |
| Benz(a)anthracene | 73 | | 70 | | 50-120 | 4 | | 30 |
| Chrysene | 72 | | 69 | | 50-120 | 4 | | 30 |
| Benzo(b)fluoranthene | 75 | | 72 | | 50-120 | 4 | | 30 |
| Benzo(k)fluoranthene | 82 | | 77 | | 50-120 | 6 | | 30 |
| Benzo(a)pyrene | 72 | | 69 | | 50-120 | 4 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 80 | | 71 | | 50-120 | 12 | | 30 |
| Dibenz(a,h)anthracene | 78 | | 74 | | 50-120 | 5 | | 30 |
| Benzo(ghi)perylene | 75 | | 71 | | 50-120 | 5 | | 30 |
| Cl2-BZ#8 | 76 | | 71 | | 50-120 | 7 | | 30 |
| Cl3-BZ#18 | 77 | | 72 | | 50-120 | 7 | | 30 |
| Cl3-BZ#28 | 77 | | 73 | | 50-120 | 5 | | 30 |
| Cl4-BZ#44 | 80 | | 76 | | 50-120 | 5 | | 30 |
| Cl4-BZ#49 | 74 | | 72 | | 50-120 | 3 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 Batch: WG836995-2 WG836995-3 | | | | | | | | |
| Cl4-BZ#52 | 83 | | 75 | | 50-120 | 10 | | 30 |
| Cl4-BZ#66 | 73 | | 70 | | 50-120 | 4 | | 30 |
| Cl5-BZ#87 | 81 | | 78 | | 50-120 | 4 | | 30 |
| Cl5-BZ#101 | 82 | | 79 | | 50-120 | 4 | | 30 |
| Cl5-BZ#105 | 82 | | 77 | | 50-120 | 6 | | 30 |
| Cl5-BZ#118 | 79 | | 76 | | 50-120 | 4 | | 30 |
| Cl6-BZ#128 | 81 | | 78 | | 50-120 | 4 | | 30 |
| Cl6-BZ#138 | 82 | | 79 | | 50-120 | 4 | | 30 |
| Cl6-BZ#153 | 81 | | 80 | | 50-120 | 1 | | 30 |
| Cl7-BZ#170 | 87 | | 84 | | 50-120 | 4 | | 30 |
| Cl7-BZ#180 | 85 | | 81 | | 50-120 | 5 | | 30 |
| Cl7-BZ#183 | 82 | | 80 | | 50-120 | 2 | | 30 |
| Cl7-BZ#184 | 86 | | 82 | | 50-120 | 5 | | 30 |
| Cl7-BZ#187 | 85 | | 81 | | 50-120 | 5 | | 30 |
| Cl8-BZ#195 | 92 | | 89 | | 50-120 | 3 | | 30 |
| Cl9-BZ#206 | 89 | | 87 | | 50-120 | 2 | | 30 |
| Cl10-BZ#209 | 100 | | 94 | | 50-120 | 6 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab | Associated sample(s): 01,04,07,10 | | Batch: WG836995-2 WG836995-3 | | | | | |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| 2-Methylnaphthalene-d10 | 80 | | 82 | | 30-150 |
| Pyrene-d10 | 78 | | 73 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 82 | | 77 | | 30-150 |
| DBOB | 93 | | 87 | | 30-150 |
| BZ 198 | 87 | | 85 | | 30-150 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836995-4 WG836995-5 QC Sample: L1527873-07 Client ID: COMP DE | | | | | | | | | | | | |
| Naphthalene | 17.6 | 335 | 267 | 74 | | 256 | 73 | | 50-120 | 4 | | 30 |
| Acenaphthylene | 108 | 335 | 363 | 76 | | 338 | 71 | | 50-120 | 7 | | 30 |
| Acenaphthene | 7.90 | 335 | 250 | 72 | | 237 | 70 | | 50-120 | 5 | | 30 |
| Fluorene | 27.0 | 335 | 306 | 83 | | 293 | 82 | | 50-120 | 4 | | 30 |
| Phenanthrene | 407 | 335 | 771 | 109 | | 751 | 106 | | 50-120 | 3 | | 30 |
| Anthracene | 78.3 | 335 | 346 | 80 | | 328 | 77 | | 50-120 | 5 | | 30 |
| Fluoranthene | 1010 | 335 | 1360E | 104 | | 1320E | 95 | | 50-120 | 3 | | 30 |
| Pyrene | 943 | 335 | 1280 | 101 | | 1230 | 88 | | 50-120 | 4 | | 30 |
| Benz(a)anthracene | 532 | 335 | 800 | 80 | | 763 | 71 | | 50-120 | 5 | | 30 |
| Chrysene | 604 | 335 | 888 | 85 | | 838 | 72 | | 50-120 | 6 | | 30 |
| Benzo(b)fluoranthene | 537 | 335 | 777 | 72 | | 749 | 65 | | 50-120 | 4 | | 30 |
| Benzo(k)fluoranthene | 402 | 335 | 717 | 94 | | 691 | 89 | | 50-120 | 4 | | 30 |
| Benzo(a)pyrene | 526 | 335 | 803 | 83 | | 765 | 73 | | 50-120 | 5 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 363 | 335 | 720 | 107 | | 672 | 95 | | 50-120 | 7 | | 30 |
| Dibenz(a,h)anthracene | 87.7 | 335 | 372 | 85 | | 361 | 84 | | 50-120 | 3 | | 30 |
| Benzo(ghi)perylene | 345 | 335 | 624 | 83 | | 584 | 73 | | 50-120 | 7 | | 30 |
| Cl2-BZ#8 | ND | 67 | 50.1 | 75 | | 48.7 | 75 | | 50-120 | 3 | | 30 |
| Cl3-BZ#18 | ND | 67 | 50.4 | 75 | | 48.8 | 75 | | 50-120 | 3 | | 30 |
| Cl3-BZ#28 | ND | 67 | 51.4 | 77 | | 49.7 | 76 | | 50-120 | 3 | | 30 |
| Cl4-BZ#44 | ND | 67 | 54.5 | 81 | | 52.6 | 81 | | 50-120 | 4 | | 30 |
| Cl4-BZ#49 | ND | 67 | 51.4 | 77 | | 50.0 | 77 | | 50-120 | 3 | | 30 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836995-4 WG836995-5 QC Sample: L1527873-07 Client ID: COMP DE | | | | | | | | | | | | |
| Cl4-BZ#52 | ND | 67 | 53.1 | 79 | | 51.5 | 79 | | 50-120 | 3 | | 30 |
| Cl4-BZ#66 | ND | 67 | 49.9 | 75 | | 48.1 | 74 | | 50-120 | 4 | | 30 |
| Cl5-BZ#87 | ND | 67 | 55.3 | 83 | | 52.8 | 81 | | 50-120 | 5 | | 30 |
| Cl5-BZ#101 | 0.757 | 67 | 56.1 | 83 | | 54.6 | 83 | | 50-120 | 3 | | 30 |
| Cl5-BZ#105 | ND | 67 | 57.1 | 85 | | 54.4 | 83 | | 50-120 | 5 | | 30 |
| Cl5-BZ#118 | 0.809 | 67 | 54.4 | 80 | | 52.7 | 80 | | 50-120 | 3 | | 30 |
| Cl6-BZ#128 | ND | 67 | 56.4 | 84 | | 54.0 | 83 | | 50-120 | 4 | | 30 |
| Cl6-BZ#138 | 1.06 | 67 | 57.6 | 84 | | 55.2 | 83 | | 50-120 | 4 | | 30 |
| Cl6-BZ#153 | 0.679 | 67 | 56.4 | 83 | | 54.7 | 83 | | 50-120 | 3 | | 30 |
| Cl7-BZ#170 | ND | 67 | 61.6 | 92 | | 59.5 | 91 | | 50-120 | 3 | | 30 |
| Cl7-BZ#180 | ND | 67 | 57.8 | 86 | | 55.5 | 85 | | 50-120 | 4 | | 30 |
| Cl7-BZ#183 | ND | 67 | 57.2 | 85 | | 54.8 | 84 | | 50-120 | 4 | | 30 |
| Cl7-BZ#184 | ND | 67 | 58.5 | 87 | | 56.5 | 87 | | 50-120 | 3 | | 30 |
| Cl7-BZ#187 | ND | 67 | 57.7 | 86 | | 55.9 | 86 | | 50-120 | 3 | | 30 |
| Cl8-BZ#195 | ND | 67 | 63.8 | 95 | | 60.3 | 93 | | 50-120 | 6 | | 30 |
| Cl9-BZ#206 | ND | 67 | 61.3 | 92 | | 59.3 | 91 | | 50-120 | 3 | | 30 |
| Cl10-BZ#209 | ND | 67 | 66.2 | 99 | | 64.6 | 99 | | 50-120 | 2 | | 30 |

| Surrogate | MS % Recovery | MS Qualifier | MSD % Recovery | MSD Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| 2-Methylnaphthalene-d10 | 77 | | 75 | | 30-150 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836995-4 WG836995-5 QC Sample: L1527873-07
Client ID: COMP DE

| Surrogate | MS % Recovery | MS Qualifier | MSD % Recovery | MSD Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| BZ 198 | 94 | | 90 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 76 | | 72 | | 30-150 |
| DBOB | 95 | | 92 | | 30-150 |
| Pyrene-d10 | 76 | | 74 | | 30-150 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836995-6 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | |
| Naphthalene | ND | ND | ug/kg | NC | | 30 |
| Acenaphthylene | 16.1 | 22.0 | ug/kg | **31** | Q | 30 |
| Acenaphthene | ND | ND | ug/kg | NC | | 30 |
| Fluorene | ND | 17.5 | ug/kg | NC | | 30 |
| Phenanthrene | 96.7 | 155 | ug/kg | **46** | Q | 30 |
| Anthracene | 10.6 | 34.7 | ug/kg | **106** | Q | 30 |
| Fluoranthene | 191 | 279 | ug/kg | **37** | Q | 30 |
| Pyrene | 170 | 256 | ug/kg | **40** | Q | 30 |
| Benz(a)anthracene | 68.9 | 118 | ug/kg | **53** | Q | 30 |
| Chrysene | 101 | 149 | ug/kg | **38** | Q | 30 |
| Benzo(b)fluoranthene | 88.5 | 121 | ug/kg | **31** | Q | 30 |
| Benzo(k)fluoranthene | 80.6 | 116 | ug/kg | **36** | Q | 30 |
| Benzo(a)pyrene | 84.0 | 125 | ug/kg | **39** | Q | 30 |
| Indeno(1,2,3-cd)Pyrene | 66.8 | 90.1 | ug/kg | 30 | | 30 |
| Dibenz(a,h)anthracene | 14.5 | 20.2 | ug/kg | **33** | Q | 30 |
| Benzo(ghi)perylene | 61.8 | 82.8 | ug/kg | 29 | | 30 |
| Cl2-BZ#8 | ND | ND | ug/kg | NC | | 30 |
| Cl3-BZ#18 | ND | ND | ug/kg | NC | | 30 |
| Cl3-BZ#28 | ND | ND | ug/kg | NC | | 30 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836995-6 QC Sample: L1527873-04 Client ID: COMP BC | | | | | |
| Cl4-BZ#44 | ND | ND | ug/kg | NC | 30 |
| Cl4-BZ#49 | ND | ND | ug/kg | NC | 30 |
| Cl4-BZ#52 | ND | ND | ug/kg | NC | 30 |
| Cl4-BZ#66 | ND | ND | ug/kg | NC | 30 |
| Cl5-BZ#87 | ND | ND | ug/kg | NC | 30 |
| Cl5-BZ#101 | ND | ND | ug/kg | NC | 30 |
| Cl5-BZ#105 | ND | ND | ug/kg | NC | 30 |
| Cl5-BZ#118 | ND | ND | ug/kg | NC | 30 |
| Cl6-BZ#128 | ND | ND | ug/kg | NC | 30 |
| Cl6-BZ#138 | ND | ND | ug/kg | NC | 30 |
| Cl6-BZ#153 | ND | ND | ug/kg | NC | 30 |
| Cl7-BZ#170 | ND | ND | ug/kg | NC | 30 |
| Cl7-BZ#180 | ND | ND | ug/kg | NC | 30 |
| Cl7-BZ#183 | ND | ND | ug/kg | NC | 30 |
| Cl7-BZ#184 | ND | ND | ug/kg | NC | 30 |
| Cl7-BZ#187 | ND | ND | ug/kg | NC | 30 |
| Cl8-BZ#195 | ND | ND | ug/kg | NC | 30 |
| Cl9-BZ#206 | ND | ND | ug/kg | NC | 30 |
| Cl10-BZ#209 | ND | ND | ug/kg | NC | 30 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836995-6 QC Sample: L1527873-04 Client ID: COMP BC

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| 2-Methylnaphthalene-d10 | 72 | | 72 | | 30-150 |
| Pyrene-d10 | 72 | | 72 | | 30-150 |
| Benzo(b)fluoranthene-d12 | 73 | | 73 | | 30-150 |
| DBOB | 88 | | 90 | | 30-150 |
| BZ 198 | 86 | | 85 | | 30-150 |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified
**Lab Number:** L1527873
**Report Date:** 11/19/15

## S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG836995-7

| Parameter | % Recovery | Qual | QC Criteria |
|---|---|---|---|
| Phenanthrene | 60 | | 40-140 |
| Fluoranthene | 66 | | 40-140 |
| Pyrene | 53 | | 40-140 |
| Benz(a)anthracene | 56 | | 40-140 |
| Chrysene | 72 | | 40-140 |
| Benzo(b)fluoranthene | 64 | | 40-140 |
| Benzo(k)fluoranthene | 96 | | 40-140 |
| Benzo(a)pyrene | 48 | | 40-140 |
| Indeno(1,2,3-cd)Pyrene | 62 | | 40-140 |
| Dibenz(a,h)anthracene | 130 | | 40-140 |
| Benzo(ghi)perylene | 59 | | 40-140 |
| Cl2-BZ#8 | 67 | | 40-140 |
| Cl3-BZ#18 | 82 | | 40-140 |
| Cl3-BZ#28 | 47 | | 40-140 |
| Cl4-BZ#44 | 78 | | 40-140 |
| Cl4-BZ#49 | 73 | | 40-140 |
| Cl4-BZ#52 | 69 | | 40-140 |
| Cl4-BZ#66 | 54 | | 40-140 |
| Cl5-BZ#87 | 70 | | 40-140 |
| Cl5-BZ#101 | 77 | | 40-140 |
| Cl5-BZ#105 | 78 | | 40-140 |
| Cl5-BZ#118 | 67 | | 40-140 |
| Cl6-BZ#128 | 101 | | 40-140 |
| Cl6-BZ#138 | 90 | | 40-140 |
| Cl6-BZ#153 | 62 | | 40-140 |
| Cl7-BZ#170 | 93 | | 40-140 |
| Cl7-BZ#180 | 77 | | 40-140 |
| Cl7-BZ#183 | 77 | | 40-140 |
| Cl7-BZ#187 | 90 | | 40-140 |
| Cl9-BZ#206 | 84 | | 40-140 |
| Cl10-BZ#209 | 81 | | 40-140 |
| 2-Methylnaphthalene-d10 (Surrogate) | 68 | | 30-150 |
| Pyrene-d10 (Surrogate) | 67 | | 30-150 |
| Benzo(b)fluoranthene-d12 (Surrogate) | 67 | | 30-150 |
| DBOB (Surrogate) | 85 | | 30-150 |
| BZ 198 (Surrogate) | 79 | | 30-150 |

# PESTICIDES

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified
**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-01
Client ID: A
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 11/06/15 19:10
Analyst: SA
Percent Solids: 45%

Date Collected: 10/28/15 14:53
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Column |
|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab | | | | | | | |
| Hexachlorobenzene | ND | | ug/kg | 1.04 | -- | 1 | A |
| gamma-BHC | ND | | ug/kg | 0.523 | -- | 1 | A |
| Heptachlor | ND | | ug/kg | 0.523 | -- | 1 | A |
| Aldrin | ND | | ug/kg | 0.523 | -- | 1 | A |
| Heptachlor epoxide | ND | | ug/kg | 1.04 | -- | 1 | B |
| Oxychlordane | ND | | ug/kg | 1.04 | -- | 1 | B |
| trans-Chlordane | ND | | ug/kg | 0.523 | -- | 1 | A |
| Endosulfan I | ND | | ug/kg | 0.523 | -- | 1 | A |
| cis-Chlordane | ND | | ug/kg | 0.523 | -- | 1 | A |
| trans-Nonachlor | ND | | ug/kg | 0.523 | -- | 1 | A |
| 4,4'-DDE | ND | | ug/kg | 0.523 | -- | 1 | A |
| Dieldrin | ND | | ug/kg | 0.523 | -- | 1 | A |
| Endrin | ND | | ug/kg | 0.523 | -- | 1 | A |
| Endosulfan II | ND | | ug/kg | 0.523 | -- | 1 | A |
| 4,4'-DDD | ND | | ug/kg | 0.523 | -- | 1 | B |
| cis-Nonachlor | ND | | ug/kg | 0.523 | -- | 1 | A |
| 4,4'-DDT | ND | | ug/kg | 0.523 | -- | 1 | A |
| Methoxychlor | ND | | ug/kg | 5.23 | -- | 1 | A |
| Toxaphene | ND | | ug/kg | 26.2 | -- | 1 | A |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|
| DBOB | 40 | | 30-150 | A |
| BZ 198 | **186** | Q | 30-150 | A |
| DBOB | 36 | | 30-150 | B |
| BZ 198 | 52 | | 30-150 | B |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-04
Client ID: COMP BC
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 11/06/15 19:43
Analyst: SA
Percent Solids: 48%

Date Collected: 10/28/15 14:46
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Column |
|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab | | | | | | | |
| Hexachlorobenzene | ND | | ug/kg | 0.999 | -- | 1 | A |
| gamma-BHC | ND | | ug/kg | 0.499 | -- | 1 | A |
| Heptachlor | ND | | ug/kg | 0.499 | -- | 1 | A |
| Aldrin | ND | | ug/kg | 0.499 | -- | 1 | A |
| Heptachlor epoxide | ND | | ug/kg | 0.999 | -- | 1 | B |
| Oxychlordane | ND | | ug/kg | 0.999 | -- | 1 | B |
| trans-Chlordane | ND | | ug/kg | 0.499 | -- | 1 | A |
| Endosulfan I | ND | | ug/kg | 0.499 | -- | 1 | A |
| cis-Chlordane | ND | | ug/kg | 0.499 | -- | 1 | A |
| trans-Nonachlor | ND | | ug/kg | 0.499 | -- | 1 | A |
| 4,4'-DDE | ND | | ug/kg | 0.499 | -- | 1 | A |
| Dieldrin | ND | | ug/kg | 0.499 | -- | 1 | A |
| Endrin | ND | | ug/kg | 0.499 | -- | 1 | A |
| Endosulfan II | ND | | ug/kg | 0.499 | -- | 1 | A |
| 4,4'-DDD | ND | | ug/kg | 0.499 | -- | 1 | B |
| cis-Nonachlor | ND | | ug/kg | 0.499 | -- | 1 | A |
| 4,4'-DDT | ND | | ug/kg | 0.499 | -- | 1 | A |
| Methoxychlor | ND | | ug/kg | 4.99 | -- | 1 | A |
| Toxaphene | ND | | ug/kg | 25.1 | -- | 1 | A |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|
| DBOB | 52 | | 30-150 | A |
| BZ 198 | 126 | | 30-150 | A |
| DBOB | 47 | | 30-150 | B |
| BZ 198 | 68 | | 30-150 | B |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-07
Client ID: COMP DE
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 11/06/15 20:48
Analyst: SA
Percent Solids: 73%

Date Collected: 10/28/15 14:22
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Column |
|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab | | | | | | | |
| Hexachlorobenzene | ND | | ug/kg | 0.675 | -- | 1 | A |
| gamma-BHC | ND | | ug/kg | 0.338 | -- | 1 | A |
| Heptachlor | ND | | ug/kg | 0.338 | -- | 1 | A |
| Aldrin | ND | | ug/kg | 0.338 | -- | 1 | A |
| Heptachlor epoxide | ND | | ug/kg | 0.675 | -- | 1 | B |
| Oxychlordane | ND | | ug/kg | 0.675 | -- | 1 | B |
| trans-Chlordane | ND | | ug/kg | 0.338 | -- | 1 | A |
| Endosulfan I | ND | | ug/kg | 0.338 | -- | 1 | A |
| cis-Chlordane | ND | | ug/kg | 0.338 | -- | 1 | A |
| trans-Nonachlor | ND | | ug/kg | 0.338 | -- | 1 | A |
| 4,4'-DDE | ND | | ug/kg | 0.338 | -- | 1 | A |
| Dieldrin | ND | | ug/kg | 0.338 | -- | 1 | A |
| Endrin | ND | | ug/kg | 0.338 | -- | 1 | A |
| Endosulfan II | ND | | ug/kg | 0.338 | -- | 1 | B |
| 4,4'-DDD | 0.814 | | ug/kg | 0.338 | -- | 1 | B |
| cis-Nonachlor | ND | | ug/kg | 0.338 | -- | 1 | A |
| 4,4'-DDT | 0.592 | IP | ug/kg | 0.338 | -- | 1 | A |
| Methoxychlor | 3.64 | P | ug/kg | 3.38 | -- | 1 | A |
| Toxaphene | ND | | ug/kg | 17.0 | -- | 1 | A |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|
| DBOB | 55 | | 30-150 | A |
| BZ 198 | 114 | | 30-150 | A |
| DBOB | 47 | | 30-150 | B |
| BZ 198 | 64 | | 30-150 | B |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-10
Client ID: COMP FG
Sample Location: BLUE HILL, ME
Matrix: Soil
Analytical Method: 1,8081B
Analytical Date: 11/06/15 22:27
Analyst: SA
Percent Solids: 72%

Date Collected: 10/28/15 14:00
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Column |
|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab | | | | | | | |
| Hexachlorobenzene | ND | | ug/kg | 0.658 | -- | 1 | A |
| gamma-BHC | ND | | ug/kg | 0.329 | -- | 1 | A |
| Heptachlor | ND | | ug/kg | 0.329 | -- | 1 | A |
| Aldrin | ND | | ug/kg | 0.329 | -- | 1 | A |
| Heptachlor epoxide | ND | | ug/kg | 0.658 | -- | 1 | B |
| Oxychlordane | ND | | ug/kg | 0.658 | -- | 1 | B |
| trans-Chlordane | ND | | ug/kg | 0.329 | -- | 1 | A |
| Endosulfan I | ND | | ug/kg | 0.329 | -- | 1 | A |
| cis-Chlordane | ND | | ug/kg | 0.329 | -- | 1 | A |
| trans-Nonachlor | ND | | ug/kg | 0.329 | -- | 1 | A |
| 4,4'-DDE | ND | | ug/kg | 0.329 | -- | 1 | A |
| Dieldrin | ND | | ug/kg | 0.329 | -- | 1 | A |
| Endrin | ND | | ug/kg | 0.329 | -- | 1 | A |
| Endosulfan II | ND | | ug/kg | 0.329 | -- | 1 | A |
| 4,4'-DDD | ND | | ug/kg | 0.329 | -- | 1 | B |
| cis-Nonachlor | ND | | ug/kg | 0.329 | -- | 1 | A |
| 4,4'-DDT | ND | | ug/kg | 0.329 | -- | 1 | A |
| Methoxychlor | ND | | ug/kg | 3.29 | -- | 1 | A |
| Toxaphene | ND | | ug/kg | 16.5 | -- | 1 | A |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|
| DBOB | 41 | | 30-150 | A |
| BZ 198 | **490** | Q | 30-150 | A |
| DBOB | 35 | | 30-150 | B |
| BZ 198 | 75 | | 30-150 | B |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-12
Client ID: BLANK
Sample Location: BLUE HILL, ME
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/06/15 14:45
Analyst: SA

Date Collected: 10/28/15 14:53
Date Received: 10/29/15
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 11/02/15 13:00

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Column |
|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab | | | | | | | |
| Hexachlorobenzene | ND | | ug/l | 0.0021 | -- | 1 | A |
| gamma-BHC | ND | | ug/l | 0.0005 | -- | 1 | A |
| Heptachlor | ND | | ug/l | 0.0005 | -- | 1 | A |
| Aldrin | ND | | ug/l | 0.0010 | -- | 1 | A |
| Heptachlor epoxide | ND | | ug/l | 0.0005 | -- | 1 | B |
| Oxychlordane | ND | | ug/l | 0.0005 | -- | 1 | B |
| trans-Chlordane | ND | | ug/l | 0.0005 | -- | 1 | A |
| Endosulfan I | ND | | ug/l | 0.0005 | -- | 1 | A |
| cis-Chlordane | ND | | ug/l | 0.0005 | -- | 1 | A |
| trans-Nonachlor | ND | | ug/l | 0.0005 | -- | 1 | A |
| 4,4'-DDE | ND | | ug/l | 0.0005 | -- | 1 | A |
| Dieldrin | ND | | ug/l | 0.0005 | -- | 1 | A |
| Endrin | ND | | ug/l | 0.0005 | -- | 1 | A |
| Endosulfan II | ND | | ug/l | 0.0005 | -- | 1 | A |
| 4,4'-DDD | ND | | ug/l | 0.0005 | -- | 1 | A |
| cis-Nonachlor | ND | | ug/l | 0.0005 | -- | 1 | A |
| 4,4'-DDT | ND | | ug/l | 0.0005 | -- | 1 | A |
| Methoxychlor | ND | | ug/l | 0.0053 | -- | 1 | A |
| Toxaphene | ND | | ug/l | 0.0268 | -- | 1 | A |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|
| DBOB | 52 | | 30-150 | A |
| BZ 198 | 67 | | 30-150 | A |
| DBOB | 50 | | 30-150 | B |
| BZ 198 | 56 | | 30-150 | B |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/06/15 12:33
Analyst: SA

Extraction Method: EPA 3510C
Extraction Date: 11/02/15 13:00

| Parameter | Result | Qualifier | Units | RL | MDL | Column |
|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 12 Batch: WG836523-1 | | | | | | |
| Hexachlorobenzene | ND | | ug/l | 0.0020 | -- | A |
| gamma-BHC | ND | | ug/l | 0.0005 | -- | A |
| Heptachlor | ND | | ug/l | 0.0005 | -- | A |
| Aldrin | ND | | ug/l | 0.0010 | -- | A |
| trans-Chlordane | ND | | ug/l | 0.0005 | -- | A |
| Endosulfan I | ND | | ug/l | 0.0005 | -- | A |
| cis-Chlordane | ND | | ug/l | 0.0005 | -- | A |
| trans-Nonachlor | ND | | ug/l | 0.0005 | -- | A |
| 4,4'-DDE | ND | | ug/l | 0.0005 | -- | A |
| Dieldrin | ND | | ug/l | 0.0005 | -- | A |
| Endrin | ND | | ug/l | 0.0005 | -- | A |
| Endosulfan II | ND | | ug/l | 0.0005 | -- | A |
| 4,4'-DDD | ND | | ug/l | 0.0005 | -- | A |
| cis-Nonachlor | ND | | ug/l | 0.0005 | -- | A |
| 4,4'-DDT | ND | | ug/l | 0.0005 | -- | A |
| Methoxychlor | ND | | ug/l | 0.0050 | -- | A |
| Toxaphene | ND | | ug/l | 0.0250 | -- | A |
| Heptachlor epoxide | ND | | ug/l | 0.0005 | -- | B |
| Oxychlordane | ND | | ug/l | 0.0005 | -- | B |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|
| DBOB | 68 | | 30-150 | A |
| BZ 198 | **164** | Q | 30-150 | A |
| DBOB | 65 | | 30-150 | B |
| BZ 198 | 73 | | 30-150 | B |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/06/15 16:58
Analyst: SA

Extraction Method: EPA 3570
Extraction Date: 11/03/15 18:24
Cleanup Method: EPA 3630
Cleanup Date: 11/04/15

| Parameter | Result | Qualifier | Units | RL | MDL | Column |
|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01,04,07,10 Batch: WG836998-1 | | | | | | |
| Hexachlorobenzene | ND | | ug/kg | 0.500 | -- | A |
| gamma-BHC | ND | | ug/kg | 0.250 | -- | A |
| Heptachlor | ND | | ug/kg | 0.250 | -- | A |
| Aldrin | ND | | ug/kg | 0.250 | -- | A |
| trans-Chlordane | ND | | ug/kg | 0.250 | -- | A |
| Endosulfan I | ND | | ug/kg | 0.250 | -- | A |
| cis-Chlordane | ND | | ug/kg | 0.250 | -- | A |
| trans-Nonachlor | ND | | ug/kg | 0.250 | -- | A |
| 4,4'-DDE | ND | | ug/kg | 0.250 | -- | A |
| Dieldrin | ND | | ug/kg | 0.250 | -- | A |
| Endrin | ND | | ug/kg | 0.250 | -- | A |
| Endosulfan II | ND | | ug/kg | 0.250 | -- | A |
| 4,4'-DDD | ND | | ug/kg | 0.250 | -- | A |
| cis-Nonachlor | ND | | ug/kg | 0.250 | -- | A |
| 4,4'-DDT | ND | | ug/kg | 0.250 | -- | A |
| Methoxychlor | ND | | ug/kg | 2.50 | -- | A |
| Toxaphene | ND | | ug/kg | 12.6 | -- | A |
| Heptachlor epoxide | ND | | ug/kg | 0.500 | -- | B |
| Oxychlordane | ND | | ug/kg | 0.500 | -- | B |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|
| DBOB | 53 | | 30-150 | A |
| BZ 198 | 70 | | 30-150 | A |
| DBOB | 51 | | 30-150 | B |
| BZ 198 | 58 | | 30-150 | B |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits | Column |
|---|---|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 12 Batch: WG836523-2 WG836523-3 | | | | | | | | | |
| Hexachlorobenzene | 70 | | 76 | | 50-120 | 8 | | 30 | A |
| gamma-BHC | 76 | | 80 | | 50-120 | 6 | | 30 | A |
| Heptachlor | 87 | | 92 | | 50-120 | 6 | | 30 | A |
| Aldrin | 82 | | 86 | | 50-120 | 5 | | 30 | A |
| trans-Chlordane | 89 | | 93 | | 50-120 | 4 | | 30 | A |
| Endosulfan I | 85 | | 89 | | 50-120 | 4 | | 30 | A |
| cis-Chlordane | 86 | | 89 | | 50-120 | 4 | | 30 | A |
| trans-Nonachlor | 89 | | 92 | | 50-120 | 4 | | 30 | A |
| 4,4'-DDE | 109 | | 113 | | 50-120 | 4 | | 30 | A |
| Dieldrin | 92 | | 96 | | 50-120 | 4 | | 30 | A |
| Endrin | 97 | | 100 | | 50-120 | 3 | | 30 | A |
| cis-Nonachlor | 85 | | 88 | | 50-120 | 4 | | 30 | A |
| 4,4'-DDT | 97 | | 101 | | 50-120 | 5 | | 30 | A |
| Methoxychlor | 110 | | 114 | | 50-120 | 4 | | 30 | A |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria | Column |
|---|---|---|---|---|---|---|
| DBOB | 64 | | 68 | | 30-150 | A |
| BZ 198 | 93 | | **166** | Q | 30-150 | A |
| DBOB | 61 | | 66 | | 30-150 | B |
| BZ 198 | 75 | | 79 | | 30-150 | B |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits | Column |
|---|---|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 12 Batch: WG836523-2 WG836523-3 | | | | | | | | | |
| Heptachlor epoxide | 80 | | 85 | | 50-120 | 5 | | 30 | B |
| Oxychlordane | 78 | | 82 | | 50-120 | 5 | | 30 | B |
| Endosulfan II | 84 | | 88 | | 50-120 | 5 | | 30 | B |
| 4,4'-DDD | 96 | | 103 | | 50-120 | 7 | | 30 | B |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria | Column |
|---|---|---|---|---|---|---|
| DBOB | 64 | | 68 | | 30-150 | A |
| BZ 198 | 93 | | **166** | Q | 30-150 | A |
| DBOB | 61 | | 66 | | 30-150 | B |
| BZ 198 | 75 | | 79 | | 30-150 | B |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits | Column |
|---|---|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01,04,07,10 Batch: WG836998-2 WG836998-3 | | | | | | | | | |
| Hexachlorobenzene | 59 | | 62 | | 50-120 | 5 | | 30 | A |
| gamma-BHC | 63 | | 67 | | 50-120 | 6 | | 30 | A |
| Heptachlor | 69 | | 73 | | 50-120 | 6 | | 30 | A |
| Aldrin | 67 | | 70 | | 50-120 | 4 | | 30 | A |
| trans-Chlordane | 72 | | 79 | | 50-120 | 9 | | 30 | A |
| Endosulfan I | 67 | | 74 | | 50-120 | 10 | | 30 | A |
| cis-Chlordane | 69 | | 76 | | 50-120 | 10 | | 30 | A |
| trans-Nonachlor | 70 | | 78 | | 50-120 | 11 | | 30 | A |
| 4,4'-DDE | 87 | | 95 | | 50-120 | 9 | | 30 | A |
| Dieldrin | 72 | | 78 | | 50-120 | 8 | | 30 | A |
| Endrin | 73 | | 76 | | 50-120 | 4 | | 30 | A |
| cis-Nonachlor | 69 | | 76 | | 50-120 | 10 | | 30 | A |
| 4,4'-DDT | 75 | | 86 | | 50-120 | 14 | | 30 | A |
| Methoxychlor | 68 | | 72 | | 50-120 | 6 | | 30 | A |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria | Column |
|---|---|---|---|---|---|---|
| DBOB | 54 | | 57 | | 30-150 | A |
| BZ 198 | 84 | | **199** | Q | 30-150 | A |
| DBOB | 52 | | 54 | | 30-150 | B |
| BZ 198 | 65 | | 72 | | 30-150 | B |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits | Column |
|---|---|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01,04,07,10 Batch: WG836998-2 WG836998-3 | | | | | | | | | |
| Heptachlor epoxide | 64 | | 70 | | 50-120 | 9 | | 30 | B |
| Oxychlordane | 63 | | 68 | | 50-120 | 8 | | 30 | B |
| Endosulfan II | 63 | | 67 | | 50-120 | 6 | | 30 | B |
| 4,4'-DDD | 78 | | 86 | | 50-120 | 10 | | 30 | B |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria | Column |
|---|---|---|---|---|---|---|
| DBOB | 54 | | 57 | | 30-150 | A |
| BZ 198 | 84 | | **199** | Q | 30-150 | A |
| DBOB | 52 | | 54 | | 30-150 | B |
| BZ 198 | 65 | | 72 | | 30-150 | B |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits | Column |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836998-4 WG836998-5 QC Sample: L1527873-07 Client ID: COMP DE | | | | | | | | | | | | | |
| Hexachlorobenzene | ND | 67 | 40.7 | 61 | | 37.2 | 57 | | 50-120 | 9 | | 30 | A |
| gamma-BHC | ND | 67 | 45.9 | 69 | | 42.2 | 65 | | 50-120 | 8 | | 30 | A |
| Heptachlor | ND | 67 | 48.3 | 72 | | 45.0 | 69 | | 50-120 | 7 | | 30 | A |
| Aldrin | ND | 67 | 47.5 | 71 | | 44.1 | 68 | | 50-120 | 7 | | 30 | A |
| Heptachlor epoxide | ND | 67 | 38.7 | 58 | | 37.8 | 58 | | 50-120 | 2 | | 30 | B |
| Oxychlordane | ND | 67 | 42.4 | 63 | | 40.0 | 61 | | 50-120 | 6 | | 30 | B |
| trans-Chlordane | ND | 67 | 50.7 | 76 | | 48.6 | 75 | | 50-120 | 4 | | 30 | A |
| Endosulfan I | ND | 67 | 48.7 | 73 | | 46.4 | 71 | | 50-120 | 5 | | 30 | A |
| cis-Chlordane | ND | 67 | 48.0 | 72 | | 45.8 | 70 | | 50-120 | 5 | | 30 | A |
| trans-Nonachlor | ND | 67 | 49.0 | 73 | | 46.4 | 71 | | 50-120 | 5 | | 30 | A |
| 4,4'-DDE | ND | 67 | 60.7 | 91 | | 57.8 | 89 | | 50-120 | 5 | | 30 | A |
| Dieldrin | ND | 67 | 49.0 | 73 | | 47.2 | 72 | | 50-120 | 4 | | 30 | A |
| Endrin | ND | 67 | 54.7 | 82 | | 52.6 | 81 | | 50-120 | 4 | | 30 | A |
| Endosulfan II | ND | 67 | 42.5IP | 63 | | 40.7IP | 62 | | 50-120 | 4 | | 30 | B |
| 4,4'-DDD | 0.814 | 67 | 52.0 | 76 | | 50.5 | 76 | | 50-120 | 3 | | 30 | B |
| cis-Nonachlor | ND | 67 | 47.9I | 72 | | 45.8I | 70 | | 50-120 | 4 | | 30 | A |
| 4,4'-DDT | 0.592 | 67 | 55.9IP | 83 | | 52.5IP | 80 | | 50-120 | 6 | | 30 | A |
| Methoxychlor | 3.64 | 67 | 70.2 | 99 | | 67.0 | 97 | | 50-120 | 5 | | 30 | A |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836998-4 WG836998-5 QC Sample: L1527873-07 Client ID: COMP DE | | | | | | | | | | | | |

| Surrogate | MS % Recovery | MS Qualifier | MSD % Recovery | MSD Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|---|---|
| BZ 198 | **242** | Q | **492** | Q | 30-150 | A |
| DBOB | 57 | | 52 | | 30-150 | A |
| BZ 198 | 63 | | 67 | | 30-150 | B |
| DBOB | 48 | | 43 | | 30-150 | B |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits | |
|---|---|---|---|---|---|---|---|
| RIM Organochlorine Pesticides - Mansfield Lab COMP BC | Associated sample(s): 01,04,07,10 | QC Batch ID: WG836998-6 | QC Sample: L1527873-04 | Client ID: | | | |
| Hexachlorobenzene | ND | ND | ug/kg | NC | | 30 | A |
| gamma-BHC | ND | ND | ug/kg | NC | | 30 | A |
| Heptachlor | ND | ND | ug/kg | NC | | 30 | A |
| Aldrin | ND | ND | ug/kg | NC | | 30 | A |
| Heptachlor epoxide | ND | ND | ug/kg | NC | | 30 | B |
| Oxychlordane | ND | ND | ug/kg | NC | | 30 | B |
| trans-Chlordane | ND | ND | ug/kg | NC | | 30 | A |
| Endosulfan I | ND | ND | ug/kg | NC | | 30 | A |
| cis-Chlordane | ND | ND | ug/kg | NC | | 30 | A |
| trans-Nonachlor | ND | ND | ug/kg | NC | | 30 | A |
| 4,4'-DDE | ND | ND | ug/kg | NC | | 30 | A |
| Dieldrin | ND | ND | ug/kg | NC | | 30 | A |
| Endrin | ND | ND | ug/kg | NC | | 30 | A |
| Endosulfan II | ND | ND | ug/kg | NC | | 30 | A |
| 4,4'-DDD | ND | ND | ug/kg | NC | | 30 | B |
| cis-Nonachlor | ND | ND | ug/kg | NC | | 30 | A |
| 4,4'-DDT | ND | ND | ug/kg | NC | | 30 | A |
| Methoxychlor | ND | ND | ug/kg | NC | | 30 | A |
| Toxaphene | ND | ND | ug/kg | NC | | 30 | A |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG836998-6 QC Sample: L1527873-04 Client ID: COMP BC

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria | Column |
|---|---|---|---|---|---|---|
| DBOB | 52 | | 47 | | 30-150 | A |
| BZ 198 | 126 | | 108 | | 30-150 | A |
| DBOB | 47 | | 43 | | 30-150 | B |
| BZ 198 | 68 | | 61 | | 30-150 | B |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG836998-7

| Parameter | % Recovery | Qual | QC Criteria |
|---|---|---|---|
| Hexachlorobenzene | 83 | | 40-140 |
| cis-Chlordane | 109 | | 40-140 |
| trans-Nonachlor | 449 | Q | 40-140 |
| DBOB (Surrogate) | 59 | | 30-150 |
| DBOB (Surrogate) | 68 | | 30-150 |
| BZ 198 (Surrogate) | 54 | | 30-150 |
| BZ 198 (Surrogate) | 240 | Q | 30-150 |

# METALS

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-01
Client ID: A
Sample Location: BLUE HILL, ME
Matrix: Soil
Percent Solids: 45%

Date Collected: 10/28/15 14:53
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Metals - Mansfield Lab** | | | | | | | | | | | |
| Arsenic, Total | 4.51 | | mg/kg | 0.053 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:49 | EPA 3050B | 1,6020A | DB |
| Cadmium, Total | 0.644 | | mg/kg | 0.021 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:49 | EPA 3050B | 1,6020A | DB |
| Chromium, Total | 21.1 | | mg/kg | 0.212 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:49 | EPA 3050B | 1,6020A | DB |
| Copper, Total | 17.6 | | mg/kg | 0.212 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:49 | EPA 3050B | 1,6020A | DB |
| Lead, Total | 21.7 | | mg/kg | 0.064 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:49 | EPA 3050B | 1,6020A | DB |
| Mercury, Total | 0.033 | | mg/kg | 0.029 | -- | 5 | 11/11/15 18:08 | 11/13/15 12:32 | EPA 7474 | 1,7474 | LC |
| Nickel, Total | 15.6 | | mg/kg | 0.106 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:49 | EPA 3050B | 1,6020A | DB |
| Zinc, Total | 54.2 | | mg/kg | 1.06 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:49 | EPA 3050B | 1,6020A | DB |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-04
Client ID: COMP BC
Sample Location: BLUE HILL, ME
Matrix: Soil
Percent Solids: 48%

Date Collected: 10/28/15 14:46
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Metals - Mansfield Lab** | | | | | | | | | | | |
| Arsenic, Total | 7.69 | | mg/kg | 0.061 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:54 | EPA 3050B | 1,6020A | DB |
| Cadmium, Total | 0.833 | | mg/kg | 0.024 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:54 | EPA 3050B | 1,6020A | DB |
| Chromium, Total | 30.9 | | mg/kg | 0.242 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:54 | EPA 3050B | 1,6020A | DB |
| Copper, Total | 16.5 | | mg/kg | 0.242 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:54 | EPA 3050B | 1,6020A | DB |
| Lead, Total | 21.8 | | mg/kg | 0.363 | -- | 10 | 11/12/15 08:42 | 11/13/15 12:12 | EPA 3050B | 1,6020A | DB |
| Mercury, Total | 0.029 | | mg/kg | 0.028 | -- | 5 | 11/11/15 18:08 | 11/13/15 12:34 | EPA 7474 | 1,7474 | LC |
| Nickel, Total | 23.6 | | mg/kg | 0.121 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:54 | EPA 3050B | 1,6020A | DB |
| Zinc, Total | 64.1 | | mg/kg | 1.21 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:54 | EPA 3050B | 1,6020A | DB |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-07
Client ID: COMP DE
Sample Location: BLUE HILL, ME
Matrix: Soil
Percent Solids: 73%

Date Collected: 10/28/15 14:22
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Metals - Mansfield Lab** | | | | | | | | | | | |
| Arsenic, Total | 5.24 | | mg/kg | 0.039 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:59 | EPA 3050B | 1,6020A | DB |
| Cadmium, Total | 0.120 | | mg/kg | 0.016 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:59 | EPA 3050B | 1,6020A | DB |
| Chromium, Total | 12.3 | | mg/kg | 0.155 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:59 | EPA 3050B | 1,6020A | DB |
| Copper, Total | 14.3 | | mg/kg | 0.155 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:59 | EPA 3050B | 1,6020A | DB |
| Lead, Total | 23.0 | | mg/kg | 0.047 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:59 | EPA 3050B | 1,6020A | DB |
| Mercury, Total | 0.017 | | mg/kg | 0.016 | -- | 5 | 11/11/15 18:08 | 11/13/15 12:45 | EPA 7474 | 1,7474 | LC |
| Nickel, Total | 10.3 | | mg/kg | 0.078 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:59 | EPA 3050B | 1,6020A | DB |
| Zinc, Total | 40.6 | | mg/kg | 0.775 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:59 | EPA 3050B | 1,6020A | DB |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-10
Client ID: COMP FG
Sample Location: BLUE HILL, ME
Matrix: Soil
Percent Solids: 72%

Date Collected: 10/28/15 14:00
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Metals - Mansfield Lab** | | | | | | | | | | | |
| Arsenic, Total | 6.32 | | mg/kg | 0.039 | -- | 2 | 11/12/15 08:42 | 11/13/15 12:00 | EPA 3050B | 1,6020A | DB |
| Cadmium, Total | 0.161 | | mg/kg | 0.016 | -- | 2 | 11/12/15 08:42 | 11/13/15 12:00 | EPA 3050B | 1,6020A | DB |
| Chromium, Total | 10.8 | | mg/kg | 0.156 | -- | 2 | 11/12/15 08:42 | 11/13/15 12:00 | EPA 3050B | 1,6020A | DB |
| Copper, Total | 6.90 | | mg/kg | 0.156 | -- | 2 | 11/12/15 08:42 | 11/13/15 12:00 | EPA 3050B | 1,6020A | DB |
| Lead, Total | 10.5 | | mg/kg | 0.047 | -- | 2 | 11/12/15 08:42 | 11/13/15 12:00 | EPA 3050B | 1,6020A | DB |
| Mercury, Total | ND | | mg/kg | 0.015 | -- | 5 | 11/11/15 18:08 | 11/13/15 12:48 | EPA 7474 | 1,7474 | LC |
| Nickel, Total | 9.40 | | mg/kg | 0.078 | -- | 2 | 11/12/15 08:42 | 11/13/15 12:00 | EPA 3050B | 1,6020A | DB |
| Zinc, Total | 37.9 | | mg/kg | 0.779 | -- | 2 | 11/12/15 08:42 | 11/13/15 12:00 | EPA 3050B | 1,6020A | DB |

**Project Name:** BLUE HILL HARBOR
**Lab Number:** L1527873
**Project Number:** Not Specified
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-12
Client ID: BLANK
Sample Location: BLUE HILL, ME
Matrix: Water
Date Collected: 10/28/15 14:53
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Prep Method | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Metals - Mansfield Lab** | | | | | | | | | | | |
| Arsenic, Total | 0.00169 | | mg/l | 0.00050 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:30 | EPA 3020A | 1,6020A | DB |
| Cadmium, Total | ND | | mg/l | 0.00050 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:30 | EPA 3020A | 1,6020A | DB |
| Chromium, Total | ND | | mg/l | 0.00100 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:30 | EPA 3020A | 1,6020A | DB |
| Copper, Total | ND | | mg/l | 0.00100 | -- | 1 | 11/11/15 12:21 | 11/13/15 13:36 | EPA 3020A | 1,6020A | DB |
| Lead, Total | ND | | mg/l | 0.00100 | -- | 1 | 11/11/15 12:21 | 11/13/15 13:36 | EPA 3020A | 1,6020A | DB |
| Mercury, Total | ND | | mg/l | 0.00010 | -- | 1 | 11/11/15 14:28 | 11/13/15 15:09 | EPA 7474 | 1,7474 | LC |
| Nickel, Total | ND | | mg/l | 0.00050 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:30 | EPA 3020A | 1,6020A | DB |
| Zinc, Total | ND | | mg/l | 0.0100 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:30 | EPA 3020A | 1,6020A | DB |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified
**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
# Batch Quality Control

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab for sample(s): 12 Batch: WG839582-1 | | | | | | | | | | |
| Arsenic, Total | ND | | mg/l | 0.00050 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:21 | 1,6020A | DB |
| Cadmium, Total | ND | | mg/l | 0.00050 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:21 | 1,6020A | DB |
| Chromium, Total | ND | | mg/l | 0.00100 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:21 | 1,6020A | DB |
| Copper, Total | ND | | mg/l | 0.00100 | -- | 1 | 11/11/15 12:21 | 11/13/15 13:22 | 1,6020A | DB |
| Lead, Total | ND | | mg/l | 0.00100 | -- | 1 | 11/11/15 12:21 | 11/13/15 13:22 | 1,6020A | DB |
| Nickel, Total | ND | | mg/l | 0.00050 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:21 | 1,6020A | DB |
| Zinc, Total | ND | | mg/l | 0.0100 | -- | 1 | 11/11/15 12:21 | 11/13/15 12:21 | 1,6020A | DB |

**Prep Information**

Digestion Method: EPA 3020A

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab for sample(s): 12 Batch: WG839590-1 | | | | | | | | | | |
| Mercury, Total | ND | | mg/l | 0.00010 | -- | 1 | 11/11/15 14:28 | 11/13/15 14:54 | 1,7474 | LC |

**Prep Information**

Digestion Method: EPA 7474

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab for sample(s): 01,04,07,10 Batch: WG839676-1 | | | | | | | | | | |
| Arsenic, Total | ND | | mg/kg | 0.050 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:31 | 1,6020A | DB |
| Cadmium, Total | ND | | mg/kg | 0.020 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:31 | 1,6020A | DB |
| Chromium, Total | ND | | mg/kg | 0.200 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:31 | 1,6020A | DB |
| Copper, Total | ND | | mg/kg | 0.200 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:31 | 1,6020A | DB |
| Lead, Total | ND | | mg/kg | 0.060 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:31 | 1,6020A | DB |
| Nickel, Total | ND | | mg/kg | 0.100 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:31 | 1,6020A | DB |
| Zinc, Total | ND | | mg/kg | 1.00 | -- | 2 | 11/12/15 08:42 | 11/13/15 11:31 | 1,6020A | DB |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified
**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
# Batch Quality Control

**Prep Information**

Digestion Method: EPA 3050B

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab for sample(s): 01,04,07,10 Batch: WG839678-1 | | | | | | | | | | |
| Mercury, Total | ND | | mg/kg | 0.013 | -- | 5 | 11/11/15 18:08 | 11/13/15 11:38 | 1,7474 | LC |

**Prep Information**

Digestion Method: EPA 7474

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab Associated sample(s): 12 Batch: WG839582-2 SRM Lot Number: A2METSPIKE | | | | | | | | |
| Arsenic, Total | 99 | | - | | 80-120 | - | | 20 |
| Cadmium, Total | 102 | | - | | 80-120 | - | | 20 |
| Chromium, Total | 103 | | - | | 80-120 | - | | 20 |
| Copper, Total | 102 | | - | | 80-120 | - | | 20 |
| Lead, Total | 110 | | - | | 80-120 | - | | 20 |
| Nickel, Total | 99 | | - | | 80-120 | - | | 20 |
| Zinc, Total | 97 | | - | | 80-120 | - | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 12 Batch: WG839590-2 SRM Lot Number: HPHGAF | | | | | | | | |
| Mercury, Total | 100 | | - | | 80-120 | - | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 Batch: WG839676-2 SRM Lot Number: ERA-D088 | | | | | | | | |
| Arsenic, Total | 97 | | - | | 79-121 | - | | 20 |
| Cadmium, Total | 99 | | - | | 83-117 | - | | 20 |
| Chromium, Total | 95 | | - | | 80-120 | - | | 20 |
| Copper, Total | 98 | | - | | 81-118 | - | | 20 |
| Lead, Total | 93 | | - | | 81-117 | - | | 20 |
| Nickel, Total | 101 | | - | | 83-117 | - | | 20 |
| Zinc, Total | 94 | | - | | 82-118 | - | | 20 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** BLUE HILL HARBOR

**Project Number:** Not Specified

**Lab Number:** L1527873

**Report Date:** 11/19/15

| Parameter | LCS %Recovery | LCSD %Recovery | %Recovery Limits | RPD | RPD Limits |
|---|---|---|---|---|---|
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 Batch: WG839678-2 SRM Lot Number: ERA-D088 | | | | | |
| Mercury, Total | 106 | - | 72-128 | - | 20 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab Associated sample(s): 12 QC Batch ID: WG839582-4 WG839582-5 QC Sample: L1527184-09 Client ID: MS Sample | | | | | | | | | | | | |
| Arsenic, Total | 0.00164 | 1 | 0.9932 | 99 | | 0.9857 | 98 | | 75-125 | 1 | | 20 |
| Cadmium, Total | ND | 0.5 | 0.5095 | 102 | | 0.5200 | 104 | | 75-125 | 2 | | 20 |
| Chromium, Total | 0.00148 | 1 | 1.02 | 102 | | 1.04 | 104 | | 75-125 | 2 | | 20 |
| Copper, Total | 0.00271 | 1 | 1.06 | 106 | | 1.10 | 110 | | 75-125 | 4 | | 20 |
| Lead, Total | ND | 1 | 1.08 | 108 | | 1.10 | 110 | | 75-125 | 2 | | 20 |
| Nickel, Total | 0.00106 | 1 | 0.9913 | 99 | | 0.9986 | 100 | | 75-125 | 1 | | 20 |
| Zinc, Total | 0.0132 | 1 | 0.985 | 97 | | 0.998 | 98 | | 75-125 | 1 | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 12 QC Batch ID: WG839590-4 WG839590-5 QC Sample: L1527873-12 Client ID: BLANK | | | | | | | | | | | | |
| Mercury, Total | ND | 0.005 | 0.00481 | 96 | | 0.00476 | 95 | | 80-120 | 1 | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839676-4 WG839676-5 QC Sample: L1527184-08 Client ID: MS Sample | | | | | | | | | | | | |
| Arsenic, Total | 11.5 | 215 | 227 | 100 | | 226 | 100 | | 75-125 | 0 | | 20 |
| Cadmium, Total | 29.9 | 107 | 135 | 98 | | 136 | 99 | | 75-125 | 1 | | 20 |
| Chromium, Total | 307 | 215 | 516 | 97 | | 515 | 97 | | 75-125 | 0 | | 20 |
| Copper, Total | 593 | 215 | 795 | 96 | | 837 | 115 | | 75-125 | 5 | | 20 |
| Lead, Total | 246 | 215 | 455 | 115 | | 502 | **137** | Q | 75-125 | 10 | | 20 |
| Nickel, Total | 65.8 | 215 | 272 | 96 | | 280 | 100 | | 75-125 | 3 | | 20 |
| Zinc, Total | 760 | 215 | 915 | 75 | | 961 | 96 | | 75-125 | 5 | | 20 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | MSD Found | MSD %Recovery | Recovery Limits | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839676-7 WG839676-8 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | | | | |
| Arsenic, Total | 7.69 | 257 | 270 | 102 | 267 | 101 | 75-125 | 1 | 20 |
| Cadmium, Total | 0.833 | 129 | 129 | 100 | 129 | 100 | 75-125 | 0 | 20 |
| Chromium, Total | 30.9 | 257 | 277 | 96 | 286 | 99 | 75-125 | 3 | 20 |
| Copper, Total | 16.5 | 257 | 252 | 91 | 259 | 94 | 75-125 | 3 | 20 |
| Lead, Total | 21.8 | 257 | 263 | 95 | 264 | 96 | 75-125 | 14 | 20 |
| Nickel, Total | 23.6 | 257 | 269 | 95 | 272 | 96 | 75-125 | 1 | 20 |
| Zinc, Total | 64.1 | 257 | 290 | 87 | 297 | 90 | 75-125 | 2 | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839678-4 WG839678-5 QC Sample: L1527184-08 Client ID: MS Sample | | | | | | | | | |
| Mercury, Total | 0.607 | 1.12 | 1.68 | 95 | 1.63 | 89 | 80-120 | 3 | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839678-7 WG839678-8 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | | | | |
| Mercury, Total | 0.029 | 1.3 | 1.17 | 88 | 1.27 | 106 | 80-120 | 8 | 20 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab Associated sample(s): 12 QC Batch ID: WG839582-3 QC Sample: L1527184-09 Client ID: DUP Sample | | | | | | |
| Arsenic, Total | 0.00164 | ND | mg/l | NC | | 20 |
| Cadmium, Total | ND | ND | mg/l | NC | | 20 |
| Chromium, Total | 0.00148 | 0.00226 | mg/l | **42** | Q | 20 |
| Nickel, Total | 0.00106 | 0.00099 | mg/l | 7 | | 20 |
| Zinc, Total | 0.0132 | 0.0156 | mg/l | 17 | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 12 QC Batch ID: WG839582-3 QC Sample: L1527184-09 Client ID: DUP Sample | | | | | | |
| Copper, Total | 0.00271 | 0.00428 | mg/l | **46** | Q | 20 |
| Lead, Total | ND | ND | mg/l | NC | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 12 QC Batch ID: WG839590-3 QC Sample: L1527873-12 Client ID: BLANK | | | | | | |
| Mercury, Total | ND | ND | mg/l | NC | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839676-3 QC Sample: L1527184-08 Client ID: DUP Sample | | | | | | |
| Arsenic, Total | 11.5 | 11.3 | mg/kg | 2 | | 20 |
| Cadmium, Total | 29.9 | 29.7 | mg/kg | 1 | | 20 |
| Chromium, Total | 307 | 308 | mg/kg | 0 | | 20 |
| Nickel, Total | 65.8 | 65.6 | mg/kg | 0 | | 20 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | | RPD Limits |
|---|---|---|---|---|---|---|
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839676-3 QC Sample: L1527184-08 Client ID: DUP Sample | | | | | | |
| Copper, Total | 593 | 582 | mg/kg | 1 | | 20 |
| Lead, Total | 246 | 240 | mg/kg | 14 | | 20 |
| Zinc, Total | 760 | 720 | mg/kg | 5 | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839676-6 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | |
| Arsenic, Total | 7.69 | 7.88 | mg/kg | 0 | | 20 |
| Cadmium, Total | 0.833 | 0.809 | mg/kg | 7 | | 20 |
| Chromium, Total | 30.9 | 31.3 | mg/kg | 1 | | 20 |
| Copper, Total | 16.5 | 15.2 | mg/kg | 13 | | 20 |
| Nickel, Total | 23.6 | 23.8 | mg/kg | 1 | | 20 |
| Zinc, Total | 64.1 | 64.7 | mg/kg | 2 | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839676-6 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | |
| Lead, Total | 21.8 | 21.7 | mg/kg | 0 | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839678-3 QC Sample: L1527184-08 Client ID: DUP Sample | | | | | | |
| Mercury, Total | 0.607 | 0.593 | mg/kg | 2 | | 20 |
| Total Metals - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG839678-6 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | |
| Mercury, Total | 0.029 | 0.078 | mg/kg | **91** | Q | 20 |

# INORGANICS
# &
# MISCELLANEOUS

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-01
Client ID: A
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:53
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 8.58 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| Total Organic Carbon (Rep2) | 8.06 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| **RIM Grain Size Analysis - Mansfield Lab** | | | | | | | | | | |
| % Total Gravel | 0.100 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Coarse Sand | 2.20 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Medium Sand | 6.60 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Fine Sand | 21.6 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Total Fines | 69.5 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 44.7 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 55.3 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-02
Client ID: B
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:46
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **RIM Grain Size Analysis - Mansfield Lab** | | | | | | | | | | |
| % Total Gravel | ND | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Coarse Sand | 1.70 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Medium Sand | 3.50 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Fine Sand | 7.40 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Total Fines | 87.4 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 48.8 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 51.2 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-03
Client ID: C
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:33
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **RIM Grain Size Analysis - Mansfield Lab** | | | | | | | | | | |
| % Total Gravel | 1.10 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Coarse Sand | 1.90 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Medium Sand | 4.90 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Fine Sand | 12.1 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Total Fines | 80.0 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 45.5 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 54.5 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-04
Client ID: COMP BC
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:46
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 3.52 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| Total Organic Carbon (Rep2) | 3.95 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 48.0 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 52.0 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-05
Client ID: D
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:22
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **RIM Grain Size Analysis - Mansfield Lab** | | | | | | | | | | |
| % Total Gravel | 4.40 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Coarse Sand | 13.2 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Medium Sand | 34.8 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Fine Sand | 35.0 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Total Fines | 12.6 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 80.4 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 19.6 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-06
Client ID: E
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:13
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **RIM Grain Size Analysis - Mansfield Lab** | | | | | | | | | | |
| % Total Gravel | 1.80 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Coarse Sand | 8.80 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Medium Sand | 26.7 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Fine Sand | 37.9 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Total Fines | 24.8 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 66.8 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 33.2 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-07
Client ID: COMP DE
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:22
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 1.99 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| Total Organic Carbon (Rep2) | 1.53 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 73.3 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 26.7 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-08
Client ID: F
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:00
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **RIM Grain Size Analysis - Mansfield Lab** | | | | | | | | | | |
| % Total Gravel | 5.00 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Coarse Sand | 14.0 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Medium Sand | 30.6 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Fine Sand | 29.8 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Total Fines | 20.6 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 73.2 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 26.8 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-09
Client ID: G
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 13:43
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **RIM Grain Size Analysis - Mansfield Lab** | | | | | | | | | | |
| % Total Gravel | 45.9 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Coarse Sand | 12.4 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Medium Sand | 16.7 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Fine Sand | 16.2 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| % Total Fines | 8.80 | | % | 0.100 | NA | 1 | - | 11/19/15 00:00 | 12,D422 | JN |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 78.6 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 21.4 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## SAMPLE RESULTS

Lab ID: L1527873-10
Client ID: COMP FG
Sample Location: BLUE HILL, ME
Matrix: Soil

Date Collected: 10/28/15 14:00
Date Received: 10/29/15
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 0.921 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| Total Organic Carbon (Rep2) | 0.845 | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 71.7 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |
| Moisture | 28.3 | | % | 0.100 | -- | 1 | - | 11/18/15 19:37 | 30,2540G | JN |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified
**Lab Number:** L1527873
**Report Date:** 11/19/15

# Method Blank Analysis
## Batch Quality Control

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon - Mansfield Lab for sample(s): 01,04,07,10 Batch: WG842407-1 | | | | | | | | | | |
| Total Organic Carbon (Rep1) | ND | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |
| Total Organic Carbon (Rep2) | ND | | % | 0.010 | -- | 1 | - | 11/18/15 12:51 | 1,9060A | CM |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG842407-4 QC Sample: L1527873-07 Client ID: COMP DE | | | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 1.99 | 0.543 | 2.19 | **37** | Q | - | - | | 75-125 | - | | 25 |
| Total Organic Carbon (Rep2) | 1.53 | 0.921 | 3.01 | **161** | Q | - | - | | 75-125 | - | | 25 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG841411-1 QC Sample: L1527873-03 Client ID: C | | | | | | |
| Solids, Total | 45.5 | 45.7 | % | 0 | | 10 |
| Moisture | 54.5 | 54.3 | % | 0 | | 10 |
| General Chemistry - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG841411-2 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | |
| Solids, Total | 48.0 | 47.7 | % | 1 | | 10 |
| Moisture | 52 | 52.3 | % | 1 | | 10 |
| Total Organic Carbon - Mansfield Lab Associated sample(s): 01,04,07,10 QC Batch ID: WG842407-3 QC Sample: L1527873-04 Client ID: COMP BC | | | | | | |
| Total Organic Carbon (Rep1) | 3.52 | 3.46 | % | 2 | | 25 |
| Total Organic Carbon (Rep2) | 3.95 | 3.52 | % | 12 | | 25 |
| RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-03,05-06,08-09 QC Batch ID: WG842455-1 QC Sample: L1527873-03 Client ID: C | | | | | | |
| % Total Gravel | 1.10 | ND | % | NC | | 25 |
| % Coarse Sand | 1.90 | 1.30 | % | **38** | Q | 25 |
| % Medium Sand | 4.90 | 4.80 | % | 2 | | 25 |
| % Fine Sand | 12.1 | 11.4 | % | 6 | | 25 |
| % Total Fines | 80.0 | 82.5 | % | 3 | | 25 |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified
**Lab Number:** L1527873
**Report Date:** 11/19/15

## S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG842407-2

| Parameter | % Recovery | Qual | QC Criteria |
|---|---|---|---|
| Total Organic Carbon (Rep1) | 106 | | 75-125 |
| Total Organic Carbon (Rep2) | 124 | | 75-125 |

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

## Sample Receipt and Container Information

Were project specific reporting limits specified? YES

**Cooler Information Custody Seal**

| Cooler | |
|---|---|
| A | Absent |

**Container Information**

| Container ID | Container Type | Cooler | pH | Temp deg C | Pres | Seal | Analysis(*) |
|---|---|---|---|---|---|---|---|
| L1527873-01A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |
| L1527873-01B | Glass 250ml/8oz unpreserved | A | N/A | 5.4 | Y | Absent | A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14) |
| L1527873-02A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-MOISTURE-2540(7),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |
| L1527873-03A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-MOISTURE-2540(7),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |
| L1527873-03B | Glass 60mL/2oz unpreserved | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-MOISTURE-2540(7),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |

*Values in parentheses indicate holding time in days

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

**Container Information**

| Container ID | Container Type | Cooler | pH | Temp deg C | Pres | Seal | Analysis(*) |
|---|---|---|---|---|---|---|---|
| L1527873-04A | Glass 250ml/8oz unpreserved | A | N/A | 5.4 | Y | Absent | A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14) |
| L1527873-05A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-MOISTURE-2540(7),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |
| L1527873-06A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-MOISTURE-2540(7),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |
| L1527873-07A | Glass 250ml/8oz unpreserved | A | N/A | 5.4 | Y | Absent | A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14) |
| L1527873-08A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-MOISTURE-2540(7),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |
| L1527873-09A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | A2-RIMHYDRO-CSAND(),A2-MOISTURE-2540(7),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-TS(7),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND() |

*Values in parentheses indicate holding time in days

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified

**Lab Number:** L1527873
**Report Date:** 11/19/15

**Container Information**

| Container ID | Container Type | Cooler | pH | Temp deg C | Pres | Seal | Analysis(*) |
|---|---|---|---|---|---|---|---|
| L1527873-10A | Glass 250ml/8oz unpreserved | A | N/A | 5.4 | Y | Absent | A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14) |
| L1527873-11A | Plastic 8oz unpreserved for Grai | A | N/A | 5.4 | Y | Absent | - |
| L1527873-12A | Plastic 500ml HNO3 preserved | A | <2 | 5.4 | Y | Absent | A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-CU-6020T(180) |
| L1527873-12B | Amber 1000ml unpreserved | A | 7 | 5.4 | Y | Absent | A2-RIM-PAH/PCBCONG(7) |
| L1527873-12C | Amber 1000ml unpreserved | A | 7 | 5.4 | Y | Absent | A2-RIM-PAH/PCBCONG(7) |
| L1527873-12D | Amber 1000ml unpreserved | A | 7 | 5.4 | Y | Absent | A2-RIM-PEST-8081(7) |
| L1527873-12E | Amber 1000ml unpreserved | A | 7 | 5.4 | Y | Absent | A2-RIM-PEST-8081(7) |

*Values in parentheses indicate holding time in days

| | | | |
|---|---|---|---|
| **Project Name:** | BLUE HILL HARBOR | **Lab Number:** | L1527873 |
| **Project Number:** | Not Specified | **Report Date:** | 11/19/15 |

## GLOSSARY

### *Acronyms*

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

### *Footnotes*

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### *Terms*

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

### *Data Qualifiers*

**A** - Spectra identified as "Aldol Condensation Product".

**B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

*Report Format:* Data Usability Report

| | | | |
|---|---|---|---|
| **Project Name:** | BLUE HILL HARBOR | **Lab Number:** | L1527873 |
| **Project Number:** | Not Specified | **Report Date:** | 11/19/15 |

***Data Qualifiers***

**C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

**D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

**E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

**G** - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

**H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

**I** - The lower value for the two columns has been reported due to obvious interference.

**M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

**NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

**P** - The RPD between the results for the two columns exceeds the method-specified criteria.

**Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

**R** - Analytical results are from sample re-analysis.

**RE** - Analytical results are from sample re-extraction.

**S** - Analytical results are from modified screening analysis.

**J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

**ND** - Not detected at the reporting limit (RL) for the sample.

*Report Format:* Data Usability Report

**Project Name:** BLUE HILL HARBOR
**Project Number:** Not Specified
**Lab Number:** L1527873
**Report Date:** 11/19/15

## REFERENCES


1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.


## LIMITATION OF LIABILITIES

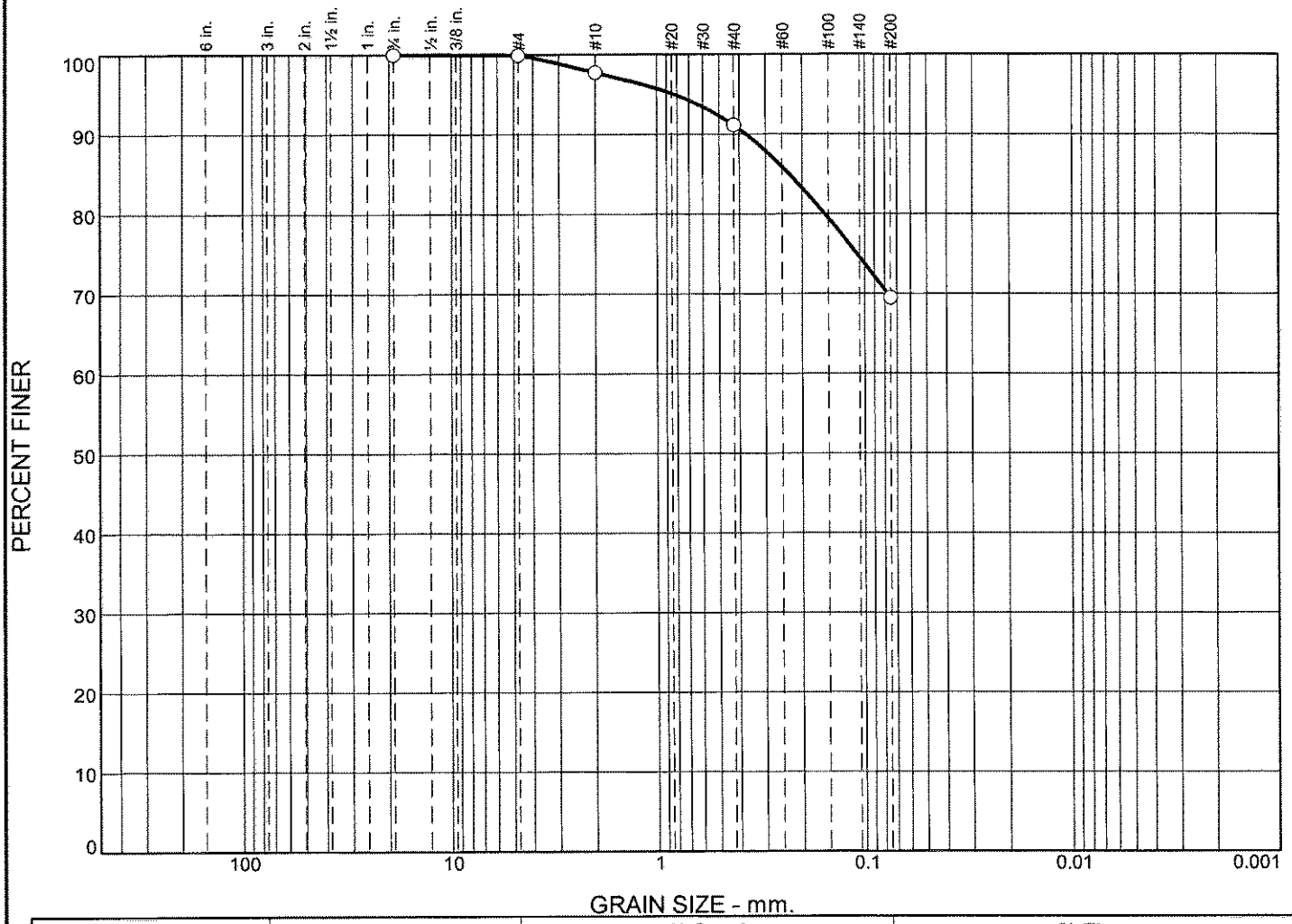
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

# ASTM D422-63

# GRAIN SIZE ANALYSIS

# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 0.1 | 2.2 | 6.6 | 21.6 | 69.5 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | 0.2313 | | | | | | | |

| | Material Description | USCS | AASHTO |
|---|---|---|---|
| ○ | | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** A **Sample Number:** L1527873-01

**Remarks:**

**Alpha Analytical**

**Mansfield, MA**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** A

**Sample Number:** L1527873-01

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 39.77 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.03 | 0.00 | 99.9 |
| | | #10 | 0.87 | 0.00 | 97.7 |
| | | #40 | 2.63 | 0.00 | 91.1 |
| | | #200 | 8.59 | 0.00 | 69.5 |

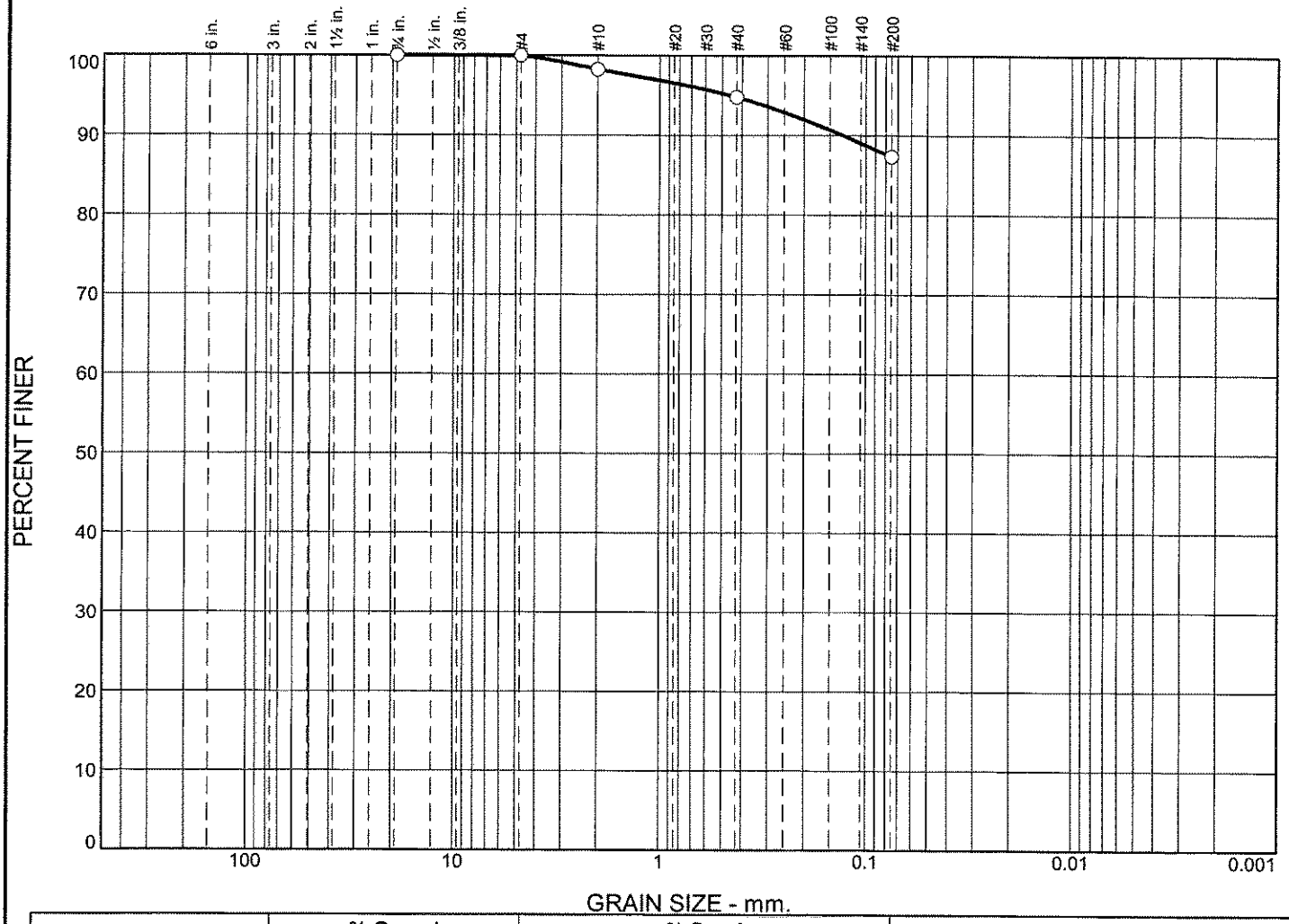
### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.1 | 0.1 | 2.2 | 6.6 | 21.6 | 30.4 | | | 69.5 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.1562 | 0.2313 | 0.3724 | 0.8229 |

| Fineness Modulus |
|---|
| 0.45 |

# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 0.0 | 1.7 | 3.5 | 7.4 | 87.4 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | | | | | | | | |

| Material Description | USCS | AASHTO |
|---|---|---|
| ○ | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** B **Sample Number:** L1527873-02

**Alpha Analytical**

**Mansfield, MA**

**Remarks:**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** B

**Sample Number:** L1527873-02

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 48.98 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.00 | 0.00 | 100.0 |
| | | #10 | 0.85 | 0.00 | 98.3 |
| | | #40 | 1.70 | 0.00 | 94.8 |
| | | #200 | 3.64 | 0.00 | 87.4 |

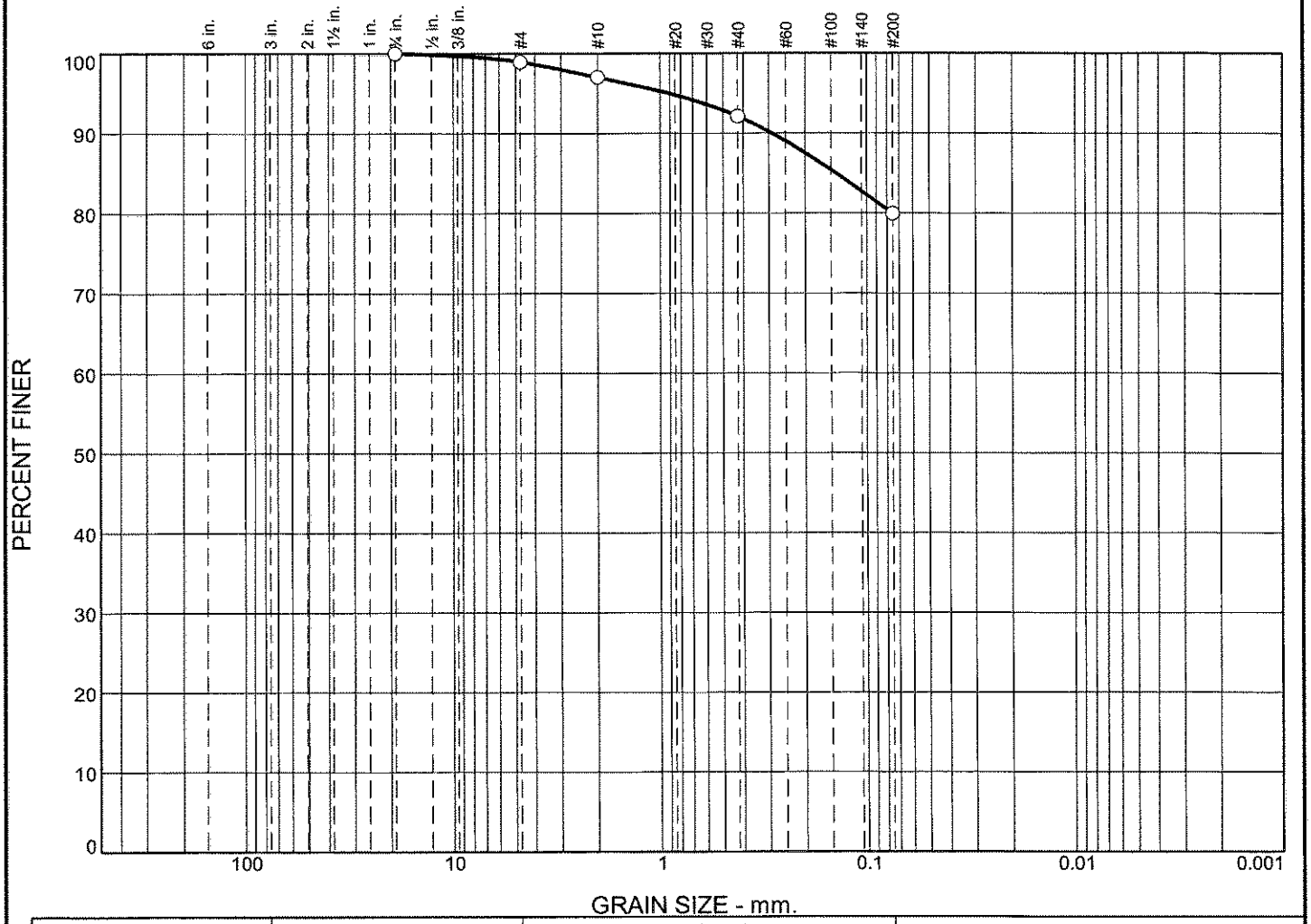
### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 3.5 | 7.4 | 12.6 | | | 87.4 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0.1296 | 0.4551 |

| Fineness Modulus |
|---|
| 0.24 |

# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 1.1 | 1.9 | 4.9 | 12.1 | 80.0 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | 0.1418 | | | | | | | |

| | Material Description | USCS | AASHTO |
|---|---|---|---|
| ○ | | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** C **Sample Number:** L1527873-03

**Remarks:**

**Alpha Analytical**

**Mansfield, MA**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** C

**Sample Number:** L1527873-03

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 49.62 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.53 | 0.00 | 98.9 |
| | | #10 | 0.95 | 0.00 | 97.0 |
| | | #40 | 2.43 | 0.00 | 92.1 |
| | | #200 | 6.03 | 0.00 | 80.0 |

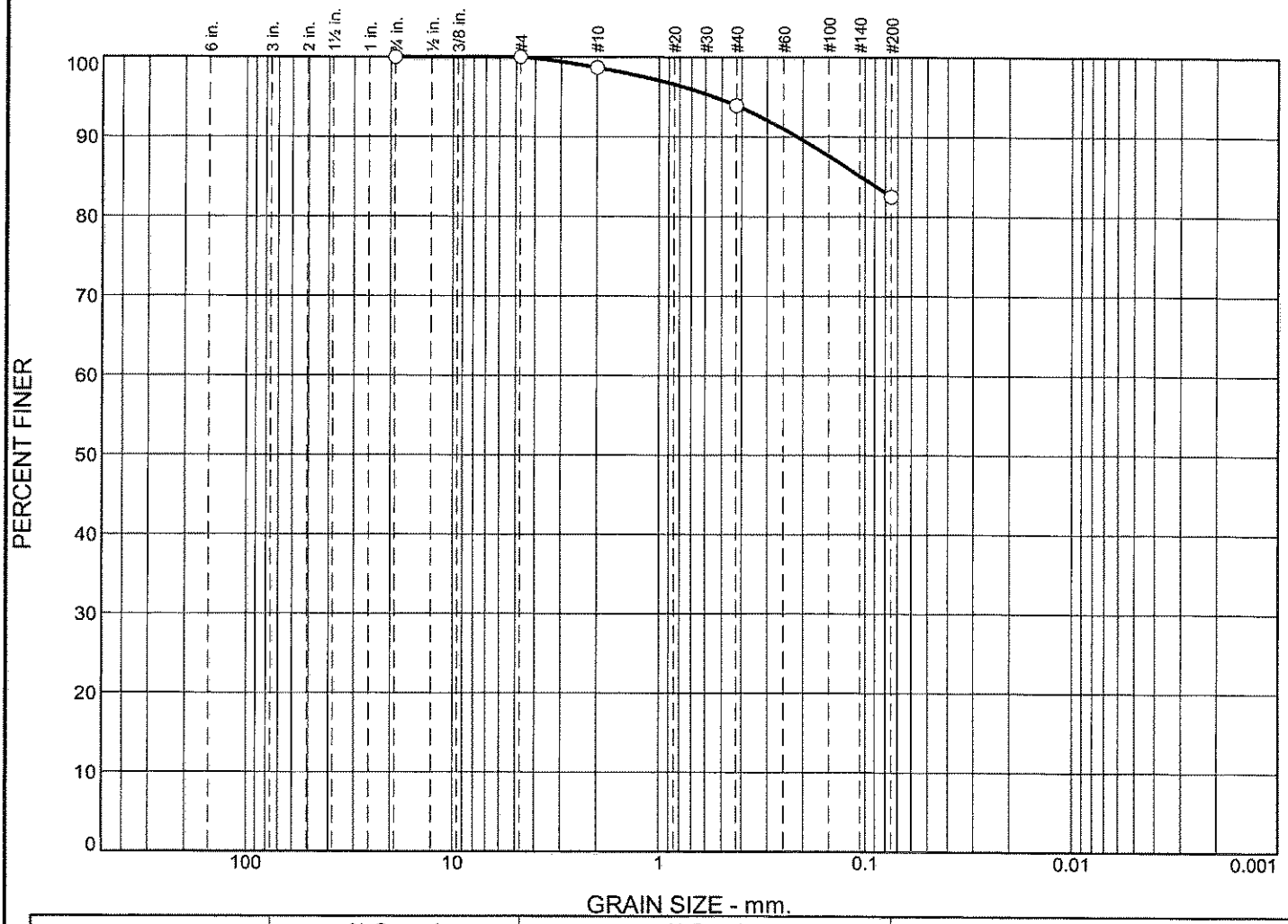
### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 1.1 | 1.1 | 1.9 | 4.9 | 12.1 | 18.9 | | | 80.0 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.0753 | 0.1418 | 0.2903 | 0.9040 |

| Fineness Modulus |
|---|
| 0.39 |

# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 0.0 | 1.3 | 4.8 | 11.4 | 82.5 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | 0.1046 | | | | | | | |

| | Material Description | USCS | AASHTO |
|---|---|---|---|
| ○ | | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** C **Sample Number:** WG842455-1

**Alpha Analytical**

**Mansfield, MA**

**Remarks:**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** C

**Sample Number:** WG842455-1

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 48.94 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 0.00 | 0.00 | 100.0 |
| | | #10 | 0.65 | 0.00 | 98.7 |
| | | #40 | 2.32 | 0.00 | 93.9 |
| | | #200 | 5.58 | 0.00 | 82.5 |

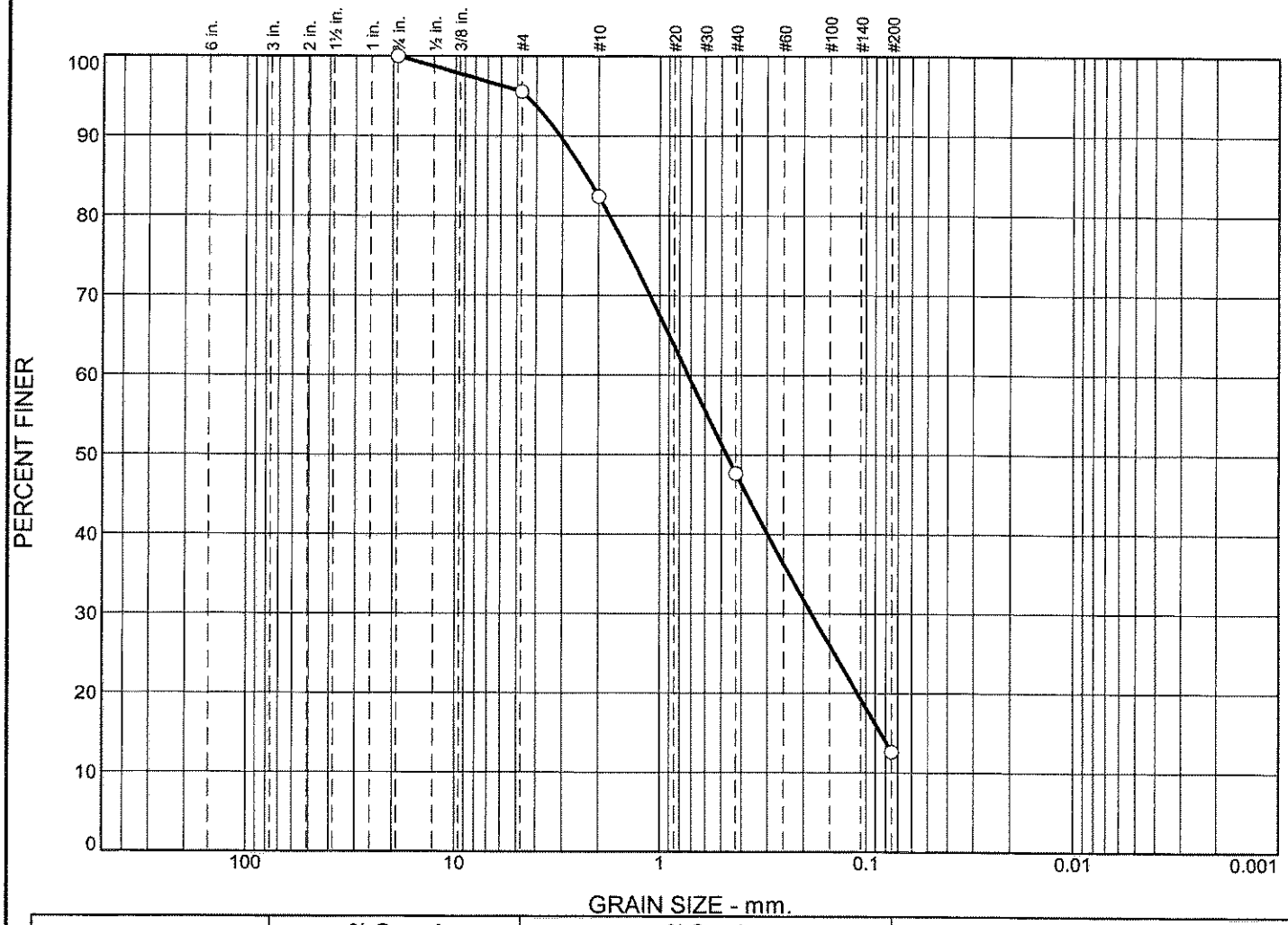
### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 4.8 | 11.4 | 17.5 | | | 82.5 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0.1046 | 0.2136 | 0.5407 |

| Fineness Modulus |
|---|
| 0.28 |

# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 4.4 | 13.2 | 34.8 | 35.0 | 12.6 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | 2.2939 | 0.7257 | 0.4718 | 0.1839 | 0.0849 | | | |

| | Material Description | USCS | AASHTO |
|---|---|---|---|
| ○ | | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** D **Sample Number:** L1527873-05

**Remarks:**

**Alpha Analytical**

**Mansfield, MA**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** D

**Sample Number:** L1527873-05

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 84.78 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 3.77 | 0.00 | 95.6 |
| | | #10 | 11.15 | 0.00 | 82.4 |
| | | #40 | 29.47 | 0.00 | 47.6 |
| | | #200 | 29.67 | 0.00 | 12.6 |

### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 4.4 | 4.4 | 13.2 | 34.8 | 35.0 | 83.0 | | | 12.6 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | 0.0849 | 0.1102 | 0.1839 | 0.4718 | 0.7257 | 1.7731 | 2.2939 | 3.0796 | 4.5017 |

| Fineness Modulus |
|---|
| 2.28 |

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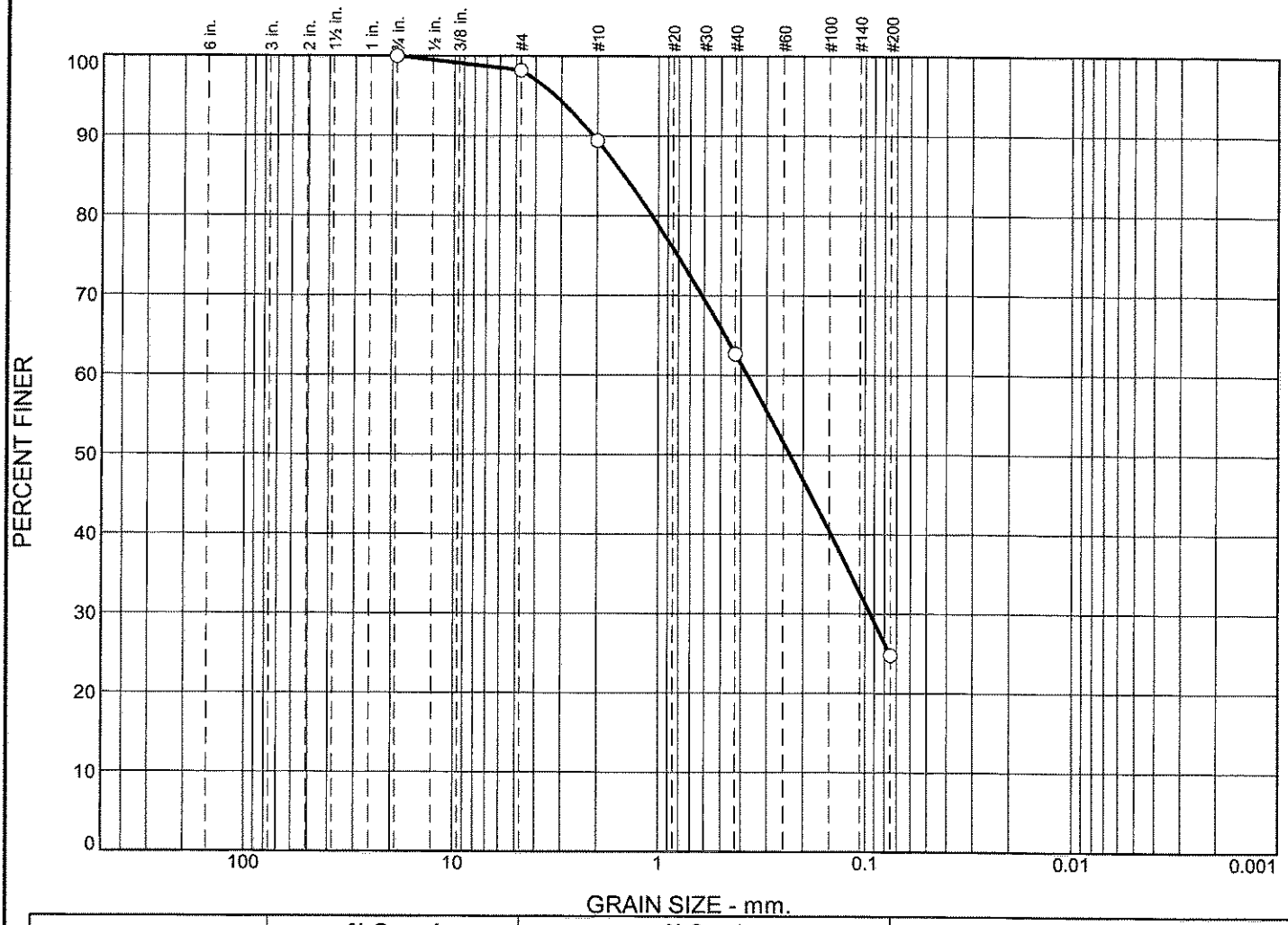
# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 1.8 | 8.8 | 26.7 | 37.9 | 24.8 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | 1.4714 | 0.3727 | 0.2322 | 0.0943 | | | | |

| Material Description | USCS | AASHTO |
|---|---|---|
| ○ | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** E **Sample Number:** L1527873-06

**Remarks:**

**Alpha Analytical**

**Mansfield, MA**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** E

**Sample Number:** L1527873-06

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 71.86 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 1.30 | 0.00 | 98.2 |
| | | #10 | 6.32 | 0.00 | 89.4 |
| | | #40 | 19.20 | 0.00 | 62.7 |
| | | #200 | 27.21 | 0.00 | 24.8 |

### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 1.8 | 1.8 | 8.8 | 26.7 | 37.9 | 73.4 | | | 24.8 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | 0.0943 | 0.2322 | 0.3727 | 1.0762 | 1.4714 | 2.0929 | 3.2147 |

| Fineness Modulus |
|---|
| 1.64 |

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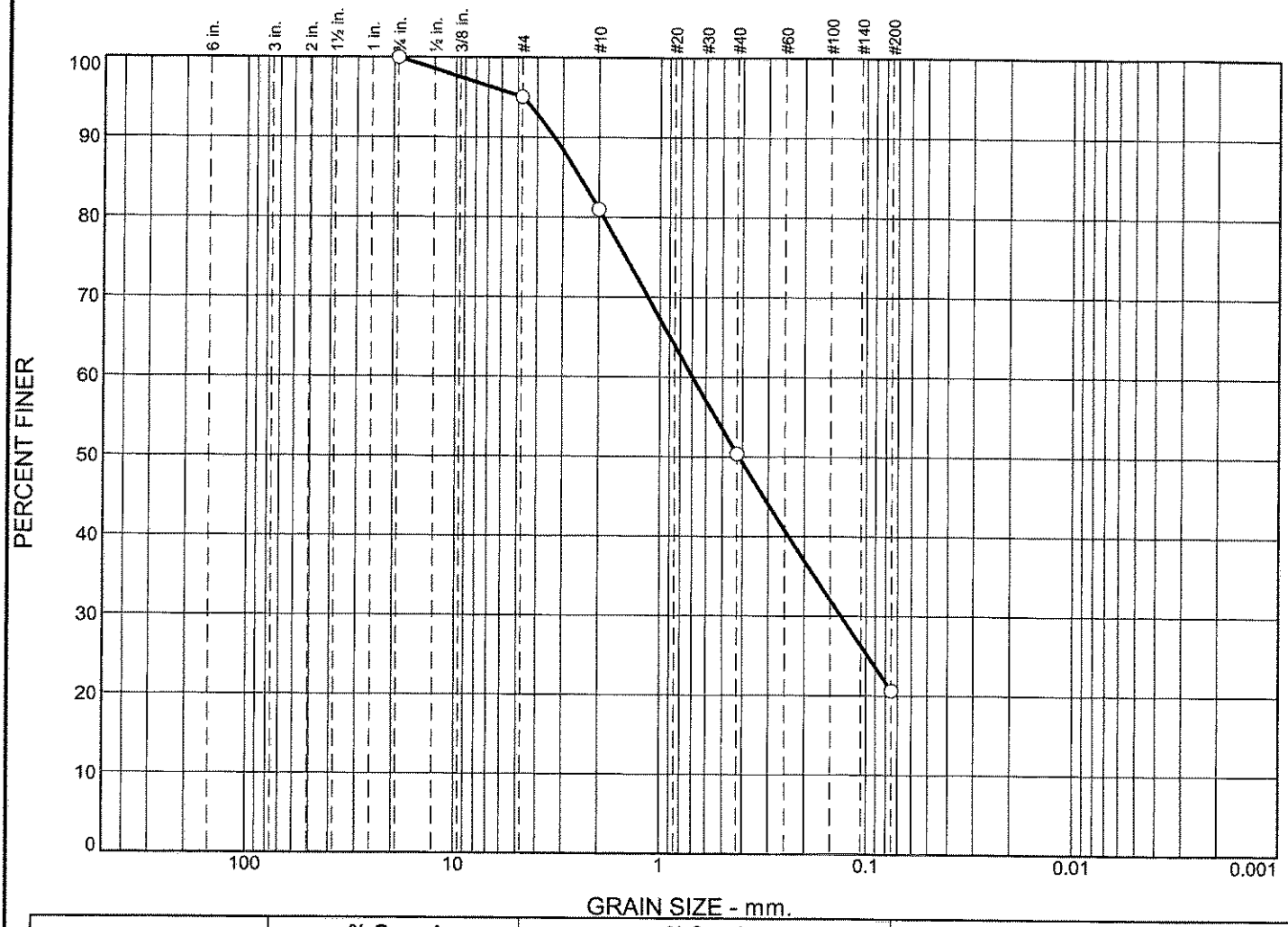
# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 5.0 | 14.0 | 30.6 | 29.8 | 20.6 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | 2.4729 | 0.6978 | 0.4170 | 0.1329 | | | | |

| Material Description | USCS | AASHTO |
|---|---|---|
| ○ | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** F **Sample Number:** L1527873-08

**Remarks:**

**Alpha Analytical**

**Mansfield, MA**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** F

**Sample Number:** L1527873-08

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 75.56 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 3.75 | 0.00 | 95.0 |
| | | #10 | 10.62 | 0.00 | 81.0 |
| | | #40 | 23.14 | 0.00 | 50.4 |
| | | #200 | 22.45 | 0.00 | 20.6 |

### Fractional Components

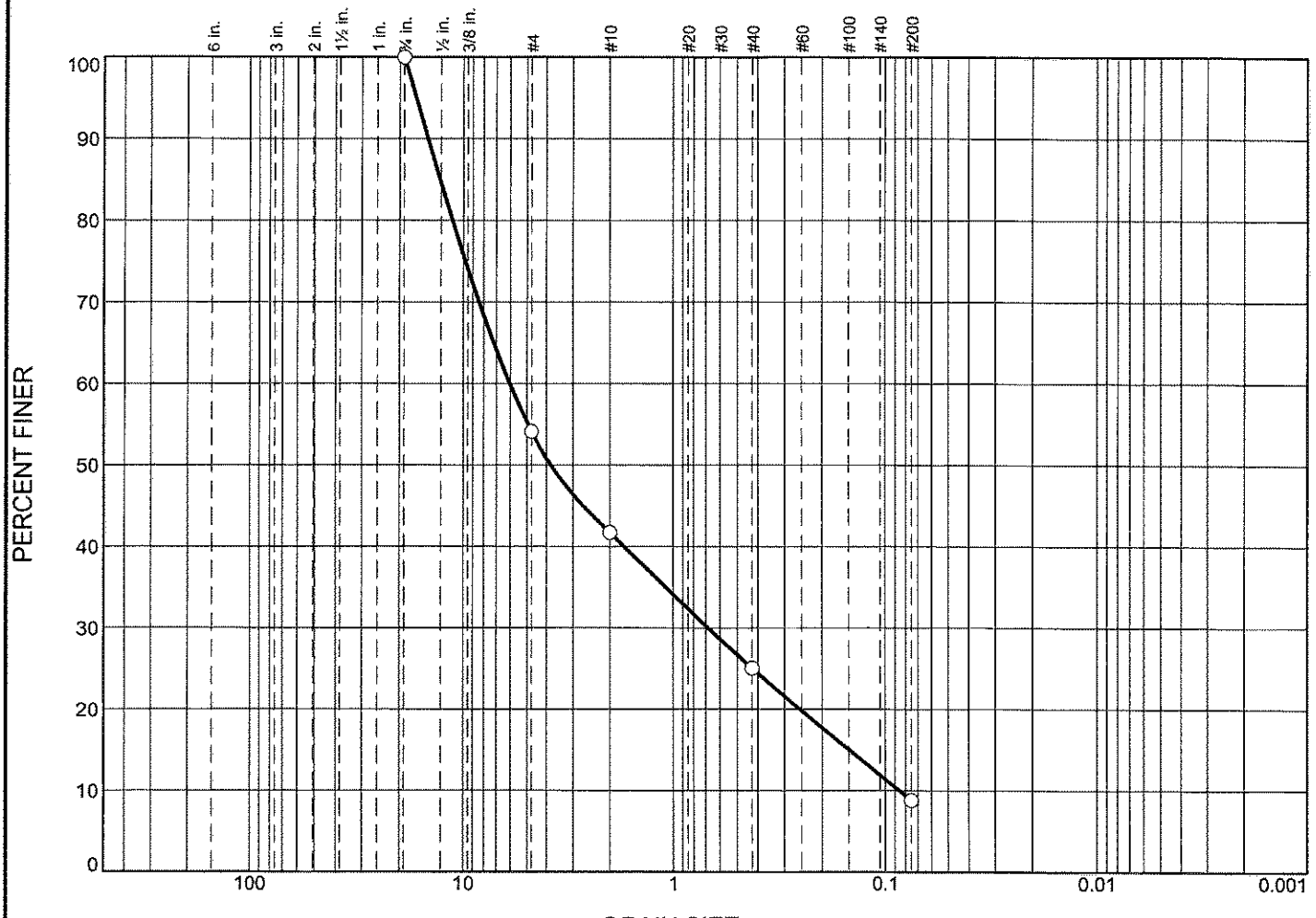
| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 5.0 | 5.0 | 14.0 | 30.6 | 29.8 | 74.4 | | | 20.6 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | | 0.1329 | 0.4170 | 0.6978 | 1.9011 | 2.4729 | 3.2979 | 4.7343 |

| Fineness Modulus |
|---|
| 2.20 |

Alpha Analytical

# Particle Size Distribution Report




| | % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|---|
| | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| ○ | 0.0 | 0.0 | 45.9 | 12.4 | 16.7 | 16.2 | 8.8 | |

| | LL | PL | $D_{85}$ | $D_{60}$ | $D_{50}$ | $D_{30}$ | $D_{15}$ | $D_{10}$ | $C_c$ | $C_u$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | | | 12.8851 | 6.0509 | 3.8250 | 0.6833 | 0.1490 | 0.0856 | 0.90 | 70.68 |

| Material Description | USCS | AASHTO |
|---|---|---|
| ○ | | |

**Project No.** **Client:**

**Project:**

○ **Source of Sample:** G **Sample Number:** L1527873-09

**Remarks:**

**Alpha Analytical**

**Mansfield, MA**

**Figure**

## GRAIN SIZE DISTRIBUTION TEST DATA

11/19/2015

**Location:** G

**Sample Number:** L1527873-09

### Sieve Test Data

| Dry Sample and Tare (grams) | Tare (grams) | Sieve Opening Size | Weight Retained (grams) | Sieve Weight (grams) | Percent Finer |
|---|---|---|---|---|---|
| 84.84 | 0.00 | 0.75 | 0.00 | 0.00 | 100.0 |
| | | #4 | 38.93 | 0.00 | 54.1 |
| | | #10 | 10.52 | 0.00 | 41.7 |
| | | #40 | 14.15 | 0.00 | 25.0 |
| | | #200 | 13.76 | 0.00 | 8.8 |

### Fractional Components

| Cobbles | Gravel | | | Sand | | | | Fines | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Total | Coarse | Medium | Fine | Total | Silt | Clay | Total |
| 0.0 | 0.0 | 45.9 | 45.9 | 12.4 | 16.7 | 16.2 | 45.3 | | | 8.8 |

| $D_{10}$ | $D_{15}$ | $D_{20}$ | $D_{30}$ | $D_{50}$ | $D_{60}$ | $D_{80}$ | $D_{85}$ | $D_{90}$ | $D_{95}$ |
|---|---|---|---|---|---|---|---|---|---|
| 0.0856 | 0.1490 | 0.2548 | 0.6833 | 3.8250 | 6.0509 | 11.2529 | 12.8851 | 14.7043 | 16.7451 |

| Fineness Modulus | $C_u$ | $C_c$ |
|---|---|---|
| 4.27 | 70.68 | 0.90 |

# Certification Information

**The following analytes are not included in our Primary NELAP Scope of Accreditation:**

**Westborough Facility**
**EPA 8260C:** 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; Iodomethane (methyl iodide) (soil); Methyl methacrylate (soil); Azobenzene.
**EPA 8270D:** Dimethylnaphthalene,1,4-Diphenylhydrazine.
**EPA 625:** 4-Chloroaniline, 4-Methylphenol.
**SM4500**: Soil: Total Phosphorus, TKN, NO2, NO3.

**Mansfield Facility**
**EPA 8270D:** Biphenyl.
**EPA 2540D:** TSS
**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:**

***Drinking Water***
**EPA 200.8**: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
**EPA 300.0**: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
**EPA 332**: Perchlorate.
**Microbiology**: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

***Non-Potable Water***
**EPA 200.8**: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
**EPA 200.7**: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
**EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH**, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
**EPA 624**: Volatile Halocarbons & Aromatics,
**EPA 608**: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
**EPA 625**: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
**Microbiology**: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

# CHAIN OF CUSTODY

PAGE 1 OF 2

Date Rec'd in Lab: 10/29/15

ALPHA Job #: L1527873

ALPHA ANALYTICAL
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

**Client Information**

Client: US ARMY CORPS OF ENG.
Address: 696 VIRGINIA RD.
CONCORD MA 01742
Phone: 978 318 8048
Email: RICHARD.B.LOYD

**Project Information**

Project Name: BLUE HILL HARBOR
Project Location: BLUE HILL, ME
Project #:
Project Manager: RICHARD LOYD
ALPHA Quote #:

**Turn-Around Time**

☑ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

**Report Information - Data Deliverables**

☑ ADEx ☐ EMAIL

**Billing Information**

☑ Same as Client info PO #:

**Regulatory Requirements & Project Information Requirements**

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☑ Other State /Fed Program REM Criteria REM

Additional Project Information:

CORPS EDD REQUIRED.
NOT ENOUGH JARS FOR SEPERATE DUP/MS/MSD SAMPLES. PLEASE TAKE FROM RANDOM COMP. SAMPLE

ANALYSIS: VOC ☐ 8260 ☐ 624 ☐ 524.2 | SVOC: ☐ 8270 ☐ ABN ☐ PAH | METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15 | METALS: ☐ RCRA5 ☐ RCRA8 ☐ PPT3 | EPH: ☐ Ranges & Targets ☐ Ranges Only | VPH: ☐ Ranges & Targets ☐ Ranges Only | ☐ PCB ☐ PEST | TPH: ☐ Quant Only ☐ Fingerprint | GRAIN SIZE | TOTAL SOLIDS/%M | TOC

**SAMPLE INFO**
*Filtration*
☐ Field
☐ Lab to do
*Preservation*
☐ Lab to do

| ALPHA Lab ID (Lab Use Only) | Sample ID | Collection Date | Collection Time | Sample Matrix | Sampler Initials | Sample Comments | TOTAL # BOTTLES |
|---|---|---|---|---|---|---|---|
| 27873.01 | A | 10/28 | 1453 | SE | RBL | | 2 |
| 02 | B | | 1446 | | | | 1 |
| 03 | C | | 1433 | | | | 1 |
| 04 | COMP BC | | 1446 | | | | 1 |
| 05 | D | | 1422 | | | | 1 |
| 06 | E | | 1413 | | | | 1 |
| 07 | COMP DE | | 1422 | | | | 1 |
| 08 | F | | 1400 | | | | 1 |
| 09 | G | | 1343 | | | | 1 |
| 10 | COMP FG | | 1400 | | | | 1 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Container Type | | | A | A | | | A | | | P | P | A | | | | | | |
| Preservative | | | A | A | | | A | | | A | A | A | | | | | | |

***Container Type***
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

***Preservative***
A= None
B= HCl
C= $HNO_3$
D= $H_2SO_4$
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = $NH_4Cl$
K= Zn Acetate
O= Other

| Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|
| UPS | 10/29/15 1652 | UPS | 10/29/15 13:04 |

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

# CHAIN OF CUSTODY

PAGE 2 OF 2

ALPHA ANALYTICAL
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Email: RICHARD.B.LOYD@USACE.ARMY.MIL

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Project #:
Project Manager: RICHARD LOYD
ALPHA Quote #:

**Turn-Around Time**

☑ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

**Report Information - Data Deliverables**

☑ ADEx ☑ EMAIL

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☑ Other State /Fed Program RFM Criteria RFM

Additional Project Information:
CORPS EDD REQUIRED

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
GRAIN SIZE
TOTAL SOLIDS by %

**SAMPLE INFO**
*Filtration*
☐ Field
☐ Lab to do
*Preservation*
☐ Lab to do

| ALPHA Lab ID (Lab Use Only) | Sample ID | Collection Date | Collection Time | Sample Matrix | Sampler Initials | Sample Comments | TOTAL # BOTTLES |
|---|---|---|---|---|---|---|---|
| 27873-11.03 | DUP (C) | 10/28 | 1433 | SE | RBL | | 1 |
| .12 | BLANK | ↓ | 1453 | DI $H_2O$ | ↓ | | 5 |

| Container Type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Container Type | A | P | | | | A | | P | P | | | |
| Preservative | A | C | | | | A | | A | A | | | |

***Container Type***
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

***Preservative***
A= None
B= HCl
C= $HNO_3$
D= $H_2SO_4$
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = $NH_4Cl$
K= Zn Acetate
O= Other

| Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|
| UPS | 10/28/15 1652 | UPS | 10/29/15 13:09 |

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

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# APPENDIX G

ESSENTIAL FISH HABITAT

# ESSENTIAL FISH HABITAT ASSESSMENT
# FOR THE
# BLUE HILL HARBOR NAVIGATION IMPROVEMENT PROJECT

**December 2019**
**Prepared by**
**U.S. Army Corps of Engineers**
**New England District**
**696 Virginia Rd**
**Concord, Massachusetts 01742-2751**

## 1.0 Introduction

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act require that an Essential Fish Habitat (EFH) consultation be conducted for activities that may adversely affect important habitats of federally managed marine and anadromous fish species. EFH includes "those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity." Blue Hill Harbor and the proposed placement site, the Eastern Passage Disposal Site (EPDS), fall into this category and may provide habitat for fish species in the area. The following is an assessment of the impacts to EFH from Blue Hill Harbor Federal Navigation Improvement Project.

## 2.0 Proposed Action

The proposed project includes dredging a 6-foot deep mean lower low water (MLLW), 80-foot wide channel from the outer harbor, extending 5,600 feet northwest to the town wharf (Figure 1). Only the upper 2,600 feet of the project will require dredging, with channel limits in the lower reaches declared for jurisdictional purposes. This channel would be widened at its upper end to form a turning basin, 160 feet by 80 feet, adjacent to the town wharf. Approximately 62,500 cubic yards (CY) of mixed gravel, sand, and silt would be removed from the proposed project area using a mechanical dredge. Dredged material deemed suitable for open water disposal, 52,000 CY, would be loaded onto scows and towed about 11 miles to the Eastern Passage Disposal Site (EPDS), a previously used disposal site near Dodge Point, for placement (Figure 2). Approximately 10,500 CY of material from the upper two feet of the inner harbor, which was deemed unsuitable for open water placement due to the presence of polycyclic aromatic hydrocarbons (PAHs) and metals, will be placed in a proposed confined aquatic disposal (CAD) cell within Blue Hill Harbor (Figure 3). Construction will occur between October 1 and April 15 and is expected to take three to four months to complete.

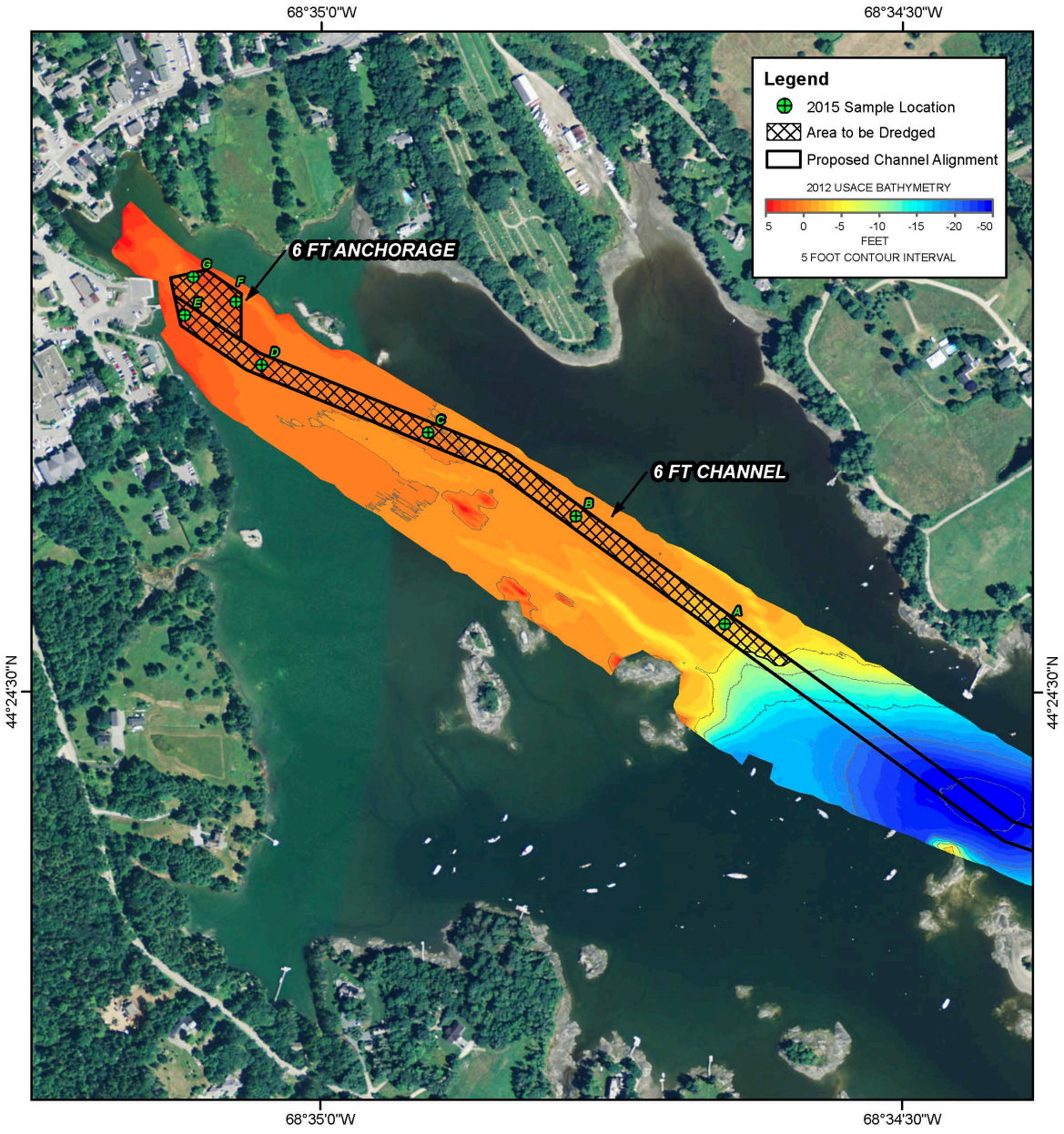


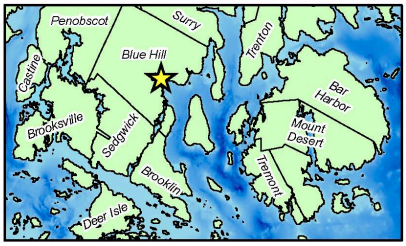

**FIGURE 1:**
**BLUE HILL HARBOR, BLUE HILL, ME**
**DREDGE AREA AND 2015 SAMPLE LOCATIONS**

US Army Corps of Engineers
New England District

0 250 500 750 1,000 Feet
0 100 200 300 Meters
1:800,000

2013 NAIP AERIAL IMAGERY

GCS NAD 1983



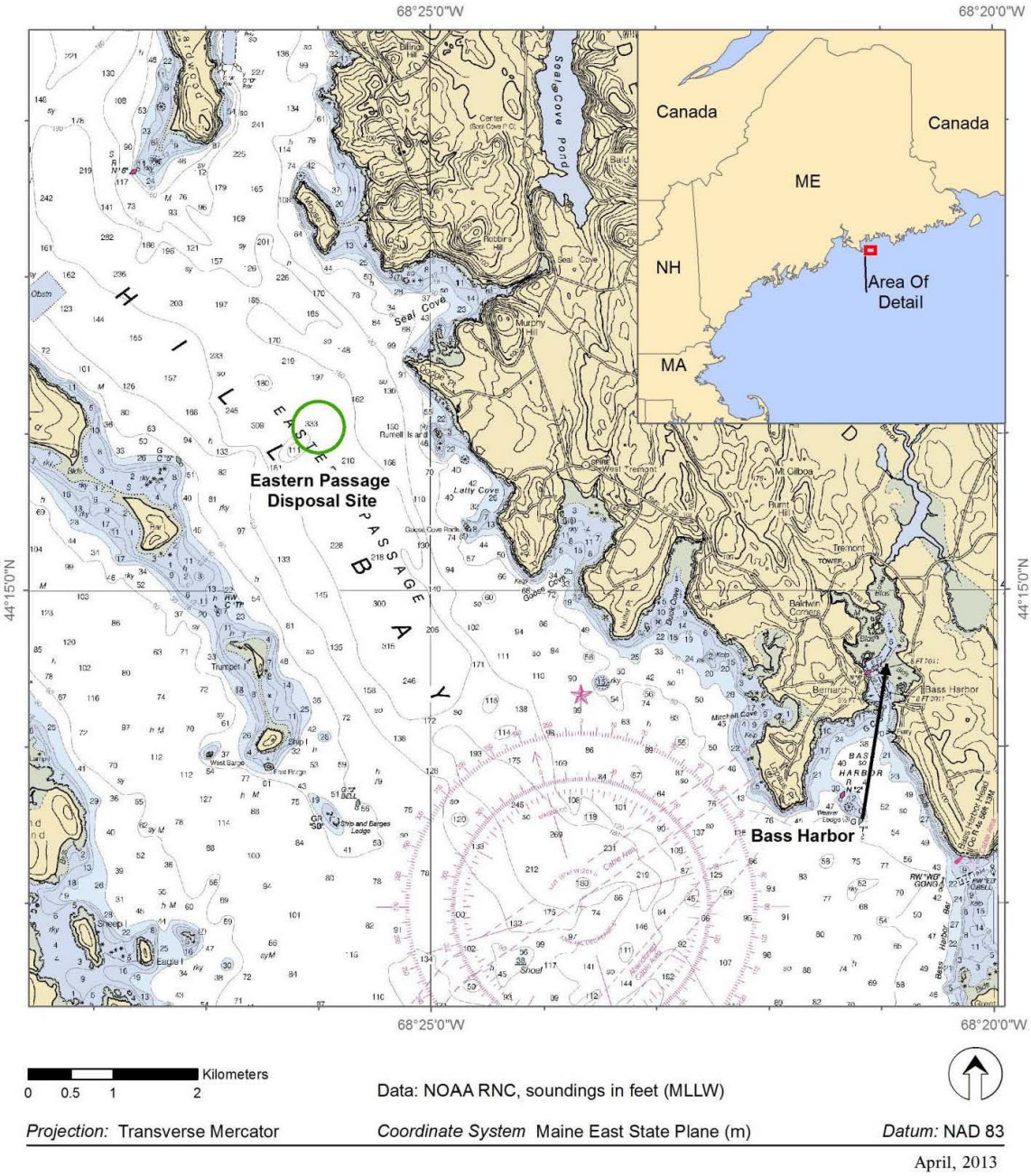



Figure 2. Eastern Passage Disposal Site.

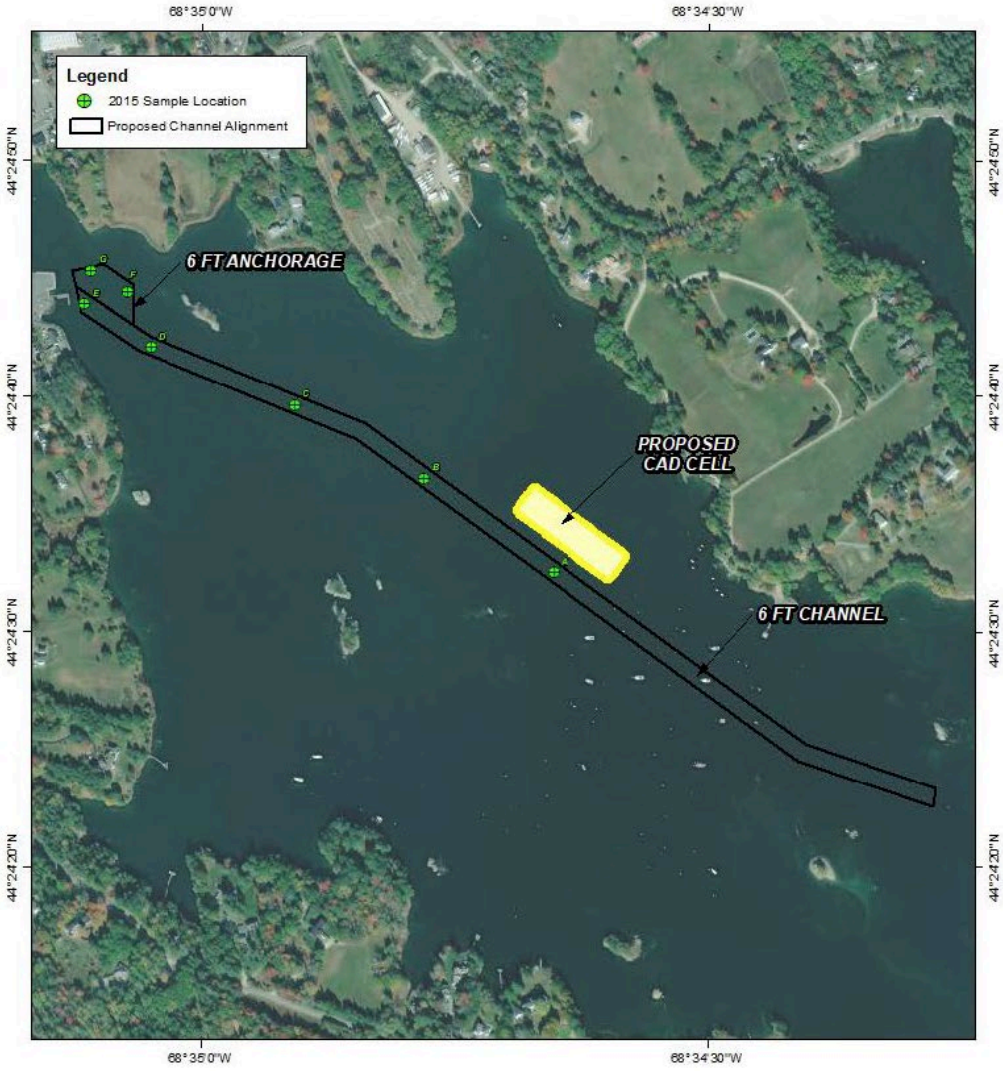


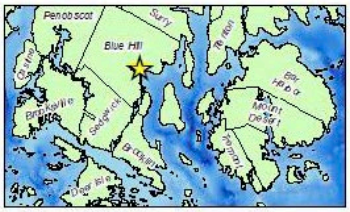

**FIGURE 3:**
**BLUE HILL HARBOR, BLUE HILL, ME**
**PROPOSED CAD CELL LOCATION**

US Army Corps of Engineers
New England District

0 250 500 750 1,000 Feet
0 100 200 300 400 Meters
1:6,500

2013 NAIP AERIAL IMAGERY

GCS NAD 1983



## 3.0 Analysis of Impacts

Impacts on EFH from any dredging and placement activity include potential changes in the physical and chemical properties of the water column, changes in sediment types both within the channel and at adjacent areas, and changes in water depth. Consequently, changes in abundance and/or distribution of prey species may also result from both dredging and placement activities. These impacts may range from both short-term (i.e. impacts to the water column, increases in turbidity and total suspended solids (TSS)), to long term impacts (changes in bathymetry as a result of dredging within the channel and deposition at the placement site of suitable material).

### 3.1 Physical environment

Water Quality – Any impacts from the dredging of the channel of Blue Hill Harbor are expected to be temporary, short term, and limited to the project area. Water quality impacts would be primarily a result of minor increases in suspended sediment (TSS) loads within the water column as a result of the dredging operations. The areas to be dredged are both intertidal and subtidal and subject to strong tidal flushing. Intertidal areas become mudflat at low tide. Consequently, any suspended sediments concentrations (which are anticipated to be minor) should quickly settle or be flushed out of the harbor by tidal activity. Unsuitable sediments would be removed and disposed of in the CAD, not resulting in any negative impacts to water quality. Any increases in the turbidity of near shore waters during open water disposal would be temporary and short term.

Dissolved oxygen levels are sometimes a concern with dredging and placement activities, however, the proposed project area is well flushed by tidal activity. No appreciable changes in the salinity regime, tidal flows, or tide height are expected as a result of the proposed dredging and placement activity.

Bathymetry/water depth – The proposed project will result in a 6-foot deep, 80-foot wide, and 2,500-foot long channel from the outer harbor to the town wharf in Blue Hill. The improvement project would deepen portions (approximately 25.5 acres) of the natural subtidal channel in Blue Hill Harbor and replace approximately 3.7 acres of intertidal area in the upstream portion of the harbor with subtidal area. There will be no other changes to bathymetry or water depth besides the navigation improvement channel. Suitable material will be disposed of at the existing Eastern Passage Disposal Site in Blue Hill Bay and will raise the existing elevations of the EPDS slightly.

The intertidal zone is an important point of nutrient exchange and productivity in estuarine ecosystems. Numerous organisms, from benthic invertebrates to birds, utilize this environment through all or part of their lifecycles. However, due to the presence of polycyclic aromatic hydrocarbons (PAHs) and other metals in Blue Hill Harbor noted in the suitability determination, the intertidal areas in the harbor have been found to have depressed functions and values (e.g., depauperate benthic communities and poor sediment quality). The removal of the 10,500 CY of material from the upper two feet of the inner harbor would reduce the risk of ecological receptors being exposed to toxicity. Therefore, dredging this intertidal area will be beneficial for aquatic resources because potential contaminants will be removed from the site, enhancing breeding and feeding opportunities for organisms utilizing the intertidal zone.

The construction of the proposed navigation channel would also allow the commercial fishing fleet more flexible access to the town wharf, improving safety and efficiency while easing restrictions on wharf access due to the tidal cycle.

## 4.0 Life History of EFH Species

4.1 Selection of EFH Species
The National Marine Fisheries Service (NFMS) Final Omnibus Essential Fish Habitat Assessment Amendment 2 Including a Final Environmental Impact Statement (EIS), along with GIS shapefiles of EFH designations from NMFS, were used to determine which species have designated EFH in the project area and surrounding areas.

The inner harbor turnaround area of the proposed project is located at approximately 44° 24' 44.18" N, 68° 35' 6.63" W, and the project area extends 2,500 feet to the southeast toward Blue Hill Bay.

Table 1 presents a list of species that have designated EFH in Blue Hill Harbor (BHB). A short summary of the EFH for each life stage of each particular species is described below.

| **Species** | Eggs | Larvae | Juveniles | Adults |
|---|---|---|---|---|
| American plaice (*Hippogloissoides platessoides)* | X | X | X | X |
| Atlantic Cod (*Gadus morhua*) | X | X | X | X |
| American wolfish (*Anarhichus lupus*) | X | X | X | X |
| Ocean pout (*Macrozoarces americanus*) | X | | X | X |
| Pollock (*Pollachius virens*) | | | X | |
| White Hake (*Urophycis tenuis*) | | | X | X |
| Windowpane flounder (*Scophtalmus aquosus*) | X | X | X | X |
| Winter flounder (*Pseudopleuronectes americanus*) | X | X | X | X |
| Silver Hake (*Merluccius bilinearis)* | | | | X |
| Red Hake (*Urophycis chuss*) | X | X | X | X |
| Smooth skate (*Malacoraja senta)* | | X | | |
| Thorny Skate (*Amblyraja radiata)* | | X | | |
| Little Skate (*Leucoraja erinacea*) | | | X | X |
| Winter Skate (*Leucoraja ocellata*) | | | X | |
| Atlantic sea scallop (*Placopecten magellanicus*) | X | X | X | X |
| Atlantic Herring (*Clupea harengus)* | | X | X | X |
| Atlantic mackerel (*Scomber scombrus*) | | | X | X |
| Atlantic Butterfish *(Peprilus triacanthus)* | | | X | X |

4.2 EFH Species
American plaice (*Hippogloissoides platessoides*) - adults, juveniles, larvae, and eggs all inhabit subtidal benthic or pelagic habitats in the Gulf of Maine of at least 40 meters. The high and mixed salinity zones for this bay are both considered EFH for this species. However, the effects of the proposed projects are short term and limited to the project area, which is also part of the intertidal zone, and is therefore not expected to harm the egg and larval life stages of this species. The dredging portion of this project occurs in intertidal and shallow subtidal zones, and therefore no adverse effects on American plaice EFH are expected because they primarily reside on the

bottom between 120 and 600 feet. Placement of material at the EPDS may temporarily displace any plaice that may be present at the site. However, all placement effects are short term and plaice EFH should not be permanently altered.

Atlantic Cod (*Gadus morhua*) - The high salinity zone (>25%) in Blue Hill Bay (BHB) is designated EFH for this species. In this area, eggs are found in surface waters around the perimeter of the Gulf of Maine, while larvae are found in pelagic waters. Juveniles prefer bottom habitats with rock, pebble, or gravel in this region, and spawning adults prefer bottom habitats with smooth sand, rocks, pebbles, or gravel and depths of 32.8- 492.1 feet. Cod need structurally complex hard bottom habitats composed of gravel, cobble, and boulder substrates and emergent epifauna and macroalgae. The proposed project would occur in a shallow (i.e. project area is exposed during low tide) intertidal zone with predominantly mud, silt, sand, and gravel substrate, and this would likely have minimal effects on Atlantic Cod EFH.

Atlantic wolfish (*Anarhichus lupus*) - EFH is designated for this species in BHB, but since the proposed project would occur in the intertidal and shallow subtidal zones, no impacts on Atlantic wolfish are expected since they inhabit deeper subtidal benthic zones. Egg EFH occurs in less than 328.1 feet depths under rocks and boulders. Larvae habitat remains in subtidal and pelagic habitats, and juvenile EFH is designated as the subtidal benthic at 229.7-603.7 feet. Adult EFH is designated as subtidal benthic habitats in less than 173 meters of water, but they are not caught over muddy bottoms. The project area does not fit any of those descriptions of EFH for this species, and therefore no adverse impacts to it are expected.

Ocean pout (*Macrozoarces americanus*) – EFH designated in the high salinity zone of BHB for all life stages. Egg EFH is hard bottom habitat, juvenile EFH is designated as sub and intertidal benthic areas, and adult EFH in 65.6 – 459.3 feet and in high salinity zones in estuaries north of Cape Cod. Juvenile ocean pout EFH may occur in the high salinity zone, but due to the small project footprint (6-foot deep by 80-foot wide channel and turning basin), and temporary nature of disturbance limited to the project area, minimal effects to ocean pout EFH are expected.

Pollock (*Pollachius virens*) – EFH designated in the mixed and salinity zones for juvenile Pollock in Blue Hill Bay. However, juveniles require rocky bottom habitat with attached micro algae or eelgrass beds, and spawning occurs over hard, stony, or rocky habitat. The benthic habitat in the proposed project area is mostly gravel, sand, and silt. Therefore, no adverse effects to EFH for this species are anticipated.

White Hake (*Urophycis tenuis*) – EFH for juveniles and adults occurs in Blue Hill Bay, in both brackish and salinity zones for juveniles and in the salinity zone for adults. Juvenile EFH is in intertidal and subtidal marine habitats, and adult EFH is fine-grained, muddy substrates in mixed soft and rocky habitats. Due to the mobile nature of adult white hake, and the short duration of the work and small footprint of the project area, no adverse effects to adult white hake EFH are anticipated.

Windowpane flounder (*Scophtalmus aquosus*) – EFH for all windowpane flounder life stages is designated for the high salinity and brackish zones of Blue Hill Bay. Juveniles and adults prefer mud and sand substrates in the intertidal and subtidal benthic zones, but due to their mobility, the

small scope of the project, and temporary disturbance caused by the work, no adverse effects to EFH for this species would occur.

Winter Flounder (*Pseudopleuronectes americanus*) - EFH for all life stages is designated in both the brackish and salinity zones of BHB. Egg EFH is designated as sub-tidal estuarine and coastal benthic habitat from mean low water to five meters, while larval EFH is designated to a maximum depth of 229.7 feet. Juvenile EFH extends from the intertidal zone to 196.9 feet, and for adults it extends to 229.7 feet. Adult habitat occurs in muddy or sandy substrates, which are present in BHB. However, the impacts will be short term and limited to the project area, and therefore adverse effects on winter flounder EFH are not expected.

Silver Hake (*Merluccius bilinearis)* - EFH is designated for juveniles and adults in the high and mixed salinity zones of Blue Hill Bay. Although adult EFH is designated for shallow areas with sandy substrates, they are usually found in pelagic and benthic habitats greater than 114.8 feet, while for juveniles the depth is between 131.2 - 1312.3 feet. Due to the mobility of the species, and the short-term nature of impacts limited to the project area, there will be minimal effects on silver hake EFH.

Red Hake (*Urophycis chuss*) - EFH in high salinity zones is designated in BHB for juveniles and adults. However, adult EFH is only designated as shallow as 65.6 feet in BHB so no impacts on adult red hake EFH are expected due to the shallow intertidal nature of the proposed project area. Juvenile red hake EFH is designated in the intertidal and subtidal zone, but due to the short term impacts limited to the project area, minimal impacts on juvenile red hake are expected.

Skates – juvenile EFH for smooth, thorny, little, and winter skate, adult EFH for little skate is designated in BHB. The impacts of dredging the channel and turnaround area in BHB will be temporary, short term, and limited to the project area, so minimal impacts to skate EFH are expected. No EFH is designated in BHB for Rosette, Clearnose, and Barndoor skates. There are no egg or larval designations for any of the skates.

Atlantic sea scallop (*Placopecten magellanicus*) - EFH is designated for all Atlantic sea scallop life stages in the high salinity zone of BHB. Shells, pebble, gravel, and sand substrates are part of scallop EFH. Due to the presence of potentially contaminated sediments in the project area, the removal of those unsuitable materials from the site in the proposed project may be beneficial to the Atlantic sea scallop and other benthic organisms in the harbor.

Atlantic Herring (*Clupea harengus*) - EFH is designated for larvae, juveniles, and adults in BHB. Egg habitat occurs on coarse sand, pebble, cobble, boulder and/or macroalgae at depths of 16.4 – 295.3 feet, while larvae are transported long distances inshore into bays and estuaries. Juvenile EFH occurs in intertidal and subtidal pelagic habitats to 984.3 feet, and for adults it is subtidal pelagic habitat to a maximum depth of 984.3 feet. Unless spawning, they usually remain near the surface. This is a highly mobile species, making extensive seasonal migrations. Therefore, due to the temporary and short term nature of disturbance from the proposed project, minimal impact to Atlantic herring EFH is expected.

Atlantic Mackerel (*Scomber scombrus*) - The Atlantic mackerel is distributed in the northwest Atlantic between Labrador and North Carolina. The mackerel is a fast swimming pelagic fish found in very large schools. Atlantic mackerel are generally found offshore and are not dependent on the coastline or bottom substrate for any period of their lives. Smaller fish, however, may move inshore into estuaries and harbors in search of food. Spawning occurs in spring and early summer (typically June) at any location, resulting in pelagic egg and larval stages that are dispersed by currents.

Impacts to Atlantic mackerel juveniles and adults and their EFH at the proposed project area and placement sites are expected to be minimal. Impacts to the water column habitat from dredged material disposal are expected to be short term and localized, therefore no significant effects to Atlantic mackerel EFH are expected.

Atlantic butterfish *Peprilus triacanthus* (juvenile and adult) - The Atlantic butterfish *Peprilus triacanthus* is distributed in the northwestern Atlantic from Newfoundland to Florida, but is most common between the Gulf of Maine and Cape Hatteras North Carolina. This species tends to loosely school near the surface in waters overlying sand bottoms several hundred feet from shore. Butterfish are common in coastal waters during the summer months, moving north and inshore to feed. During winter, butterfish move south and offshore to deeper warmer water to overwinter. Spawning occurs in the coastal waters offshore during the summer months (June through August). Eggs and larvae are pelagic and drift in the plankton

Juvenile and adult butterfish are likely to move from the water column areas while dredged material is being disposed, resulting in only minimal impacts to individuals. As noted above, impacts to the water column are expected to be short term and localized, therefore no significant effects to Atlantic Butterfish EFH are expected.

**5.0 Cumulative Effects**

Cumulative impacts are those resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Past and current activities in Blue Hill Harbor include boat traffic from the large commercial fleet spread across four landings (Blue Hill Town Wharf, Steamboat Wharf, South Blue Hill, and East Blue Hill). The harbor is also population with recreational boaters, recreational fishing, and other water-based recreation. The effects of these previous and existing actions are generally limited to infrequent disturbances of benthic communities, for example in the grounding of a vessel due to the falling tide or urban discharges. Land use around the harbor is primarily low density residential with several businesses and the Blue Hill Memorial Hospital. The Blue Hill Fire Department and waste water treatment plant are located adjacent to the town wharf. There are two automotive garages on Main Street that were former gas stations. The Maine Department of Environmental Protection documented the removal of multiple gasoline and diesel underground storage tanks (UST), and there was one reported gasoline discharge from these properties. There are no other known spills other than the UST history noted here. The creation of a federal navigation channel will service existing traffic from the commercial and recreational fleet in an already heavily utilized harbor, and are not expected to add to impacts from other actions in the area. Although the project will transform approximately 3.7 acres of intertidal habitat to subtidal habitat, the removal and sequestering of contaminated sediments will be beneficial to the local

ecological communities. Therefore, no adverse cumulative impacts to EFH species are anticipated as a result of this project.

**6.0 Summary of Effects**

The dredging activities proposed for the federal navigation improvement of Blue Hill Harbor could potentially have some limited temporary impacts on EFH and managed species found in the vicinity of the dredge and placement areas. There would be minimal turbidity associated with the project since the dredged material is being moved approximately 13 miles away to a near shore disposal site, and it is expected to be completed in a relatively short time frame (1 - 2 months). The localized and short term increases in turbidity levels should have minimal effects on anadromous fish and shellfish spawning. In general, eggs and larvae are more susceptible to impacts from dredging that juveniles and adults, which can avoid dredging and disposal related disturbance.

The EFH species with the greatest potential to be affected by this project are those with planktonic eggs and larvae suspended in the water column, such as red hake and windowpane flounder. These eggs and larvae may be physically damaged or killed from exposure to elevated concentrations of suspended solids, but the significant tidal flushing in the area will function to rapidly disperse and settle out any fines remaining in the water column after dredging. BHB is a commercial harbor with a significant amount of boat traffic, therefore the consistent disturbance from those activities is expected to create a localized area of unsuitable habitat coinciding with the project area. Also, BHB may benefit from the removal of the unsuitable material in the upper two feet of the inner harbor by reducing the risk of those potentially toxic substances being exposed to fish and wildlife resources.

6.1 Conclusions

Although there is the potential for project activities to impact EFH and managed species which may occur in the dredging and disposal areas, any impacts are expected to be short-term and limited to the immediate project area. Hydrological conditions such as tides and currents will not change as a result of the proposed project. Any changes to water quality (temperature, TSS, DO) will be temporary and water quality will return to pre-project conditions following project completion. Prey species destroyed or otherwise impacted during the dredging and placement processes are expected to return following project completion.

Additionally, not all areas designated as EFH for the various species will be impacted. Most species with designated EFH in Blue Hill Harbor also have EFH in the Gulf of Maine, continental shelf, and other harbors along the coast, meaning that a very small portion of those species' EFH will actually be impacted by this project. The effects of the dredging and placement will be confined to the proposed navigation channel and disposal areas. Therefore, the species at these locations will be able to sustain the population of their respective species in this geographic region.

CENAE–PDE October 29, 2018

**Memorandum For:** William Bartlett, Project Manager, CENAE-PDP

**Subject:** Suitability Determination for the Blue Hill Harbor Navigation Improvement Project, Blue Hill, Maine.

1. **Summary:**

This memorandum addresses the suitability of material to be dredged from the proposed Blue Hill Harbor Navigation Improvement Project for openwater disposal. The New England District (NAE) of the U.S. Army Corps of Engineers (USACE) finds that sufficient data has been provided to satisfy the evaluation and testing requirements of Section 404 of the Clean Water Act (CWA). Based on an evaluation of the project site and the material proposed to be dredged, portions of these sediments are suitable for placement at the proposed location with the constraints outlined below.

2. **Project Description:**

NAE is evaluating the feasibility of establishing a Federal navigation channel and turning basin in Blue Hill, Maine. The proposed plan includes the construction of an 80 foot wide channel and a one acre turning basin to allow for full time vessel access to the town wharf as shown on Figure 1. The channel would extent 2,500 feet southeast to naturally deep water in the outer harbor and be dredged to -6 feet mean lower low water (MLLW) plus 1 foot of allowable overdepth. This is expected to produce a volume of 73,000 cubic yards of mixed gravel, sand, silt, and clay. The material will be mechanically dredged and suitable material will be placed at the Eastern Passage Disposal Site (EPDS) in Blue Hill Bay. Any material found unsuitable for openwater placement will be placed in a newly constructed confined aquatic disposal (CAD) cell in the inner harbor.

3. **Conceptual Site Model:**

NAE reviewed data from previous environmental investigations, analyzed current and historical land-use around the harbor, and interviewed local officials to develop a conceptual site model (CSM) for the improvement project which is depicted in Figure 2. NAE used the CSM to characterize the system and identify potential sources of contamination and any site-specific contaminants of concern (COCs) to inform the sampling, testing, and analysis of the project site.

Blue Hill Harbor is located in the northwest end of Blue Hill Bay and is separated from the bay by a 300 foot wide passage between Parker Point and Sculpin Point in Blue Hill. The inner harbor contains the town wharf, docks, and loading facilities but is inaccessible to vessel traffic for several hours around low tide every day.

The waters of Blue Hill Harbor and Blue Hill Bay are classified as Class SB by the State of Maine (MEDEP 2012). Designated uses for Class SB waters include contact recreation, fishing, aquaculture, harvesting shellfish, and habitat for fish and marine life. Mill Stream, the major freshwater tributary to the harbor, and all minor tributaries to the harbor are considered Class B (MEDEP 2012). Class B freshwater resources are managed to attain good physical, chemical, and biological water quality.

Land use around the harbor is primarily low density residential houses along with several retail shops, restaurants, and the Blue Hill Memorial Hospital. The Blue Hill Fire Department and municipal waste water treatment plant are located adjacent to the town wharf. There are two automotive garages on Main Street near the head of the harbor that were former gas stations. The Maine Department of Environmental Protection (MEDEP) Environmental and Geographic Analysis Database (EGAD) documented the removal of multiple gasoline and diesel underground storage tanks (USTs) and one reported gasoline discharge from these properties.

NAE proposes to place suitable dredged material from the improvement project at EPDS. EPDS is located in outer Blue Hill Bay approximately 14 miles from Blue Hill Harbor and is monitored by NAE's Disposal Area Monitoring System (DAMOS) Program. The last DAMOS monitoring survey of EPDS was in 2012 after placement of material from the maintenance and improvement dredging of Bass Harbor in 2010-2011 (Carey et al 2013).

NAE proposes to place any unsuitable dredged material from the improvement project into a newly constructed CAD cell in the inner harbor of Blue Hill (Figure 3). CAD cells have been used as a disposal alternative for unsuitable dredged material since the 1980's and are currently in use in multiple harbors in New England and across the country. The technique involves excavating a depression below the seafloor, placing the unsuitable material into the depression, and covering the unsuitable material with a cap layer to contain and sequester the unsuitable material from the environment (Figure 4). Multiple maintenance dredging and navigation improvement projects have utilized CAD cells to successfully manage unsuitable dredged material while limiting environmental risk, material handling, and transportation costs. NAE's DAMOS program has regularly monitored and evaluated CAD cells throughout New England and has documented their stability and performance (USACE 2012a, USACE 2012b, ENSR 2007).

Based on a review of available data, and communication with local officials, NAE determined that there are no known recent spills in the vicinity of the project area other than the UST and gasoline spill history noted above.

Following this Tier 1 review of the site characteristics and the available historical data, NAE assigned the project a low-moderate risk ranking according to the following matrix (adapted from USACE 2014):

| Rank | Guidelines |
|---|---|
| Low | Few or no sources of contamination. Data available to verify no significant potential for adverse biological effects. |
| Low-Moderate | Few or no sources of contamination but existing data is insufficient to confirm ranking. |
| Moderate | Contamination sources with the potential to produce chemical concentrations that may cause adverse biological effects exist within the vicinity of the project. |
| High | Known sources of contamination within the project area and historical data exist that previously failed biological testing. |

4. **Sampling, Testing, and Analysis:**

NAE prepared a sampling and analysis plan (SAP) for the project on 23 October 2015 based on the low-moderate ranking for the Blue Hill Harbor Navigation Improvement Project. NAE coordinated this plan with the U.S. Environmental Protection Agency Region 1 (USEPA), the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and MEDEP.

On 28 October 2015 NAE collected sediment vibracores from seven locations throughout the proposed dredging area identified as Stations A through G on Figure 1. NAE personnel described each sediment core in the field and composited the length of each individual core for analysis of grain size, total solids, and water content. NAE then composited the core samples according to the plan outlined in the SAP for chemical analysis of the contaminants of concern (COC) specified in the Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters (RIM, USACE/EPA 2004).

The sediments in the outer portion of the proposed channel (Stations A, B, and C) were predominantly poorly graded fine to coarse sands with overlying marine clay deposits. There was fine woody organic debris in all three cores from this area. Core penetration at the inner harbor stations (D, E, F, and G) was limited due to gravel and coarse sand deposits near the sediment surface and was 2.0 feet or less at Stations D, F, and G. Grain size results are presented in Table 1.

**Table 1. Physical Testing Results from Blue Hill Harbor Sediment Cores (October 2015)**

| Sample ID | % Cobble | % Gravel | % Coarse Sand | % Medium Sand | % Fine Sand | % Total Fines | % Moisture |
|---|---|---|---|---|---|---|---|
| **A** | 0.1 (U) | 0.1 | 2.2 | 6.6 | 21.6 | 69.5 | 55.3 |
| **B** | 0.1 (U) | 0.1 (U) | 1.7 | 3.5 | 7.4 | 87.4 | 51.2 |
| **C** | 0.1 (U) | 1.1 | 1.9 | 4.9 | 12.1 | 80 | 54.5 |
| **D** | 0.1 (U) | 4.4 | 13.2 | 34.8 | 35 | 12.6 | 19.6 |
| **E** | 0.1 (U) | 1.8 | 8.8 | 26.7 | 37.9 | 24.8 | 33.2 |
| **F** | 0.1 (U) | 5 | 14 | 30.6 | 29.8 | 20.6 | 26.8 |
| **G** | 0.1 (U) | 45.9 | 12.4 | 16.7 | 16.2 | 8.8 | 21.4 |

U = Non-detected analytes are reported as the RL and qualified with a "U".

No polychlorinated biphenyls (PCBs) or pesticide analytes were detected above the method detection limit in the harbor samples with the exception of individual compounds in Composite DE. There were detectable concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals in all four composite samples. To examine the harbor concentrations in an ecologically meaningful context, NAE screened the values with Sediment Quality Guidelines (SQGs). Applicable SQG screening values for marine and estuarine sediments are the National Oceanic and Atmospheric Administration (NOAA) effects-range low (ERL) and effects-range median (ERM). ERL/ERM values are empirically derived guidelines that identify contaminant levels that indicate when toxic effects are unlikely (ERL) and when an increased probability of toxic effects is evident (ERM).

No COCs in Composite A or BC exceeded the ERL value as shown on Table 2. All COCs in Composite DE and FG were also below the ERL value with the exception PAHs which were above the ERL in Composite DE and above the ERM in Composite FG (Table 2). This suggests that a toxic response from exposure to sediments from Composite A or BC would be highly unlikely but there is increased potential for a toxic response from exposure to sediments from Composites DE and FG due to elevated PAHs.

**Table 2. Chemical Testing Results from Blue Hill Harbor Sediment Cores and Sediment Quality Guidelines (October 2015)**

| Chemical or Class | ERL | ERM | Unit | COMP A | COMP BC | COMP DE | COMP FG |
|---|---|---|---|---|---|---|---|
| Arsenic | 8.2 | 70 | mg/kg | 4.5 | 7.7 | 5.2 | 6.3 |
| Cadmium | 1.2 | 9.6 | mg/kg | 0.6 | 0.8 | 0.1 | 0.2 |
| Chromium | 81 | 370 | mg/kg | 21.1 | 30.9 | 12.3 | 10.8 |
| Copper | 34 | 270 | mg/kg | 17.6 | 16.5 | 14.3 | 6.9 |
| Lead | 46.7 | 218 | mg/kg | 21.7 | 21.8 | 23.0 | 10.5 |
| Mercury | 0.15 | 0.71 | mg/kg | 0.03 | 0.03 | 0.02 | 0.02 |
| Zinc | 150 | 410 | mg/kg | 54.2 | 64.1 | 40.6 | 37.9 |
| HMW PAH* | 1,700 | 9,600 | µg/kg | 879 | 629 | 3,703 | 20,089 |
| HMW PAH* | 552 | 3,160 | µg/kg | 165 | 123 | 646 | 7,388 |
| Total PCBs* | 22.7 | 180 | µg/kg | 9.36 | 5.99 | 8.03 | 6.17 |
| Total DDT* | 1.58 | 46.1 | µg/kg | 0.8 | 0.7 | 0.9 | 0.5 |

*For total values non-detects calculated as half the reporting limit

NAE reviewed results from the initial round of testing and performed a second sampling effort on 10 May 2016 to better define the vertical and spatial extent of the elevated PAH concentrations around Composites DE and FG. NAE collected push cores at low tide from ten stations in the inner harbor and one location at the mouth of the each of the three tributaries as shown on Figure 5. Similar to the vibracore effort core penetration with this sampling method was limited to approximately 2 feet for this area of the harbor. NAE personnel described the push cores in the field and then collected discrete subsamples for PAH analysis from the top six inches and from six inches to the end of each core. Results from this analysis showed no discernable pattern for the spatial distribution of PAHs in the harbor (Appendix A).

Due to the inability to penetrate inner harbor sediments to the design depth and determine the vertical extent of the elevated PAH concentrations the Town of Blue Hill dug four test pits in October 2016 (Figure 6). The Town's contractor placed timber mats across the harbor at low tide and used an excavator to dig 4-9 foot deep test pits at predetermined locations. NAE personnel were on-site to describe the lithology of the pit walls and subsample the sediment in two foot horizons for PAH analysis. Results from this analysis are presented in Appendix A and showed that the extent of PAH contamination is limited to the upper two feet of the inner harbor sediments.

5. **Evaluation of Dredged Material:**

The placement of sediments at the Eastern Passage Disposal Site is regulated under Section 404 of the Clean Water Act (CWA). Subpart G of the Section 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or

Fill Material describes the procedures for conducting this evaluation, including any relevant testing that may be required.

The material from the Blue Hill Harbor Navigation Improvement Project was evaluated for placement at EPDS according to §230.61 (Chemical, Biological, and Physical Evaluation and Testing) of the CWA and the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual (EPA/USACE 1998). The conceptual site model identified the uptake of contaminants from the water column during placement, and the uptake of placed dredged material by benthic organisms, as the primary exposure pathways for the harbor sediments.

NAE evaluated potential water quality effects by modeling the release of contaminants from dredged sediments during the disposal process at EPDS. To determine if the discharge of dredged material would attain compliance with Water Quality Standards, NAE performed a Tier II evaluation following the procedure outlined in the RIM. This evaluation utilizes the Short-Term Fate (STFATE) numerical model to analyze the physical behavior of a disposal cloud as it descends through the water column after release from a barge. Results of the STFATE evaluation predicted that the water column would attain State of Maine Water Quality Standards within four hours of disposal and therefore meet the criteria in the testing protocol.

NAE evaluated potential effects on the benthic environment through an assessment of the physical and chemical conditions of the proposed dredged material. No PCB or pesticide analytes were detected above the method reporting limit in the harbor sediments with the exception of individual compounds in Composite DE. PAHs and metals were detected in the sediment samples from the harbor but metal concentrations in all composites, and PAH concentrations in Composites A and BC, were below the ERL. These results suggest that a toxic response from exposure to these sediments would be highly unlikely and the material can be considered environmentally acceptable with no further testing.

PAH concentrations were above the ERL in Composite DE and above the ERM in Composite FG which suggests an elevated risk for toxicity from exposure to these sediments. Further sampling of the harbor revealed that the PAH signature is limited to the upper two feet of sediment with non-detect or near non-detect values below that horizon. This equates to approximately 10,500 cubic yards of material from the inner harbor with an increased potential to cause toxicity.

Based on an evaluation of the physical and chemical properties of the proposed dredged material NAE determined that additional testing of the Blue Hill Harbor sediments was not required to confirm the suitability of the material

for openwater placement with the exception of the material from the upper two feet of the inner harbor.

6. **Suitability Determination:**

NAE evaluated the sediment from the Blue Hill Harbor Navigation Improvement Project through §230.61 of the CWA and found the material suitable for openwater placement at EPDS with the exception of 10,500 cubic yards of material from the upper two feet of the inner harbor. The sediment from this portion of the harbor is not suitable for openwater placement due to elevated PAH concentrations. NAE proposes to contain the unsuitable material in a newly constructed CAD cell. The material excavated to create the CAD cell is outside of the elevated PAH footprint, adjacent to Composites A and BC, and is suitable for openwater placement at ELDS.

Approximately 10,500 cubic yards of unsuitable dredged material will be disposed in the proposed CAD cell and approximately 8,750 cubic yards of suitable dredged material will be used as the CAD cell cap layer. The remaining 53,750 cubic yards of project material, plus approximately 15,500 cubic yards of material excavated to create the proposed CAD cell, will be placed at EPDS. Bringing the total volume to be placed at EPDS to 69,250 cubic yards.

Copies of this determination were sent to USEPA and Maine DEP who concurred with the findings.

Aaron Hopkins
Marine Ecologist
Environmental Resources Section
USACE – New England District

Joseph Mackay
Chief
Environmental Resources Section
USACE – New England District

7. **References:**

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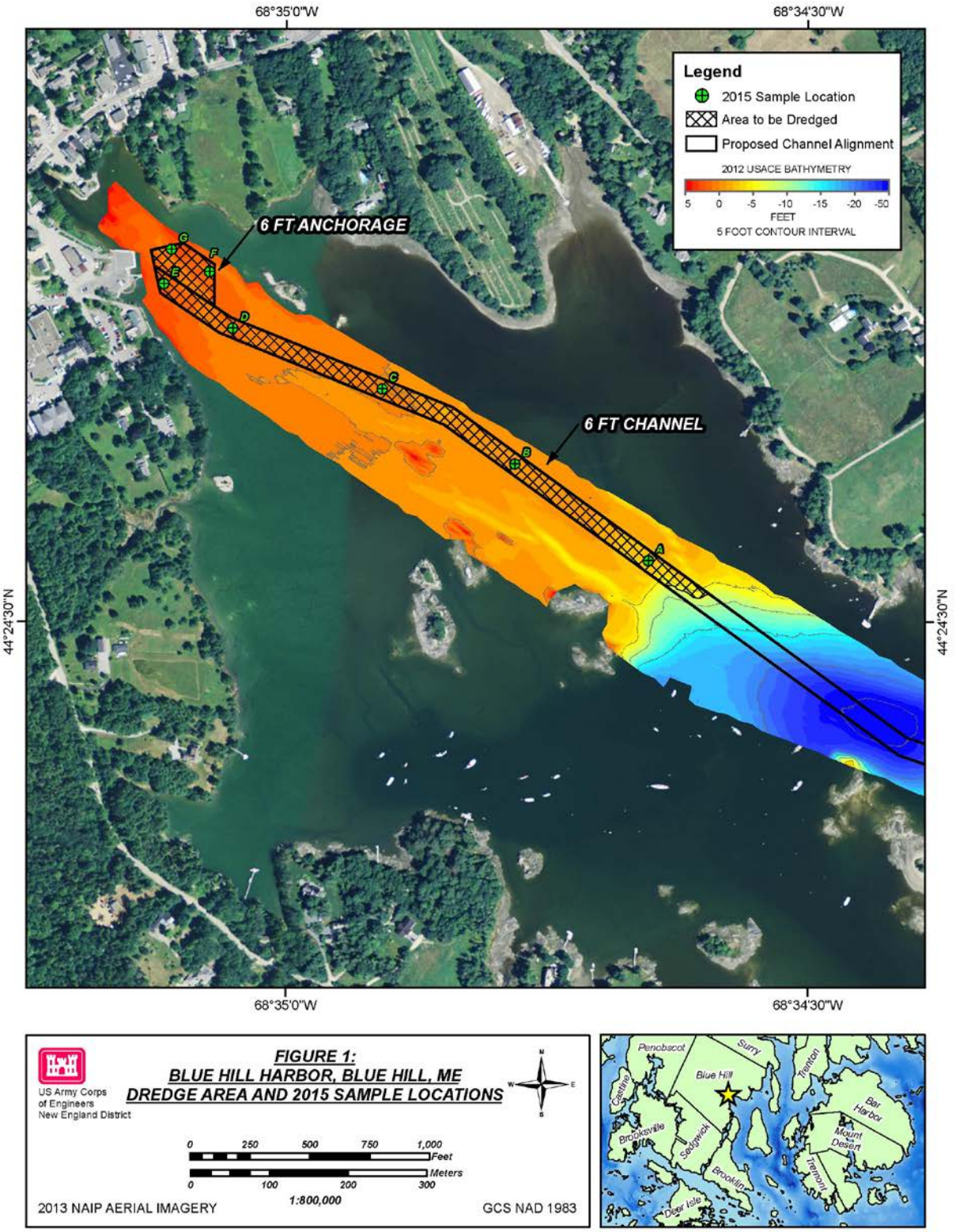
USACE 2012b. Monitoring Survey of the Boston Harbor CAD Cells, November 2009. DAMOS Contribution 186. U.S. Army Corps of Engineers, New England District, Concord, MA.


68°35'0"W
68°34'30"W
44°24'30"N
Legend
2015 Sample Location
Area to be Dredged
Proposed Channel Alignment
2012 USACE BATHYMETRY
5 0 -5 -10 -15 -20 -50
FEET
5 FOOT CONTOUR INTERVAL
6 FT ANCHORAGE
6 FT CHANNEL
A
B
C
D
E
F
G
US Army Corps of Engineers New England District
FIGURE 1:
BLUE HILL HARBOR, BLUE HILL, ME
DREDGE AREA AND 2015 SAMPLE LOCATIONS
0 250 500 750 1,000 Feet
0 100 200 300 Meters
1:800,000
2013 NAIP AERIAL IMAGERY
GCS NAD 1983
Penobscot
Surry
Trenton
Blue Hill
Castine
Bar Harbor
Brooksville
Sedgwick
Mount Desert
Tremont
Brooklin
Deer Isle

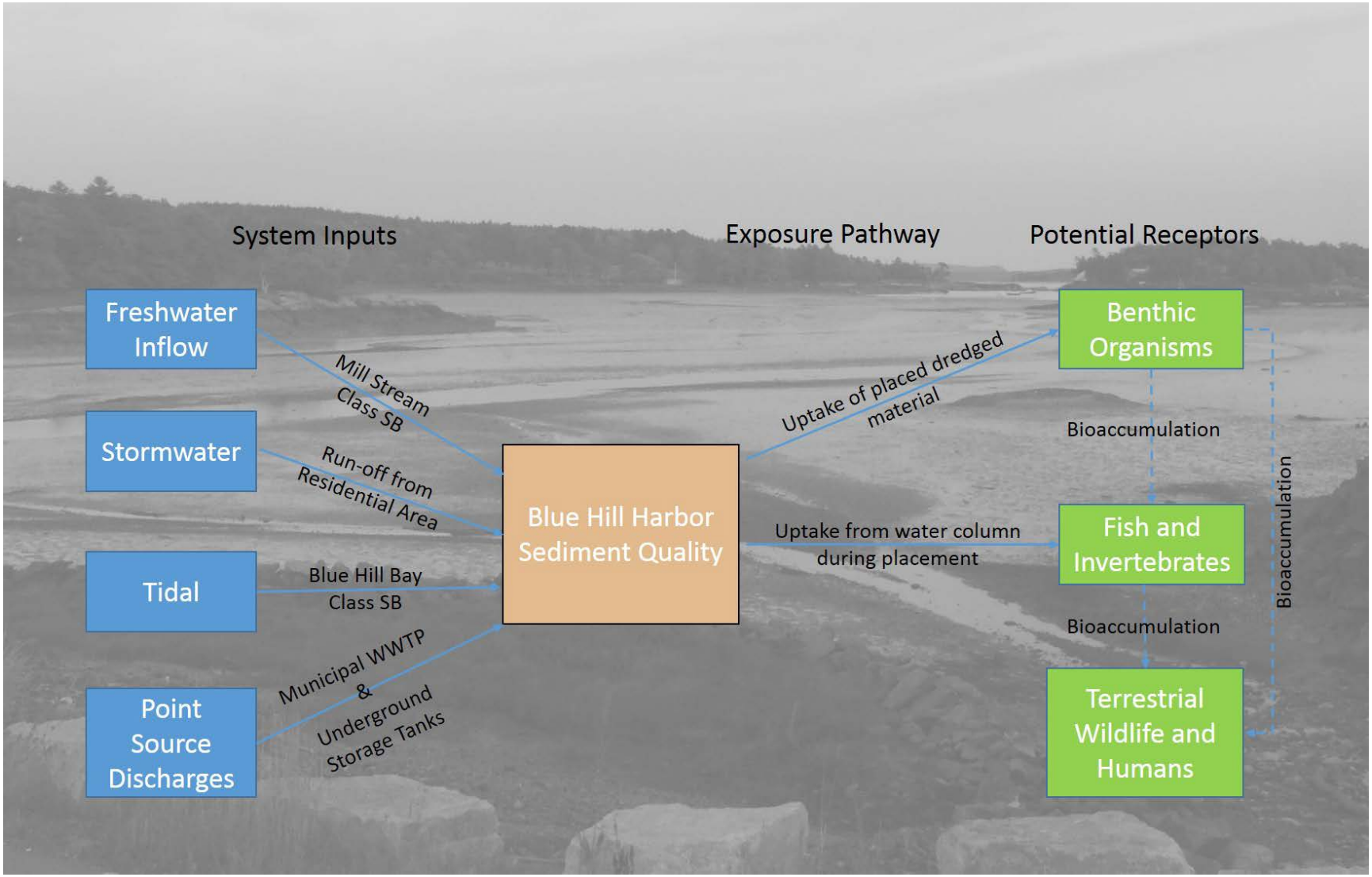
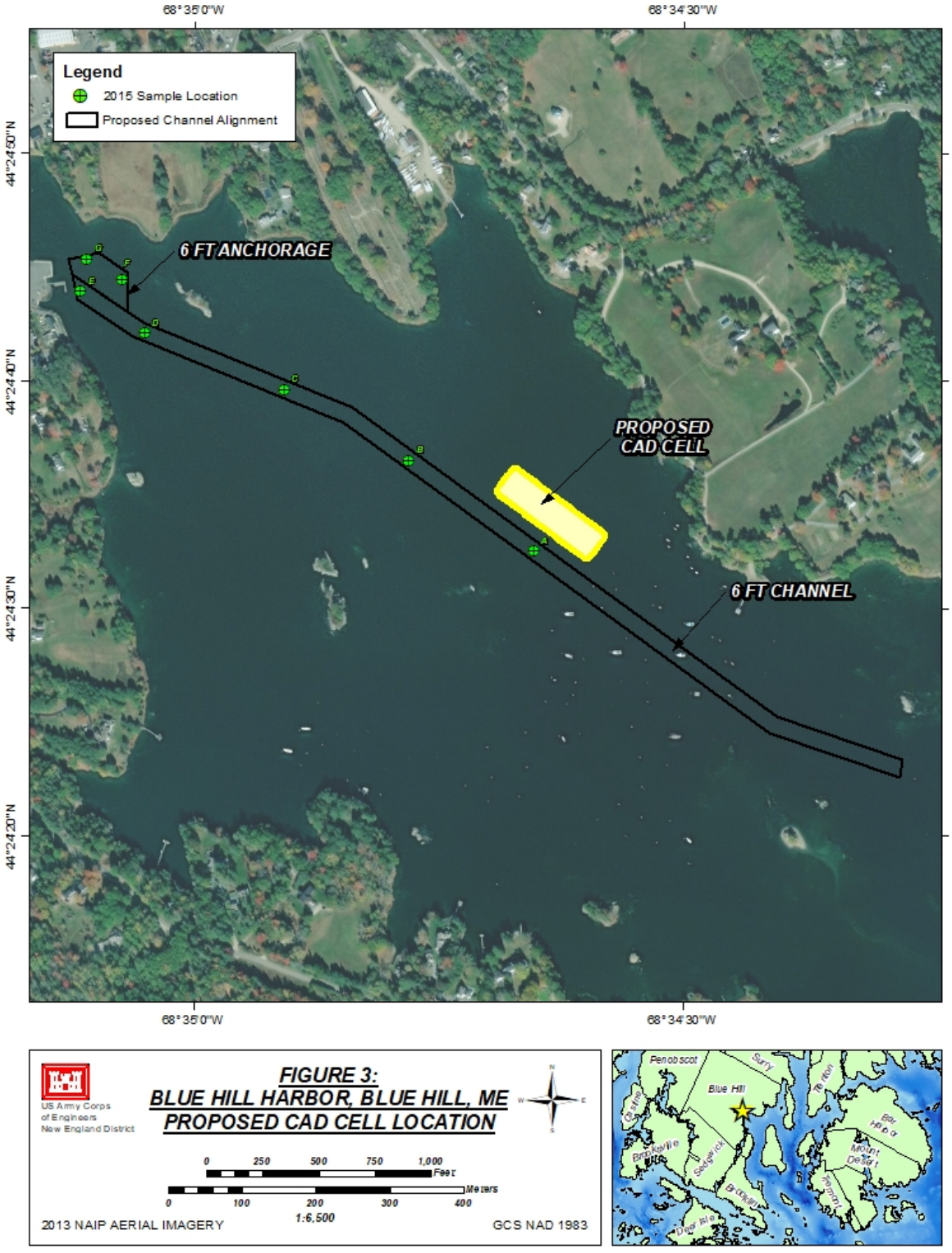
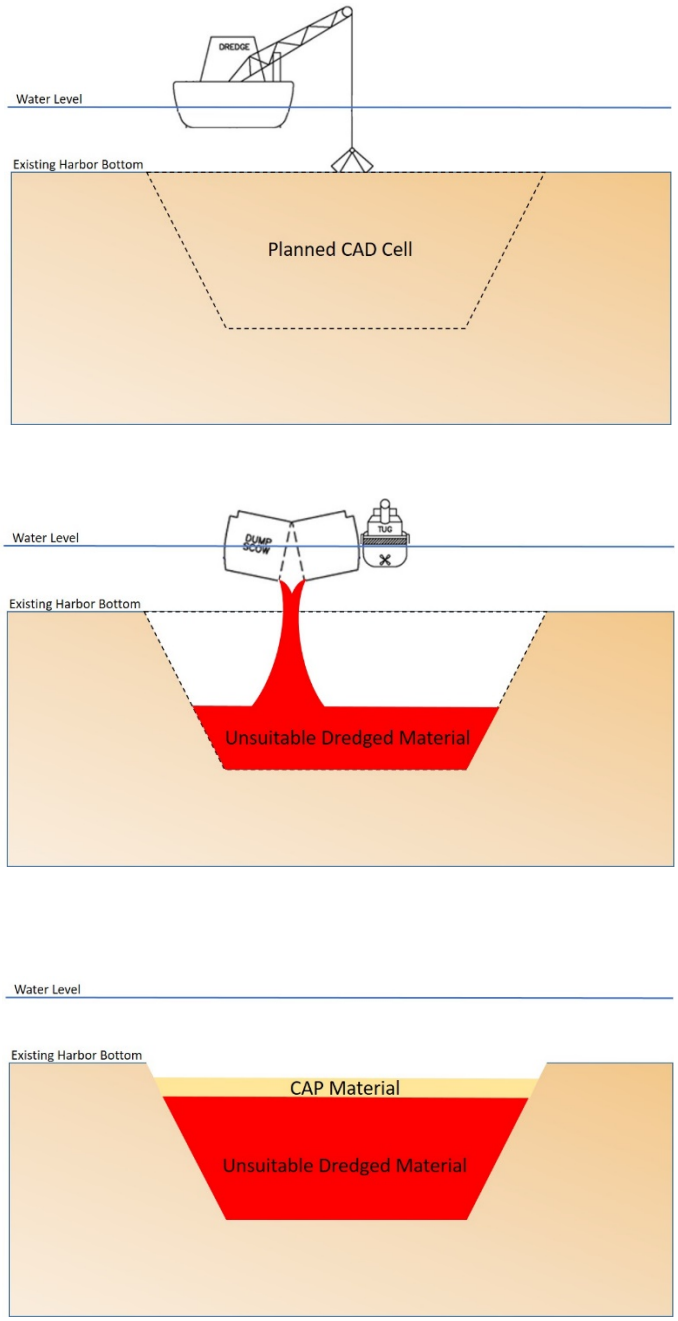


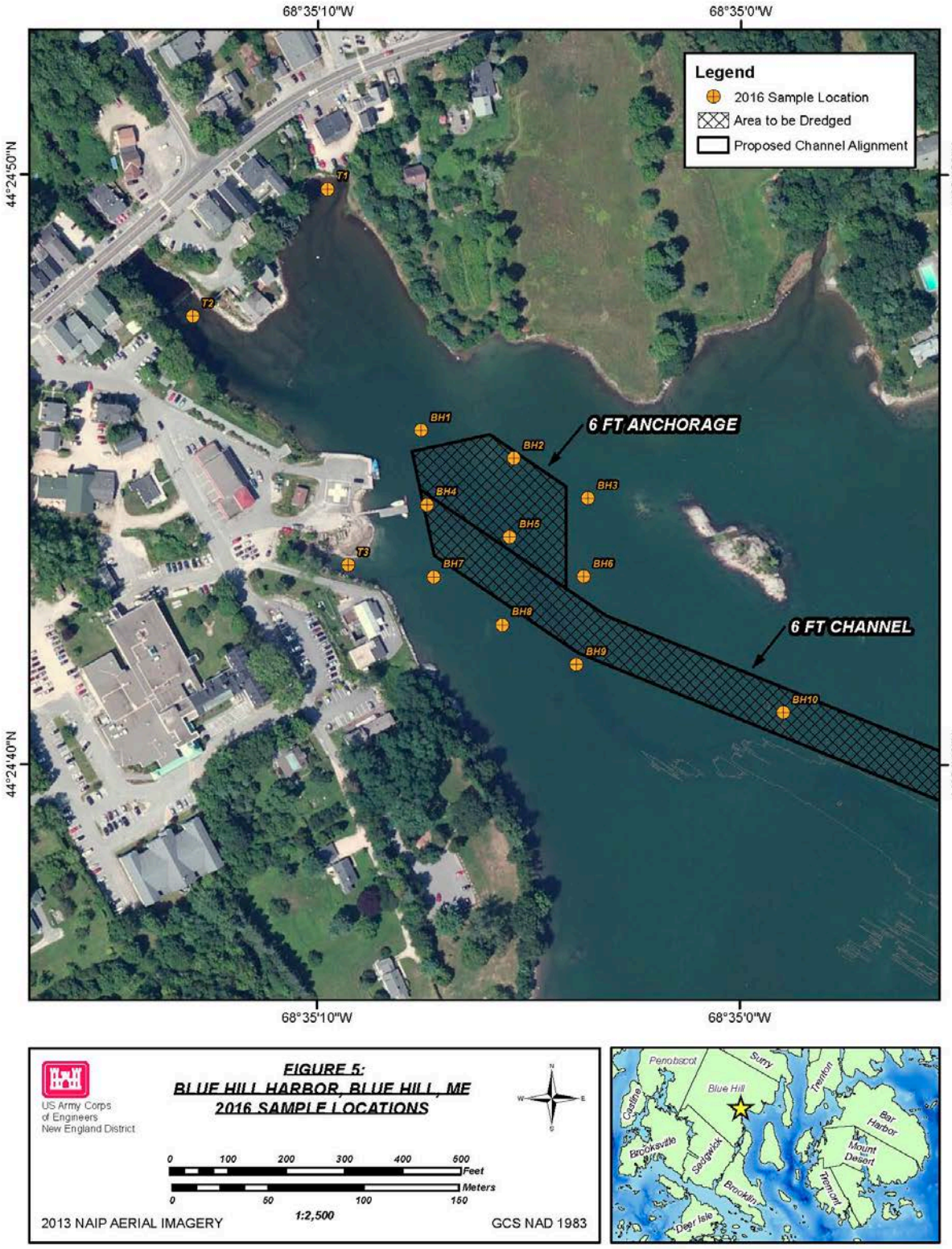

**Figure 2. Blue Hill Harbor Conceptual Site Model**

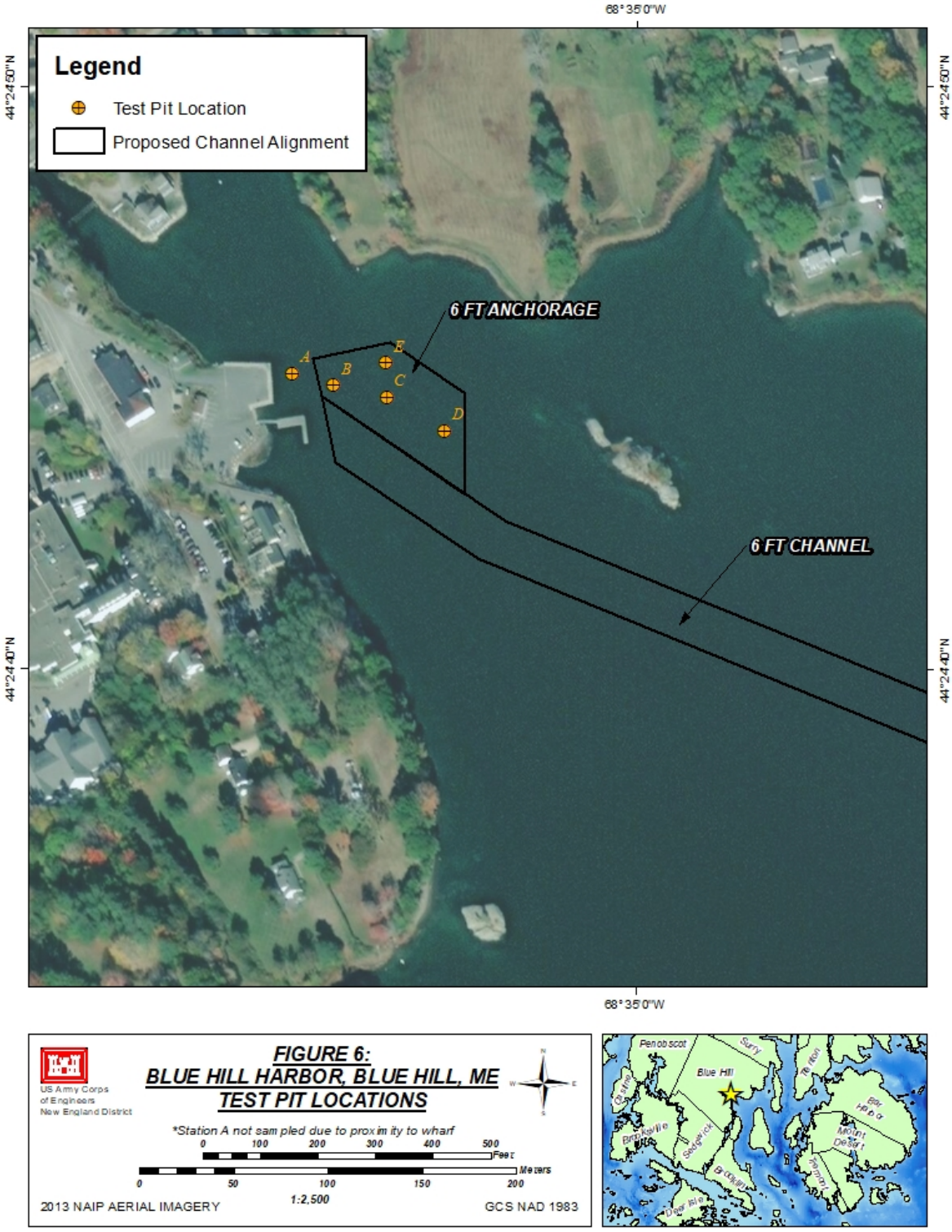

68°35'0"W
68°34'30"W
44°24'50"N
44°24'40"N
44°24'30"N
44°24'20"N
Legend
2015 Sample Location
Proposed Channel Alignment
6 FT ANCHORAGE
PROPOSED CAD CELL
6 FT CHANNEL
A
B
C
D
E
F
G
US Army Corps of Engineers New England District
FIGURE 3:
BLUE HILL HARBOR, BLUE HILL, ME
PROPOSED CAD CELL LOCATION
0 250 500 750 1,000 Feet
0 100 200 300 400 Meters
1:6,500
2013 NAIP AERIAL IMAGERY
GCS NAD 1983
Penobscot
Blue Hill
Castine
Brooklin
Sedgwick
Deer Isle
Mount Desert




*Not to scale

**Figure 4. Typical Confined Aquatic Disposal (CAD) Cell Schematic**


68°35'10"W
68°35'0"W
44°24'50"N
44°24'40"N
Legend
2016 Sample Location
Area to be Dredged
Proposed Channel Alignment
T1
T2
T3
BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10
6 FT ANCHORAGE
6 FT CHANNEL
US Army Corps of Engineers New England District
FIGURE 5:
BLUE HILL HARBOR, BLUE HILL, ME
2016 SAMPLE LOCATIONS
0 100 200 300 400 500 Feet
0 50 100 150 Meters
1:2,500
2013 NAIP AERIAL IMAGERY
GCS NAD 1983
Penobscot
Surry
Blue Hill
Trenton
Castine
Bar Harbor
Brooksville
Sedgwick
Mount Desert
Brooklin
Tremont
Deer Isle


68°35'0"W
44°24'50"N
Legend
Test Pit Location
Proposed Channel Alignment
6 FT ANCHORAGE
A
B
C
D
E
6 FT CHANNEL
44°24'40"N
68°35'0"W
US Army Corps of Engineers New England District
FIGURE 6:
BLUE HILL HARBOR, BLUE HILL, ME
TEST PIT LOCATIONS
*Station A not sampled due to proximity to wharf
0 100 200 300 400 500 Feet
0 50 100 150 200 Meters
1:2,500
2013 NAIP AERIAL IMAGERY
GCS NAD 1983
Penobscot
Surry
Blue Hill
Brooklin
Sedgwick
Mount Desert
Deer Isle

# APPENDIX H

SUITABILITY DETERMINATION

## PAH Results from Sediment Push Cores (May 2016)

| PAH | BH-1, 0-6 | BH-1, 6-12 | BH-2, 0-6 | BH-2, 6-14 | BH-3, 0-6 | BH-3, 6-16 | BH-4, 0-6 | BH-4, 6-17 | BH-5, 0-6 | BH-5, 6-18 | BH-6, 0-6 | BH-6, 6-22 | BH-7, 0-6 | BH-7, 6-12 | BH-8, 0-6 | BH-8, 6-28 | BH-9, 0-6 | BH-9, 6-17 | BH-10, 0-6 | BH-10, 6-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 9.9(U) | 11.4(U) | 9.73(U) | 7.08(U) | 8.5(U) | 8.72(U) | 23.9 | 12(U) | 6.98(U) | 13.4(U) | 11.4(U) | 12.7(U) | 11.9(U) | 18.8 | 15.2 | 12.7 | 41.3 | 10.6(U) | 11.6(U) | 14.6 |
| Acenaphthylene | 47.8 | 54 | 55.1 | 56.5 | 30.7 | 8.72(U) | 292 | 25.2 | 23.5 | 13.4(U) | 92.1 | 101 | 29.2 | 208 | 147 | 12.8 | 131 | 10.6(U) | 62.2 | 90.8 |
| Anthracene | 77.8 | 64.5 | 37.4 | 38.8 | 24.6 | 8.72(U) | 254 | 27.2 | 45.5 | 13.4(U) | 126 | 70.4 | 41.7 | 163 | 144 | 39.6 | 247 | 10.6(U) | 51.9 | 118 |
| Benz(a)anthracene | 520 | 472 | 372 | 345 | 240 | 8.72(U) | 2460 | 123 | 174 | 14.8 | 821 | 650 | 233 | 1490 | 932 | 122 | 1070 | 10.6(U) | 603 | 776 |
| Benzo(a)pyrene | 403 | 382 | 367 | 349 | 248 | 8.72(U) | 1950 | 120 | 143 | 25.6 | 667 | 637 | 224 | 1320 | 886 | 100 | 895 | 10.6(U) | 618 | 690 |
| Benzo(b)fluoranthene | 390 | 440 | 407 | 372 | 275 | 8.72(U) | 1890 | 119 | 137 | 19.2 | 657 | 596 | 196 | 1320 | 792 | 86.1 | 943 | 10.6(U) | 629 | 718 |
| Benzo(g,h,i)perylene | 255 | 253 | 277 | 249 | 181 | 8.72(U) | 1230 | 81.4 | 97 | 14.2 | 423 | 458 | 148 | 842 | 618 | 57.4 | 508 | 10.6(U) | 384 | 434 |
| Benzo(k)fluoranthene | 432 | 323 | 325 | 304 | 219 | 8.72(U) | 1400 | 98.4 | 110 | 20.5 | 600 | 540 | 219 | 1140 | 831 | 85.2 | 760 | 10.6(U) | 587 | 573 |
| Chrysene | 463 | 435 | 390 | 366 | 258 | 8.72(U) | 2120 | 127 | 154 | 15 | 722 | 669 | 228 | 1380 | 962 | 110 | 1030 | 10.6(U) | 706 | 720 |
| Dibenz(a,h)anthracene | 65.6 | 61.3 | 63.3 | 59 | 44.5 | 8.72(U) | 281 | 23.6 | 21.5 | 13.4(U) | 103 | 101 | 39.5 | 191 | 139 | 19 | 141 | 10.6(U) | 98.7 | 106 |
| Fluoranthene | 1020 | 978 | 749 | 690 | 471 | 8.72(U) | 3940 | 230 | 360 | 18.6 | 1350 | 1130 | 463 | 2740 | 1910 | 209 | 2440 | 10.6(U) | 767 | 1420 |
| Fluorene | 29.5 | 29.1 | 18.4 | 23.8 | 12.2 | 8.72(U) | 104 | 13.7 | 15.6 | 13.4(U) | 47.9 | 39.8 | 12 | 85.8 | 59.5 | 21.7 | 200 | 10.6(U) | 14.5 | 49.5 |
| Indeno(1,2,3-cd)pyrene | 304 | 296 | 313 | 287 | 213 | 8.72(U) | 1300 | 97.8 | 106 | 23.6 | 486 | 496 | 175 | 944 | 687 | 71.2 | 612 | 10.6(U) | 460 | 500 |
| Naphthalene | 9.9(U) | 11.4(U) | 9.73(U) | 11.4 | 8.5(U) | 8.72(U) | 30.6 | 12(U) | 6.98(U) | 13.4(U) | 11.4(U) | 12.7(U) | 11.9(U) | 37.8 | 32.1 | 16.5 | 16.4 | 10.6(U) | 11.6(U) | 16.3 |
| Phenanthrene | 397 | 384 | 274 | 319 | 186 | 8.72(U) | 1180 | 142 | 161 | 13.4(U) | 536 | 616 | 172 | 1280 | 951 | 126 | 1830 | 10.6(U) | 304 | 572 |
| Pyrene | 777 | 766 | 702 | 690 | 410 | 8.72(U) | 4040 | 269 | 317 | 21.7 | 1240 | 1220 | 404 | 2750 | 1840 | 198 | 1840 | 10.6(U) | 788 | 1230 |

All units in µg/kg

Non-detected analytes are reported as the RL and qualified with a “U”

## PAH Results from Sediment Test Pits (October 2016)

| PAH | B-1 (0-2') | | B-2 (2-4') | | C-1 (0-2') | | C-2 (2-4') | | C-3 (4-7') | | D-1 (0-2') | | D-2 (2-4') | | D-3 (4-6') | | D-4 (6-9') | | E-1 (0-2') | | E-2 (2-4') | | E-3 (4-6') | | E-4 (6-8') | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | 10.3 | U | 5.76 | U | 5.52 | U | 8.29 | U | 8.8 | U | 9.17 | U | 5.78 | U | 6.39 | U | 6.37 | U | 9.22 | U | 8.09 | U | 7.58 | U | 8.12 | U |
| Acenaphthene | 10.3 | U | 5.76 | U | 5.52 | U | 8.29 | U | 8.8 | U | 9.17 | U | 5.78 | U | 6.39 | U | 6.37 | U | 9.22 | U | 8.09 | U | 7.58 | U | 8.12 | U |
| Acenaphthylene | 10.3 | U | 5.76 | U | 5.52 | U | 8.29 | U | 8.8 | U | 45.2 | | 5.78 | U | 6.39 | U | 6.37 | U | 9.22 | U | 8.09 | U | 7.58 | U | 8.12 | U |
| Anthracene | 10.3 | U | 5.76 | U | 16.8 | | 8.29 | U | 8.8 | U | 27.6 | | 5.78 | U | 6.39 | U | 6.37 | U | 9.22 | U | 8.09 | U | 7.58 | U | 8.12 | U |
| Benz(a)anthracene | 50.6 | | 13.4 | | 76.6 | | 8.29 | U | 8.8 | U | 321 | | 11.1 | | 6.39 | U | 6.37 | U | 21 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Benzo(a)pyrene | 46.2 | | 14.3 | | 82.8 | | 8.29 | U | 8.8 | U | 408 | | 12.3 | | 6.39 | U | 6.37 | U | 24.5 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Benzo(b)fluoranthene | 39.3 | | 11.8 | | 73.2 | | 8.29 | U | 8.8 | U | 395 | | 10.6 | | 6.39 | U | 6.37 | U | 21 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Benzo(g,h,i)perylene | 24.8 | | 8.38 | | 43.7 | | 8.29 | U | 8.8 | U | 246 | | 7.42 | | 6.39 | U | 6.37 | U | 14.6 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Benzo(k)fluoranthene | 39.6 | | 12.9 | | 74.3 | | 8.29 | U | 8.8 | U | 283 | | 11.4 | | 6.39 | U | 6.37 | U | 21.9 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Chrysene | 50.4 | | 20 | | 82 | | 8.29 | U | 8.8 | U | 415 | | 13.7 | | 6.39 | U | 6.37 | U | 25.5 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Dibenz(a,h)anthracene | 10.3 | U | 5.76 | U | 12 | | 8.29 | U | 8.8 | U | 56.7 | | 5.78 | U | 6.39 | U | 6.37 | U | 9.22 | U | 8.09 | U | 7.58 | U | 8.12 | U |
| Fluoranthene | 80.9 | | 22.3 | | 154 | | 8.29 | U | 8.8 | U | 659 | | 23.2 | | 6.39 | U | 6.37 | U | 41.8 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Fluorene | 10.3 | U | 5.76 | U | 5.52 | U | 8.29 | U | 8.8 | U | 12.4 | | 5.78 | U | 6.39 | U | 6.37 | U | 9.22 | U | 8.09 | U | 7.58 | U | 8.12 | U |
| Indeno(1,2,3-cd)pyrene | 26 | | 9.23 | | 52.9 | | 8.29 | U | 8.8 | U | 265 | | 8.06 | | 6.39 | U | 6.37 | U | 16 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Naphthalene | 10.3 | U | 5.76 | U | 5.52 | U | 8.29 | U | 8.8 | U | 9.17 | U | 5.78 | U | 6.39 | U | 6.37 | U | 9.22 | U | 8.09 | U | 7.58 | U | 8.12 | U |
| Phenanthrene | 36.4 | | 13.8 | | 61.6 | | 8.29 | U | 8.8 | U | 224 | | 12.9 | | 6.39 | U | 6.37 | U | 13.5 | | 8.09 | U | 7.58 | U | 8.12 | U |
| Pyrene | 83.9 | | 24 | | 135 | | 8.29 | U | 8.8 | U | 638 | | 22.2 | | 6.39 | U | 6.37 | U | 47.7 | | 8.09 | U | 7.58 | U | 8.12 | U |

All units in µg/kg

Non-detected analytes are reported as the RL and qualified with a “U”