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US ARMY CORPS
OF ENGINEERS
New England District

**Contract No. DACW33-01-D-0004**
**Delivery Order No. 01**
**January 7, 2005**

# *Final Work Plan*

# Centredale Manor Sediment Probing Data Collection at Allendale and Lyman Mill Ponds

## Centredale Manor Restoration Project Superfund Site North Providence, Rhode Island

# Final Work Plan
# Sediment Probing Data Collection at Allendale and Lyman Mill Ponds
# Centredale Manor Restoration Project Superfund Site

**Prepared for:**

**U.S. Army Corps of Engineers, New England District**

**January 7, 2005**

**Prepared by:**

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## INTRODUCTION

This work plan is based on the scope of work provided by the U.S. Army Corps of Engineers (COE) dated October 15, 2004. This work will be performed under Task Order No. 01 for Contract No. DACW33-01-D-0004, *Centredale Manor Restoration Project Superfund Site*. Sampling will be conducted at the Centredale Manor Restoration Project (CMRP) site in North Providence, Rhode Island. Sediment probe data will be collected along transects within Allendale and Lyman Mill Ponds (Figures 1 and 2) during a one-day sampling event. The data will be used to map the bed sediment type in each pond and will be incorporated into the Phase 2 Sediment Stability Study. The sediment probing data collection will be conducted in accordance with the following documents:

> *Final Quality Assurance Project Plan Addendum, Interim Data Collection, Centredale Manor Restoration Project Site* (QAPP Addendum; September, 2002), as modified in the Errata Sheet (November, 2002).
>
> *Final Health and Safety Plan for the Human Health and Ecological Risk Assessment for the Centredale Manor Restoration Project Superfund Site* (HASP; May, 2002).

Sediment probing data collection details are provided below.

## SEDIMENT PROBING DATA COLLECTION

The Phase 1 Sediment Stability Study indicated that the upper reaches (i.e., northern ends) of Allendale and Lyman Mill Ponds are the predicted areas of potentially significant scour in a 100-year flood event, based on current velocities of >2 ft/sec (Quantitative Environmental Analysis (QEA), 2004). Therefore, the northern ends of the ponds are the primary focus of this sediment probing effort. The ponds will be probed during a single day sampling event conducted by two Battelle staff. Sediment probing data will be collected from transects shown in Figures 1 and 2. Stations will be spaced approximately 20 ft apart along Transects A-H in Allendale Pond, and Transects A-J in Lyman Mill Pond. These transects correspond with the predicted areas of potentially significant scour in a 100-year flood event, and the spacing is on approximately the same scale as the grid spacing for the hydrodynamic model used for the Sediment Stability Study. Stations will be spaced approximately 100 ft apart along Transects I through O in Allendale Pond, and Transects K through W in Lyman Mill Pond. The spacing of the stations in the central and southern ends of the ponds may be increased in the field if sediment type is found to be homogeneous. Data will be obtained using the following protocol:

- The field crew will navigate using a handheld Garmin Promark IV GPS unit. The accuracy of the handheld GPS unit is $\pm$10 ft.
- The field crew will navigate to within 10 ft of the east or west end of each transect (coordinates are provided in Tables 1 and 2). The field crew will navigate to the other end of the transect using the GPS, which provides a directional arrow.
- Sediment will be probed at a series of stations along each transect. The crew will estimate the distance between each station in the field. The boat will not be anchored at each station because the current velocities are expected to be low, and it is not critical to sample at exactly a given location. The actual latitude and longitude of each probing location will be recorded electronically using the GPS at the time of sampling. The GPS waypoint at the beginning and end of each transect will be recorded on the field data sheet (Attachment 1).
- The sediment will be probed to a depth of ~6" using a 1-inch diameter poly-vinyl chloride (PVC) pipe with an open end. The approximate water depth at each station will be recorded based on depth indicators marked on the pipe with indelible marker.

- The pipe will be manually lowered into the sediments at a consistent speed and then gently removed. The sediment type will be determined by observing residual sediment on the probe. If no sediment is present on the probe, then the ease of penetration/refusal will be used to infer the sediment type (i.e., a hard bottom is likely to be associated with sand or gravel).
- At stations where no residual sediment is found on the probe, bottom sediments will be collected using a small sediment grab-sampler deployed over the side of the boat to confirm the characterization determined using the sediment probe. Grab samples will be collected frequently at the beginning of the probing effort until the relationship between ease of penetration and sediment type is well established. After this relationship is established, grab samples will be collected less frequently, with a minimum frequency of 10%.
- The sediment type at each station will be noted on the field data sheet using the Unified Soil Classification System (USCS) (see Attachment 1). The probing pole will be rinsed with site water between stations.
- Station IDs will be recorded using the following sequential labeling schemes. Each transect is assigned a letter, starting with 'A' at the north end of each pond. Each station along the transect will be assigned a sequential number (e.g. AL-A1, AL-A2, etc.)

## DATA MANAGEMENT AND REPORTING

Sediment probing test results will be documented on the field log sheets maintained by Battelle. Electronic tables will be prepared that summarize station ID, coordinates, and sediment type based on the USCS. Maps showing bed sediment type based on the USCS will be prepared for each pond and added to the project GIS. QEA will use the USCS sediment type to infer whether the sediment is cohesive or non-cohesive. Field data and maps will be provided to QEA for inclusion in the Phase 2 Sediment Stability Study Report.

## REFERENCE

Quantitative Environmental Analysis (QEA). 2004. *Final Technical Memorandum. Sediment Stability Study, Centredale Manor Restoration Project Superfund Site, North Providence, Rhode Island.* Prepared for U.S. Army Corps of Engineers New England District. November.

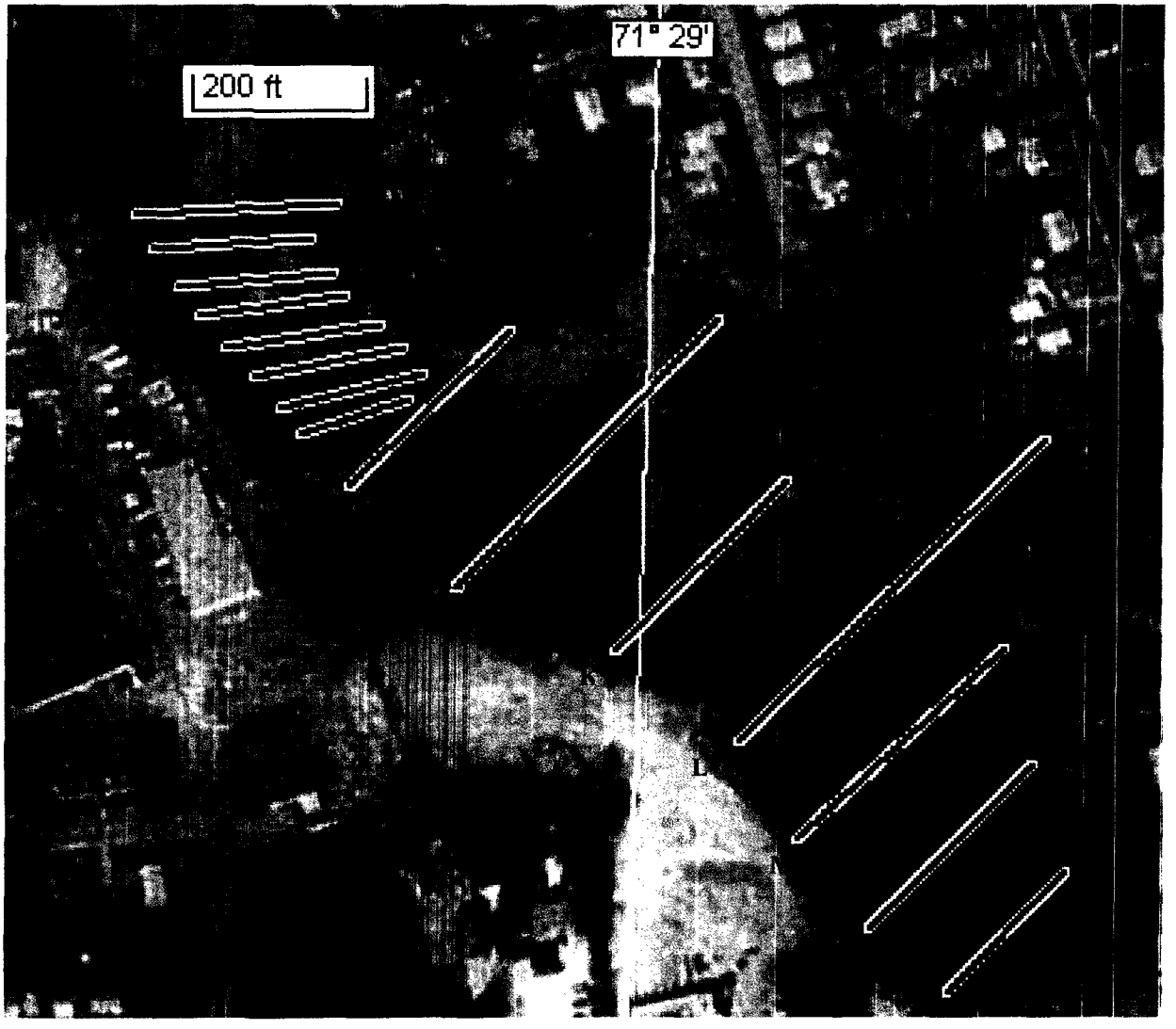


**Figure 1. Allendale Pond Sampling Transects**


**Figure 2. Lyman Mill Pond Sampling Transects**

**Table 1. Transect Locations in Allendale Pond**

| Transect | Begin Latitude | Begin Longitude | End Latitude | End Longitude |
|---|---|---|---|---|
| AL-A | 41.85344 | -71.485503 | 41.85348 | -71.484638 |
| AL-B | 41.85333 | -71.485433 | 41.85337 | -71.484760 |
| AL-C | 41.85320 | -71.485308 | 41.85327 | -71.484660 |
| AL-D | 41.85314 | -71.485227 | 41.85319 | -71.484609 |
| AL-E | 41.85303 | -71.485114 | 41.85311 | -71.484461 |
| AL-F | 41.85294 | -71.484978 | 41.85303 | -71.484367 |
| AL-G | 41.85284 | -71.484866 | 41.85296 | -71.484280 |
| AL-H | 41.85276 | -71.484779 | 41.85288 | -71.484325 |
| AL-I | 41.85261 | -71.484562 | 41.85311 | -71.483913 |
| AL-J | 41.85231 | -71.484099 | 41.85317 | -71.483041 |
| AL-K | 41.85212 | -71.483447 | 41.85267 | -71.482733 |
| AL-L | 41.85185 | -71.482906 | 41.85281 | -71.481673 |
| AL-M | 41.85154 | -71.482647 | 41.85214 | -71.481809 |
| AL-N | 41.85128 | -71.482336 | 41.85180 | -71.481682 |
| AL-O | 41.85109 | -71.481991 | 41.85147 | -71.481536 |

## Table 2. Transect Locations in Lyman Mill Pond

| Transect | Begin Latitude | Begin Longitude | End Latitude | End Longitude |
|---|---|---|---|---|
| LM-A | 41.84630 | -71.481234 | 41.84631 | -71.480506 |
| LM-B | 41.84600 | -71.481211 | 41.84601 | -71.480494 |
| LM-C | 41.84568 | -71.481138 | 41.84570 | -71.480446 |
| LM-D | 41.84551 | -71.480975 | 41.84553 | -71.480319 |
| LM-E | 41.84527 | -71.480839 | 41.84529 | -71.480262 |
| LM-F | 41.84498 | -71.480653 | 41.84500 | -71.479576 |
| LM-G | 41.84474 | -71.480427 | 41.84478 | -71.478899 |
| LM-H | 41.84450 | -71.479581 | 41.84453 | -71.478173 |
| LM-I | 41.84423 | -71.479366 | 41.84427 | -71.477886 |
| LM-J | 41.84401 | -71.479514 | 41.84402 | -71.479008 |
| LM-K | 41.84377 | -71.479457 | 41.84379 | -71.479006 |
| LM-L | 41.84354 | -71.479466 | 41.84355 | -71.479008 |
| LM-M | 41.84330 | -71.479517 | 41.84332 | -71.479102 |
| LM-N | 41.84304 | -71.479555 | 41.84306 | -71.479062 |
| LM-O | 41.84279 | -71.479593 | 41.84281 | -71.478968 |
| LM-P | 41.84252 | -71.479474 | 41.84253 | -71.478867 |
| LM-Q | 41.84225 | -71.479145 | 41.84226 | -71.478820 |
| LM-R | 41.84195 | -71.478893 | 41.84196 | -71.478580 |
| LM-S | 41.84166 | -71.478099 | 41.84164 | -71.478790 |
| LM-T | 41.84128 | -71.478614 | 41.84129 | -71.477753 |
| LM-U | 41.84076 | -71.478600 | 41.84080 | -71.477258 |
| LM-V | 41.84028 | -71.478678 | 41.84032 | -71.476957 |
| LM-W | 41.83976 | -71.478706 | 41.83980 | -71.476696 |

# Attachment 1

# Field Data Sheet

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**Centredale Manor Restoration Project Superfund Site**
**Sediment Probing Data Collection Field Log**

**Location:** _____

**Date and Time:** _____

**Data Entered by Field Team member (Signature):** _____

| Transect | Station | GPS Waypoint | Approximate Water Depth (ft) | Sediment Type (check box) | | | | | Grab Sample Collected | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Gravel GW/GP/GM/GC | Sand SW/SP/SM/SC | Silt ML/MH | Clay CL/CH | Organic silt, clay, peat OL/OH/PT | | |
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