

Planning and Implementing a Lake Dredging Project

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HDR

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Planning and implementing a lake dredging project is a significant management effort

- It is important to gather the information necessary to make informed planning decisions, such as:
 - 1) The extent of the sediment impaired area(s) of the lake,
 - 2) The quantity of sediment to be removed (cu. yds.),
 - 3) The physical & chemical characteristics of the sediment,
 - 4) The method of sediment removal,
 - 5) Where it can be placed for storage and dewatering,
 - 6) How much the potential project is likely to cost, and
 - 7) If dredging is needed, how can the project be paid for...

The Benefits of Sediment Removal as a Restoration Alternative

- 1) Increased water depths and overall storage capacity that has been lost to sediment deposition;
- 2) Improved and expanded recreational opportunities for safe boating and access;
- 3) A more balanced fish population resulting from expanded aquatic habitat, effective management efforts and deeper overwintering conditions
- 4) Water quality and clarity is likely to improve in addition to reducing internal nutrient (phosphorus) recycling from wind and wave resuspension
- 5) Water supply lakes can increase storage volume to help prevent water shortages during drought

Preliminary Project Requirements

- Complete a Sedimentation Survey that includes water depth and sediment thickness measurements
- Determine optimum dredging limits, target depths and total quantity of sediment to be removed
- Characterize and analyze physical and chemical properties of sediment to be removed
- Determine dredging method (Hydraulic or Mechanical)
- Locate site(s) for Sediment Storage and/or Dewatering
- If implemented, obtain Regulatory Permits from Army Corps of Engineers, Illinois EPA, Illinois DNR, Illinois Historic Preservation Agency, Local and/or County



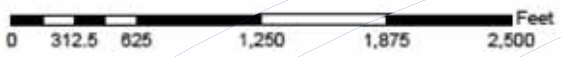
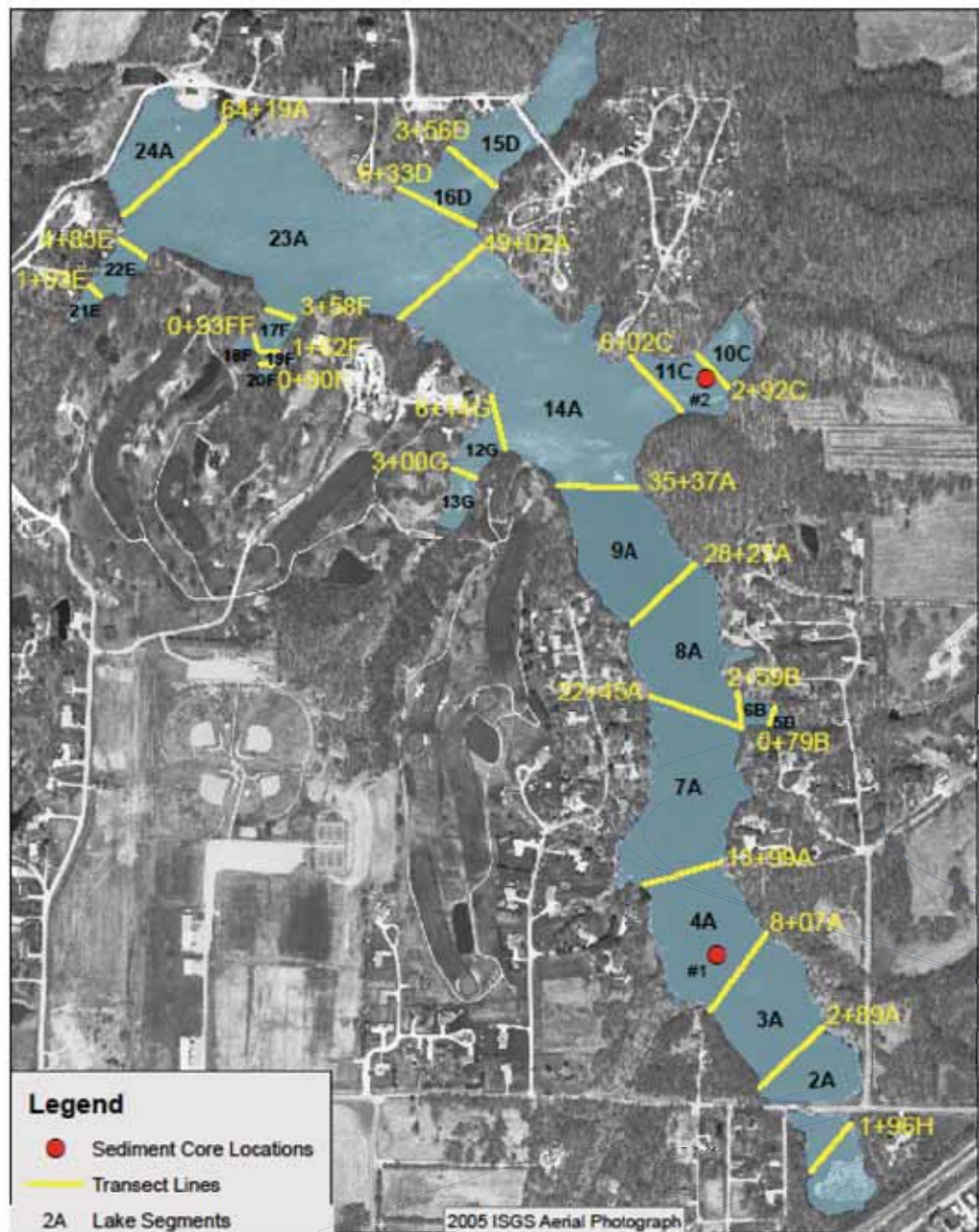
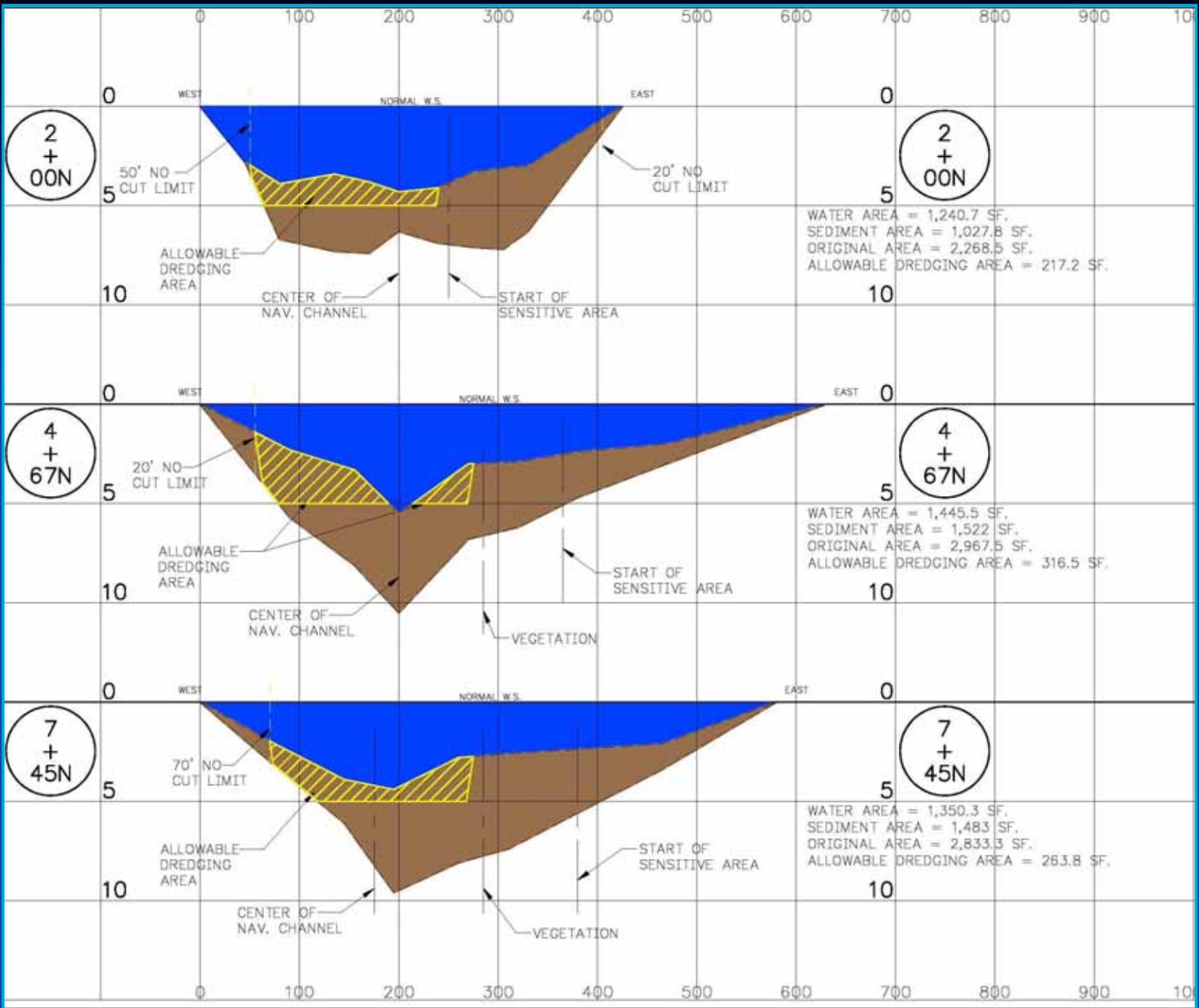


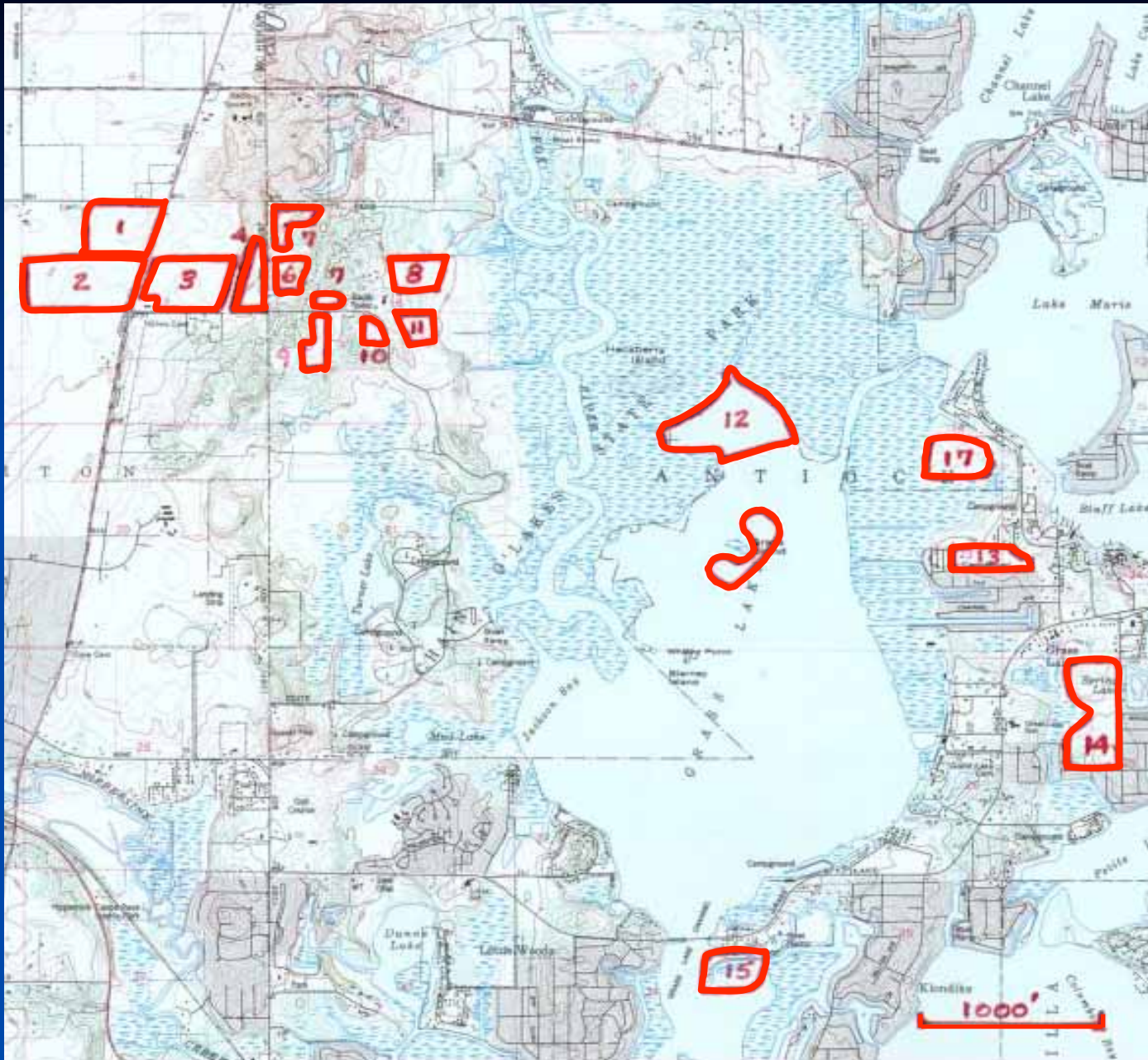
Figure 4. Sediment Survey Plan



Prioritized Sediment Removal and Management Plan







Potential Sediment Storage and Dewatering Sites





Various site characteristics and obstacles must be considered for the dredge pipeline access, sediment storage and dewatering requirements

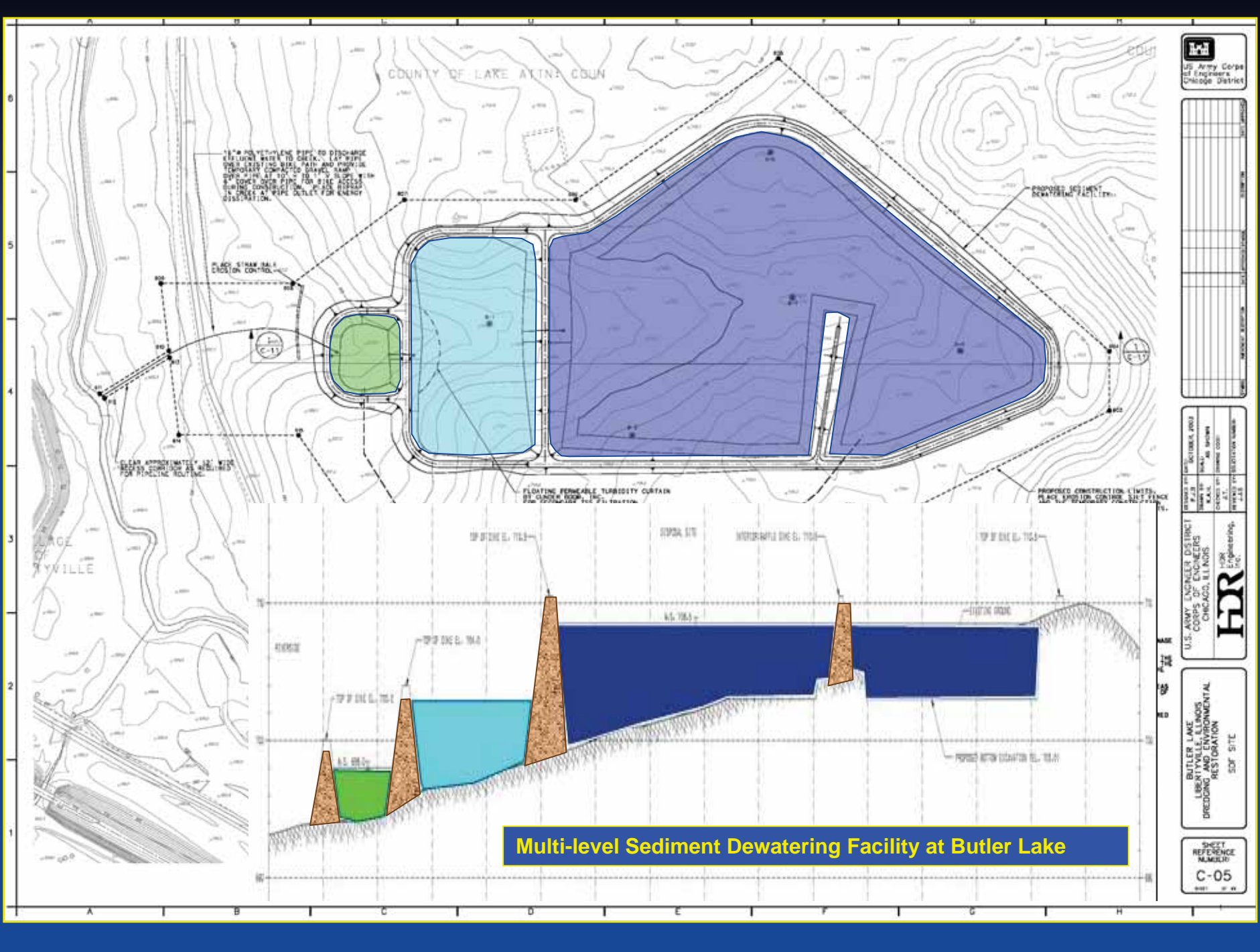


Permitting Requirements

- Joint Application Permit to be completed and submitted to USACE, Illinois EPA and IL DNR
- Section 401 Water Quality Certification (EPA)
- Anti-Degradation Assessment (EPA)
- Illinois DNR Dam Permit may be required for storage and dewatering impoundment:
- Illinois EPA Storm Water Permit (NPDES ILR10)
- Illinois Historic Preservation Agency (Phase 1 Archeological Survey)

Dredging & Dewatering Options

- Hydraulic Cutterhead, Swinging Ladder, Horizontal Auger, Low Turbidity, High Solids, Diver Operated
- Mechanical Excavation: Wet and Dry
- Conventional Upland Containment Area Designs based on retention and gravity settling of solids
- Geotextile Tubes (Geotubes) both in-lake and upland
- Treatment Options such as Polymers, Flocculants, etc.
- On-Site Mechanical Dewatering Systems



 U.S. Army Corps of Engineers Chicago District																					
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Hydraulic dredge with rotating basket type cutterhead capable of excavating large volumes sediment and transporting a slurry via pipeline.





Hydraulic dredge equipment with both horizontal auger type cutterhead for soft sediment and swinging ladder with basket type cutterhead for maneuverability and versatility.



Hydraulic dredge equipment with conventional upland sediment storage and dewatering facilities.





Hydraulic dredge mobilization and pipeline assembly.





Hydraulic dredge slurry discharge from pipeline and water control structures at dewatering facilities.





Clarified effluent return water being discharged from sediment dewatering facilities must be 15 mg/l or less of total suspended solids satisfy IEPA permit requirements.





Fine grained sediment that does not settle within a 24 hour period may require a polymer or flocculent to achieve necessary return water clarity.





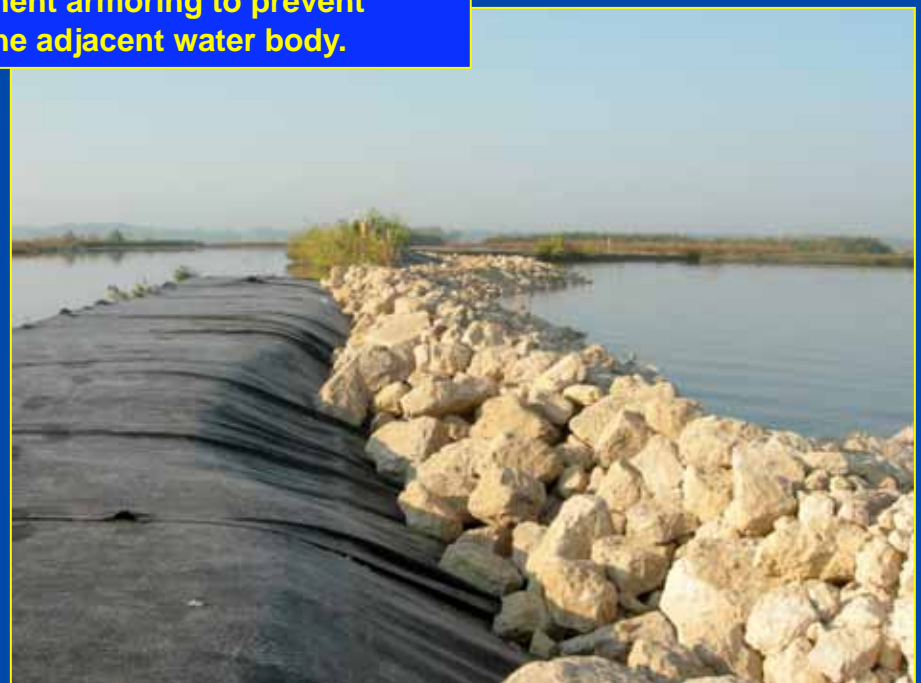


An in-lake island may be constructed by filling geotubes with sediment and pumping sediment into the interior as an alternative to upland sediment storage and dewatering facilities.





However, hydraulically filled geotubes may be damaged and must be protected with permanent armoring to prevent sediment from escaping into the adjacent water body.





Geotextile tubes and mechanical dewatering systems can be used when land for sediment storage and dewatering is limited



A modified high solids "Dry Dredge" can excavate material and pump a thickened slurry of "lava" consistency, which reduces dewatering and is efficient at filling geotubes.





A barge mounted excavator or crane equipped with a clamshell excavating unit allows mechanical dredging in a river or waterbody without a water level drawdown.





The Bunn Park Lagoon, which is a Springfield Park District golf course lake was mechanically excavated after a water level drawdown. Sediment was placed on adjacent areas and re-vegetated with turf grass.



Mechanical dredging with long reach excavators at Bunn Park Lagoon





Mechanically excavated sediment placed in a confined area for drying, grading and re-vegetation.



Upland sediment storage and dewatering impoundments are often permitted dams and must be decommissioned by breaching to eliminate impounding capability



Sediment drying and consolidation allows for rapid establishment of vegetation due to soil fertility. Extensive agronomic testing at Univ. of Illinois has confirmed that most lake and river sediment has excellent agricultural potential.



A restored lake can provide increased water storage capacity, in addition to enhanced recreational opportunities.