Dredged Material Separation
Plan Execution in New York Harbor Deepening Projects

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Construction Phase
Dredged Material Separation

- Regulatory Considerations
- Project Costs
- Dredging Methods
- Survey & Geotechnical Investigation
- Port-wide Harbor Deepening Program
- Phased program underway over 10 years
- Deepen primary channels to -50’ MLW
- Accommodate Post-Panamax Class Ships
New York & New Jersey Harbor Deepening Contracts

1. S-E-1
2. S-HB-1
3. S-HB-2
4. S-AK-3
5. S-AK2
6. S-AK-1
7. S-KVK-5
8. S-KVK-2
9. PI-4
10. S-KVK-1
11. PI-3
12. S-AK-2
13. S-AK-1A
14. S-AN-1B
15. S-AM-2B
16. S-AM-1
17. S-AM-3A
18. S-AM3B
19. S-BR* (Deferred)
• **Stakeholders**
  
  - U.S. Army Corps of Engineers
  - EPA
  - Port Authority of New York and New Jersey
  - State of New Jersey (DEP, DOT)
  - State of New York (DEC, DOT)
  - Terminal Operators
Dredged materials consist of:

- Silt (Recent) = 10.3 MCY
- Sand = 16.5 MCY
- Glacial Till / Clay = 12.4 MCY
- Rock = 7.5 MCY
Dredging methods include:

- Environmental Clamshell Buckets
- Heavy Clamshell Buckets
- Excavators
- Hydraulic Cutterheads

Equipment selection driven by:

- Material
- Environmental Regulations
• **Environmental Considerations**
  • Disposal/Placement Sites
    • Historic Area Remediation Site
    • Confined Disposal Facility (closed)
    • Upland (after processing)

• **Cost Implications**
  • HARS approximately $10 - $20 / cy
  • CDF approximately $35 - $45 / cy
  • Upland approximately $75 - $100 / cy
Historic Area Remediation Site
- Former “Mud-Dump Site”
- Offshore of NY/NJ
- Now authorized only for “remediation” material
- “Clean material” only

What is “remediation” material?
- Not silt.
• Material Authorized for Placement at HARS

• Subject to full suite of
  • Physical/Chemical/Bio Testing

• Geology tends to drive HARS suitability
  • Recent silt/maintenance material - Not Suitable
    • PAHs, PCBs, Metals
  • Pleistocene glacial till and clay – Suitable
    • 2005 Memorandum of Understanding

• Rock – Goes to offshore reef sites
• Distinguishing Between Suitable/Unsuitable
  • Hardness/Firmness
    • Silt: Soft, blow counts less than 5 to 10 over 6”
    • Till and Clay: Firm/hard, blows between 10 and 65 over 6”
    • Rock: Refusal on split spoon
  • Odor
    • Silt: Strong petroleum odors
    • Till, Clay, Rock: Odorless
• **Distinguishing Between Suitable/Unsuitable**
  
  • **COLOR!**
  
  • Recent Silt (Unsuitable) = Black, Dark Gray
  
  • Glacial Till/Clay (Suitable) = Red
• Environmental Considerations
  • Disposal/Placement Sites
    • Historic Area Remediation Site
    • Confined Disposal Facility (closed in 2012)
      • 1.5 Million Cubic Yards
    • Upland (after processing)
• **PROBLEM**

• HARS-Unsuitable silt overlies HARS-suitable Glacial Till and Clay

• Striking a Balance between
  • Environmental protection of HARS by sending only suitable material offshore against
  • Cost implications of sending too much volume for upland processing.

• Don’t underdig

• Don’t overdig
Historic Approach to Dredged Material Separation

- Contractor Dredges to Refusal with Environmental Bucket
- Material taken upland or to CDF
- Glacial till/clay prevents efficient dredging
- Contractor Reports Completed Effort to Refusal
- Progress Surveys Verify Volume
- Contractor Proceeds with Open Buckets and HARS Placement Activities
• 2005 – Change in Paradigm
  • USACE – NY Operations Division (Regulatory)
    • Pressure from environmental groups to PROVE that HARS was only receiving suitable material.
    • Pressure on contractors to exercise due diligence
  • USACE – NY Construction Division
    • Pressure to maintain budgets and prevent over-digging of material destined for Upland processing
    • Larger/heavier environmental buckets can dig, somewhat inefficiently, into glacial till/clay
  • New Dredged Material Separation Plan Scheme
Current Dredged Material Separation Plans

- Contractor dredges to refusal with environmental bucket.
  - Subcontractor performs sidescan sonar survey or dual-frequency bathymetric survey.
  - Subcontractor performs short sediment core sampling
    - Less than 3-feet.
  - Subcontractor reports results; contractor cleans-up.
- Progress surveys verify volume.
- Contractor Proceeds with Open Buckets and HARS Placement Activities
• **Sidescan Survey**
  
  • Use imagery to classify bottom
  
  • Geographically referenced
    • Overlay project plans
  
  • Rely on acoustic reflectivity
    • Backscatter caused by material
    • Reflection caused by structure
  
  • Make general interpretations
Federal Deepening Project S-E-1
Elizabeth Channel Deepening
Western Acceptance Area
HARS Material Separation
Client: DonJon Marine Inc.

Figure 11:
Gravity core sampling plan
SideScan Sonar Image Mosaic
With Interpretations

SeaVision Figure 05-015-11
Drawn by: J. Snyder
Date: 07/14/2009

Notes:
The sideScan sonar imagery depicted on this drawing represents the results of survey performed by SeaVision Underwater Solutions, Inc. to delineate the project boundary extending at least 15 feet.
The sideScan sonar data was collected using a GeoSea GeoScan 3200 SideScan Sonar System with SonarData Imaging Processing software.

Scale: 1 inch = 200 feet

Legend:
- Sample Locations
- Black Silt
- Exposed HARS Suitable

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All other areas within contract dredging footprint for the “Upland Material Areas” exhibit characteristics of recently dredged channel bottom that has penetrated into the HARS-suitable gravel materials with a thin veneer of remaining upland suitable silt. Sampling efforts have concentrated on these “Black Silt” and undetermined areas.
• **Sediment Core Sampling**
  
  • Vibracore or gravity core
  • Short samples
    • Less than 3-feet.
  • Preserve vertical relationships
  • Photograph core samples
  • Develop standardized logs
Good sample = less than 6” Silt
Bad Sample = more than 6” Silt
Schedule

- Sidescan Sonar + Processing = 1 Day
- Sediment Sampling = 1 to 2 Days
  - (20 Samples per day)
- Reporting = 12 Hour turn-around
  - Compare sample depths with progress MBES surveys and design-phase geotech cores
- Clean-up dredging = As Needed
- Progress survey
Lessons Learned

Contractor Requirements

- Trust in subcontractor
  - Know the geology.
  - Know the regulatory issues.
  - Turn the data around quickly.
  - Issue strong reports.
  - Provide clear feedback to dredges.

Close interface between dredge captain and subcontractor

- Project choreography.
- Immediate reporting.
Lessons Learned

USACE Requirements

Subcontractor qualifications
- Know the geology.
- Know the regulatory issues.
- Standardized reporting.
- Clear photographs and core logs.

Trust that subcontractor can direct the contractor (his own client) to go back to clean-up material.
• Separation Plan Facts

• Since 2005 – all Federal deepening projects (with exception of Ambrose Channel) have required these efforts.

• All non-Federal deepening projects utilizing the HARS require the “sampling-only” material separation effort.

• Sidescan sonar can be used to delineate areas of exposed HARS-unsuitable silts so long as the underlying material provides an acoustic contrast, but,

• Core sampling is necessary to verify thickness