
Upland Disposal Management of Confined Disposal Facilities (CDFs)

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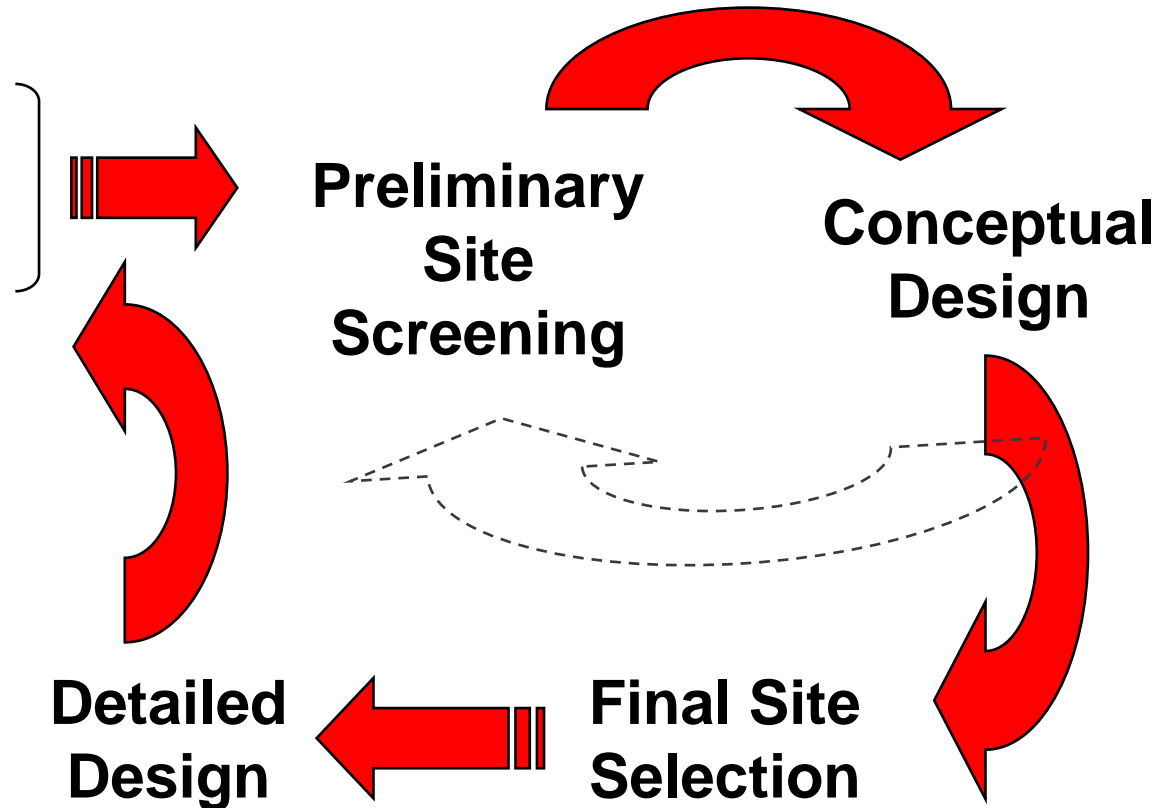
When do we use upland disposal?

- **Logistics**
 - Open water is not first option
 - Upland disposal site in close proximity
- **Unsuitable for open water disposal**
 - Unacceptable risk
 - Benthic toxicity
 - Dilution attainable



CDF Life-cycle Stages

- Planning
- Design
- Construction
- Management
- Closure



CDF Planning Stage

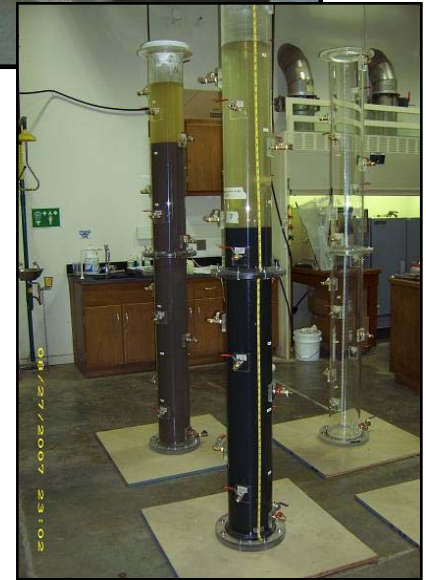
- **Screen potentially suitable sites**

- **Location**
- **Adjacent land uses**
- **Available area**
- **Access**
- **Ownership/acquisition**
- **Transportation**
- **Utilities**
- **Encroachments**
- **Wetlands**
- **Site specific receptors**



CDF Conceptual Design Stage

- **Design objectives**
 - Retain solids
 - Contain contaminants
 - Material recovery
- **Information/data required**
 - Sediment characterization
 - Dredging plan
 - Dredging/offloading method
 - Column settling tests
 - Consolidation testing
- **Three step process....**

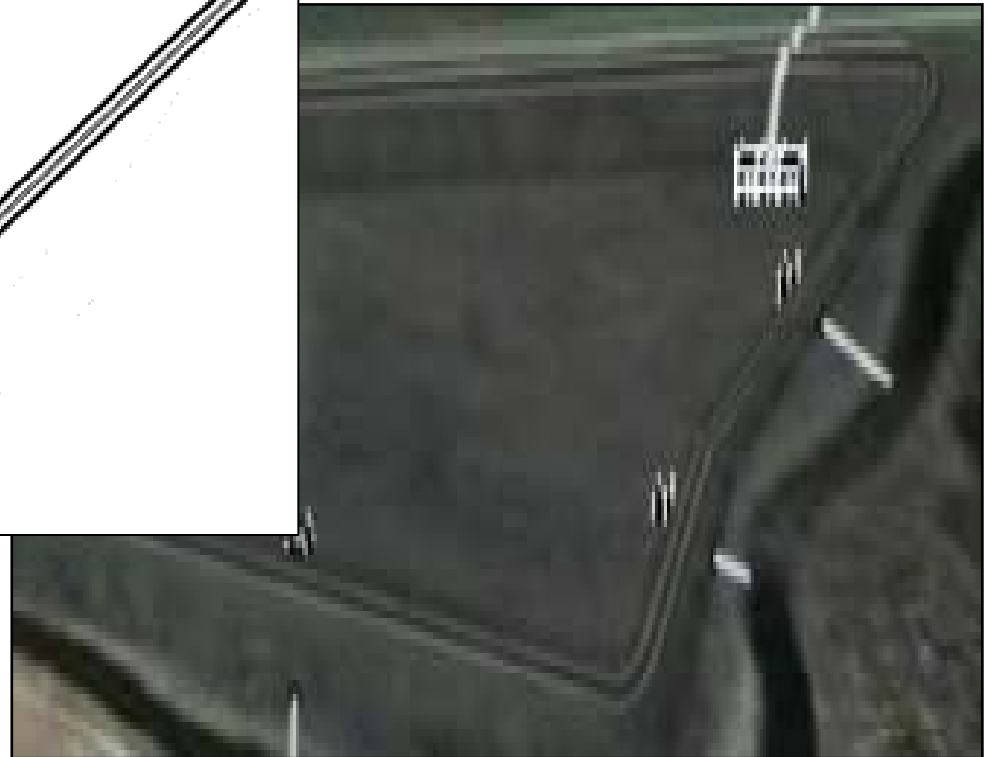
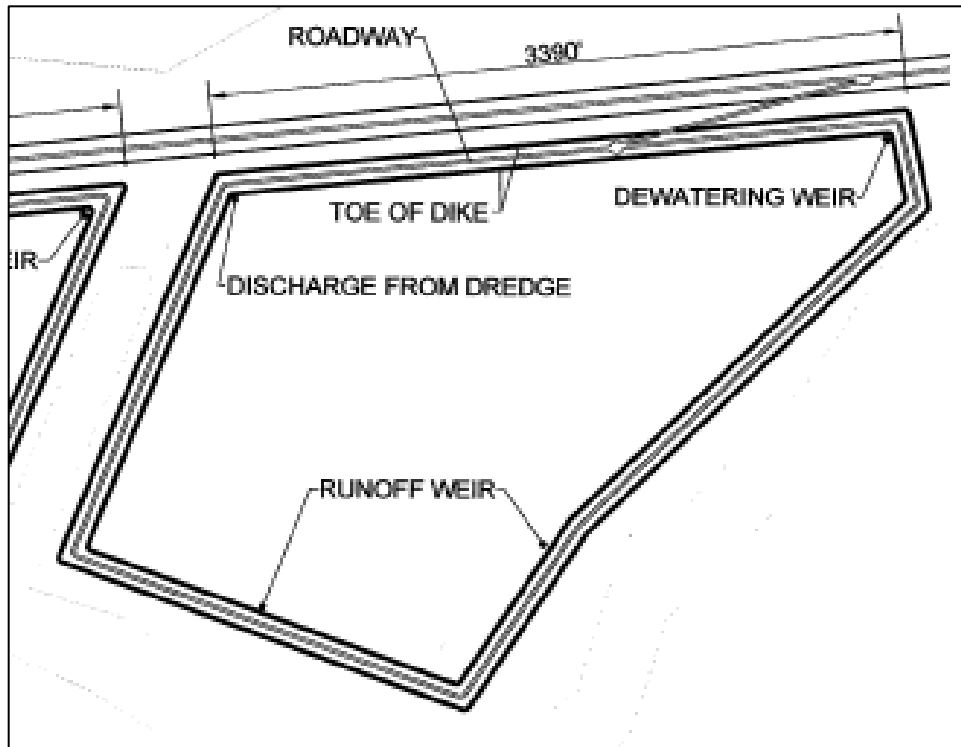


Step I Capacity Evaluation

- **SETTLE**
 - Storage & clarification area
 - Outlet weir length
 - Effluent suspended solids
- **PSDDF**
 - Long term consolidation
 - Multiple placements

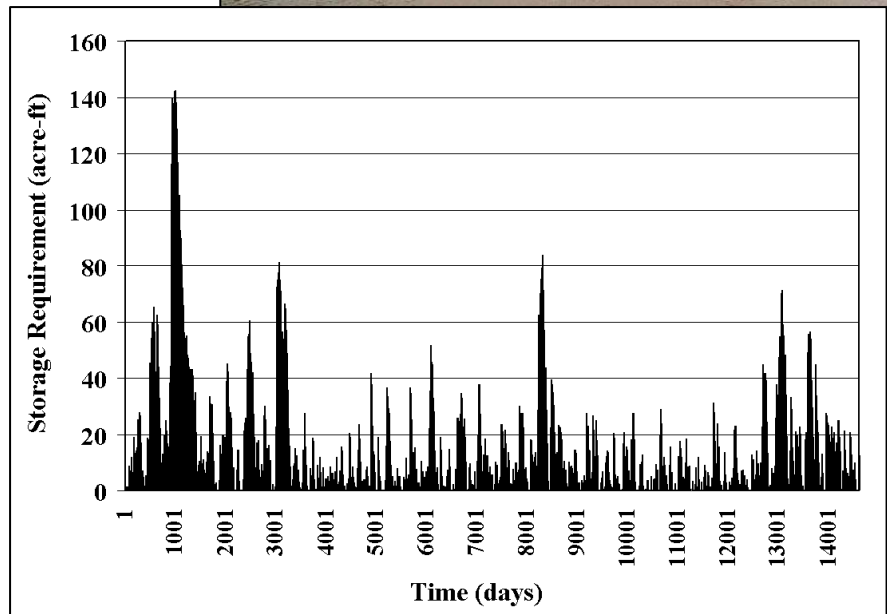
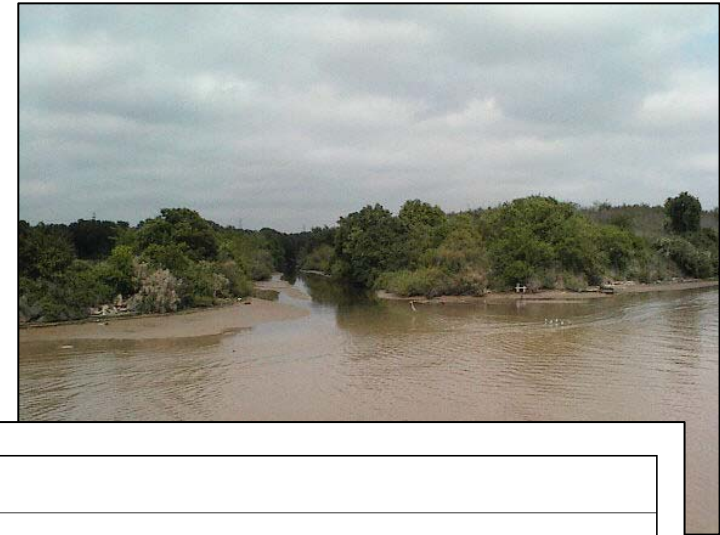


Step II Preliminary Layout



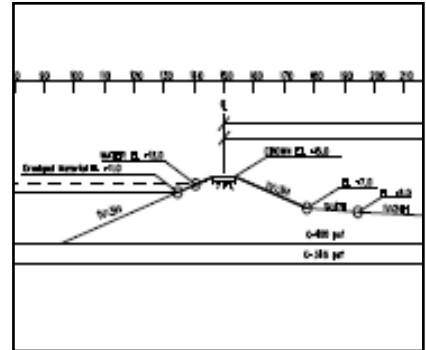
Step III Information Gathering

- Borrow materials
- Receiving waters
 - Flow
 - Water quality
- Site characterization
 - Geotechnical
 - Chemical
- Climate information
 - Stormflows
 - Dewatering



CDF Detailed Design Stage

- Construction/RFP level specifications
- Site appurtenances
- Dike design
 - Material specifications, side slopes
 - Construction staging
- Outlet structures
 - Size, type, number and placement
- Water management
 - Pumping or treatment requirements
- Overall Management Plan



Construction

- **Site preparation**
 - Grubbing
 - Grading
 - Foundation treatment
- **Dike construction**
- **Dewatering trench**
- **Liners, filters**
- **Utilities**
- **Roadways**
- **Fencing**



CDF Management Plan

- **Objectives**
 - Maximize storage capacity
 - Accelerate dewatering
 - Environmental compliance
- **Typical Management activities**
 - Dewatering
 - Vegetation control
 - Effluent monitoring
 - Material recovery
 - Dike raising
 - Closure and capping



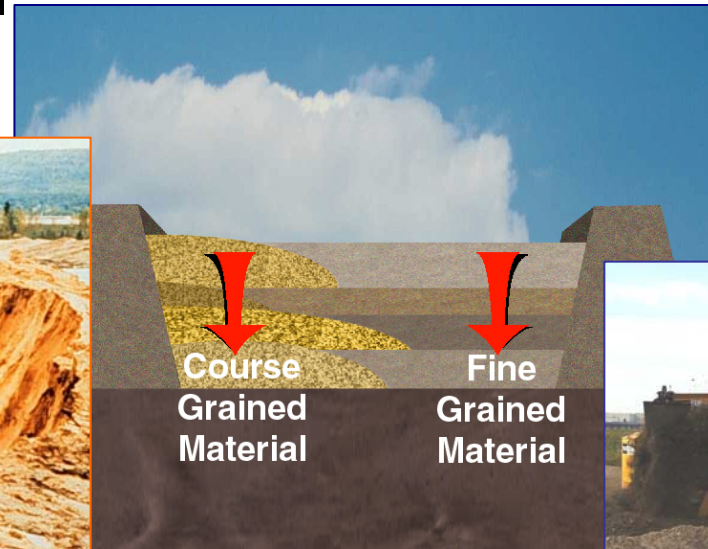
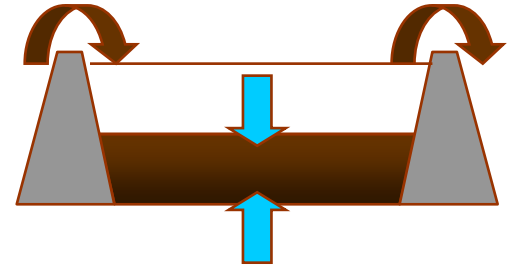
Dewatering

- **Perimeter trenching**
 - Long reach excavator
- **Cross trenching**
 - Typically 100'-200' on center
 - Low pressure tracked vehicles
 - Requires crust formation
- **Mechanical dewatering**
 - Rare - material processing
 - Off-site disposal
- **Vertical drains**
- **Underdrains**



Material Recovery

- Beneficial use = sustainability
- Recovery methods
 - Simple excavation
 - Composting
 - Physico-Chemical Treatment



Sediment Treatment

- **Applicability**
 - Navigation dredging - limited (\$\$)
 - More common to remediation dredging
- **Basic Processes**
 - Separation
 - Contaminant immobilization
 - Contaminant destruction

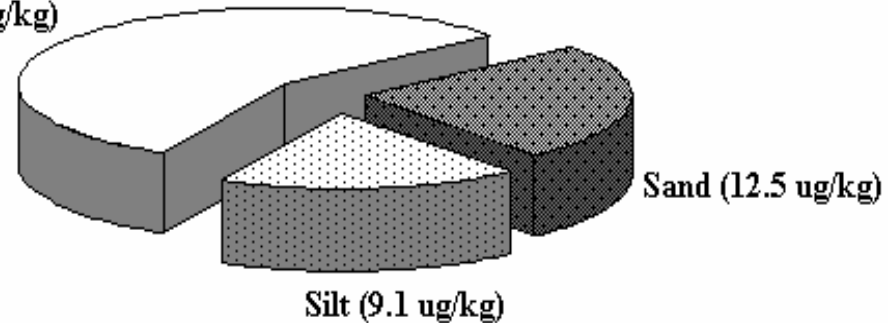


Separation

- Grain size separation
 - Sand recovery
- Density separation
 - Contaminant bearing phases



Clay (28.0 ug/kg)



Contaminant Immobilization

- **Contaminant binding amendments**
 - Lime
 - Portland Cement
 - Fly Ash
- **Mechanical mixing**
 - Barge
 - Pit

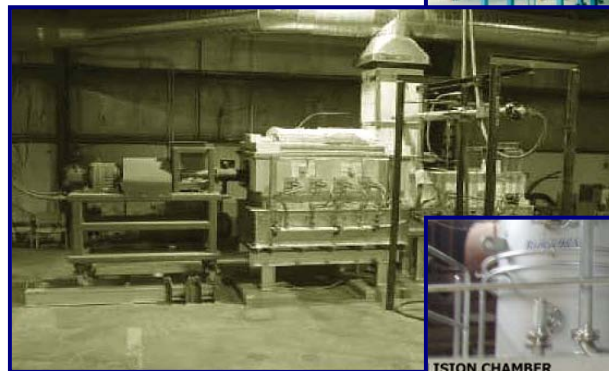


(Photos courtesy of
Sand Diego Unified
Port District)



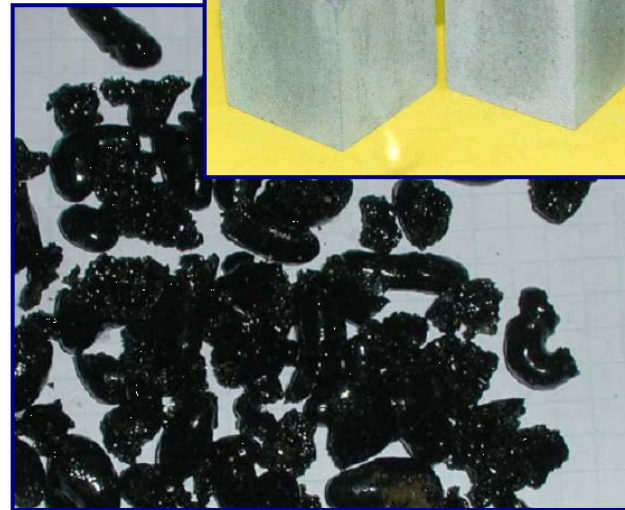
Contaminant Destruction

- **Thermal**
 - Rotary Kiln (RK)
 - GTI Cement Lock™ (GTI)
 - Minergy (MIN)
- **Soil Washing**
 - Biogenesis (BG)

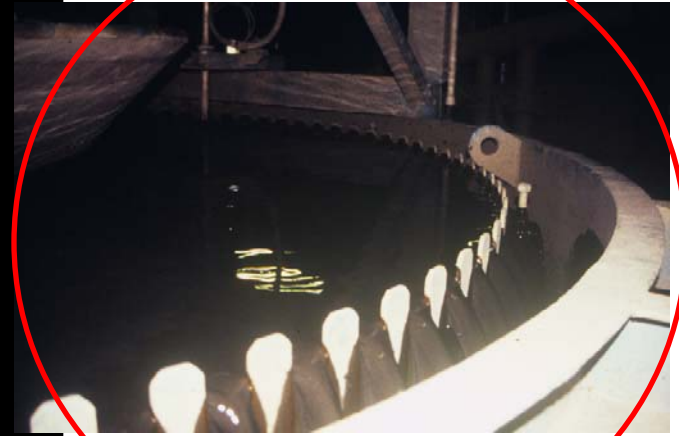


Beneficial Use Products

- Rotary Kiln (RK)
 - Construction-grade light-weight aggregate (LWA)
- GTI Cement Lock™ (GTI)
 - Construction-grade cement
- Minergy (MIN)
 - Glass aggregate
- Biogenesis (BG)
 - Decontaminated soil



Treatment Trains



Pretreatment

Residuals

Process



Pretreatment

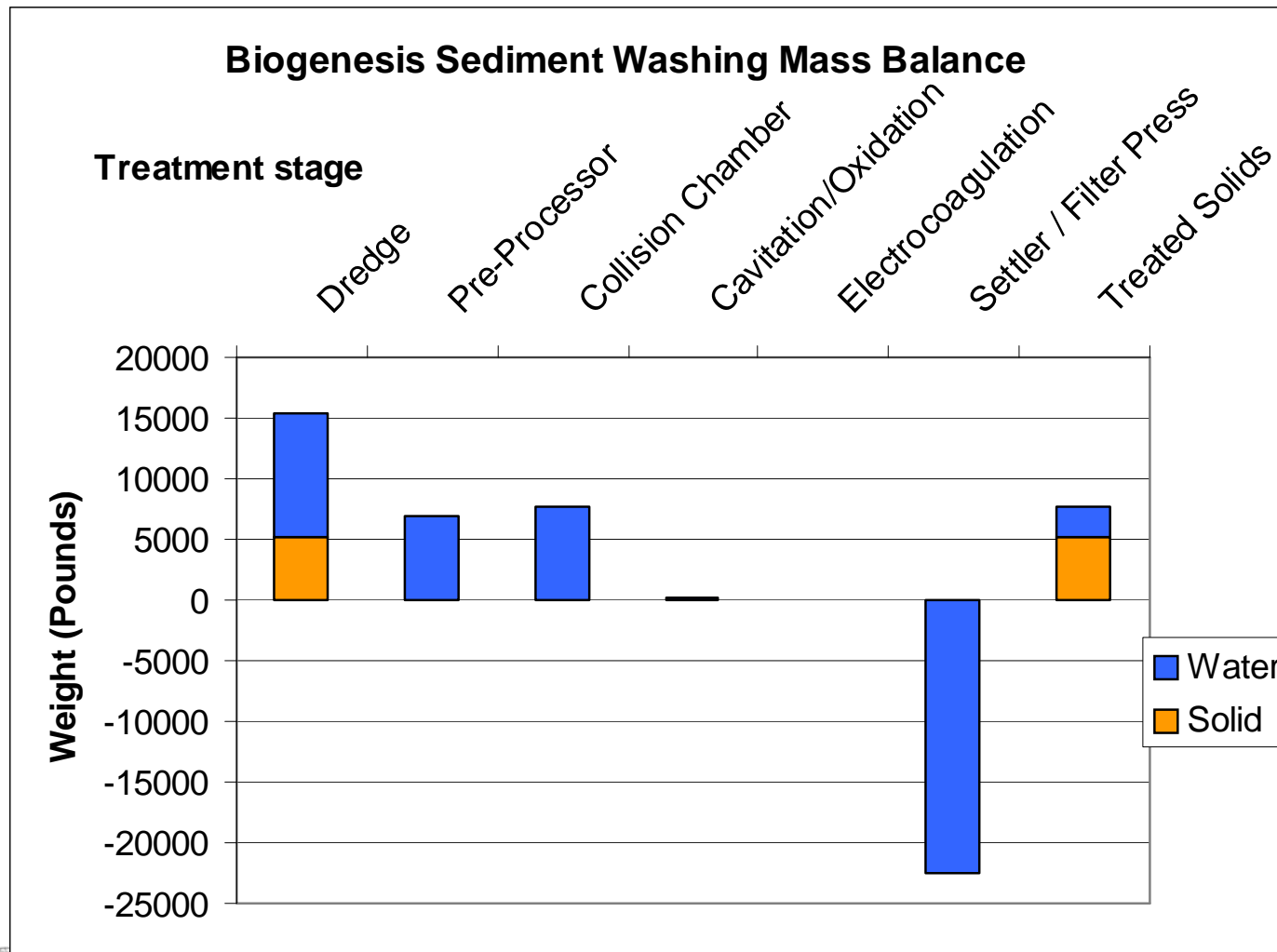


Oversize/Trash Removal

Separation/Dewatering/Drying



Residuals = Cost



CDF Closure

- **Capping**
- **End uses**
 - **Municipal facilities**
 - **Recreation areas**
 - **Agricultural areas**
 - **Habitat**



- **Moving away from closure to sustainable use....**

