

Selected Dredging-related Projects

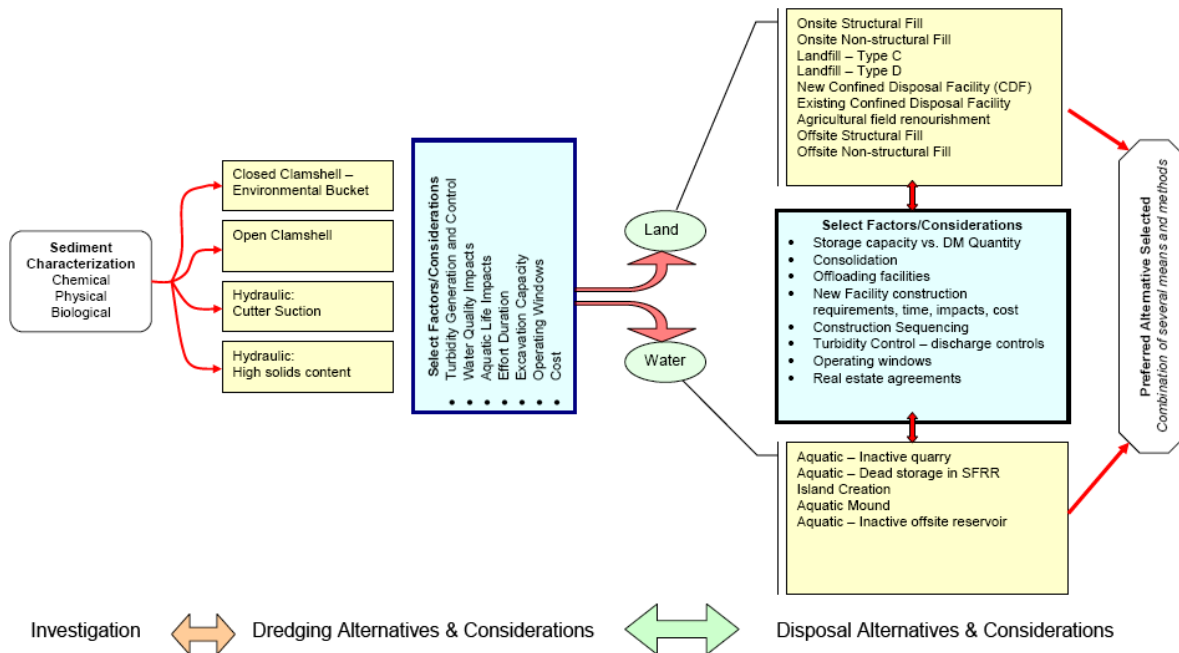
Dredging is as much art as science.

Dredging projects are often nestled within a hot bed of political quagmire. The Owner, regulatory agencies, local government and elected officials, non-profits, and citizen action groups often all have opinions and positions.

The dredging and disposal can not be evaluated or selected in isolation. The interdependency of these efforts creates the Preferred Alternative and the understanding of the limiting factors, pros/cons, and 'what works for a reasonable cost and duration' usually makes or breaks the dredging feasibility.

The ultimate 'preferred alternative' may likely be a combination of cost-effective locations, means and methods including means/methods of hydraulic dredging where a high solids content slurry is obtained and dewatered using commercially available dewatering equipment; mechanical using a hydraulic excavator; or hydraulic using a 'over the road' transportable dredge with an expected high water content slurry. The graphic below illustrates the range of possibilities as well as engineering, constructability, and environmental considerations that need to be considered when reducing and selecting the 'preferred alternative.'

C2D has first-hand experience successfully completing this process and the in-house skills to achieve the best outcome for all the players.



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The following are select project descriptions for C2D relative to dredging and dredged material disposal.

Carraizo Reservoir Dredging Project	
Client	Puerto Rico Aqueduct and Sewer Authority
Location	Trujillo Alto, Gurabo, Caguas, Puerto Rico
Dates	1995 to 1999
Contact	Teresita Vega, PE (retired); home phone = 787.722.2721
Team Member	Corry Platt, CEP
Services Provided	Feasibility analysis, environmental permitting, preliminary design oversight, construction contract administration, construction phase environmental and water quality monitoring.

C2D’s president and owner, Corry Platt, was the ‘on the ground’ representative of a past employer self-performing and leading/directing specialized teams of engineers, environmental scientists, construction inspectors, and cost estimators carrying the Carraizo Reservoir Dredging Project from planning through construction. Constructed in 1953 over half of the reservoir storage capacity had accumulated sediment rendering severe water restrictions and human health emergencies for the over 1.5 million residents of the San



Juan Metropolitan Area whose sole source of drinking water was from the Carraizo Reservoir. The Carraizo Reservoir Dredging Project was the first USACE-permitted dredging of a drinking water reservoir that was never taken offline during the dredging works. Approximately 6 million cubic meters (8 million cubic yards) were hydraulically dredged and placed into three upland confined disposal facilities (CDF). The alternative analyses, environmental planning, geotechnical evaluations, sediment characterizations, preliminary design, and construction contract/technical specifications were all conducted in an extremely rapid, time-critical situation because of extreme drought conditions and associated human health and welfare concerns.

Over the multi-year project, C2D staff conducted numerous tasks including:

- Comprehensive aquatic, nearshore, and upland disposal site identification, volumetric capacity estimation, feasibility and alternative reduction, conceptual design and feasibility reduction, geotechnical and seismic studies and design, and preliminary design for three upland confined disposal facilities (CDF).
- Dredge, pipeline, booster pumps, and earthworks construction equipment mobilization routing, staging, access, availability, timing, and cost estimating.
- Bathymetric/historic topography mapping and accumulated sediment volume estimation and identification of dredging depths/locations
- Comprehensive sediment characterization through Tier II Evaluation in coordination with the EPA/USACE Inland Testing Manual, which was under development.

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- Federal, Commonwealth, and local permitting spanning USACE, EPA, USFWS, Commonwealth Department of Natural Resources, Commonwealth Environmental Quality Board, Commonwealth Cultural Resources, Commonwealth Dam Laws, Commonwealth Planning Board, and local, municipal planning departments.
- Environmental Impact Statement
- Biological Opinion for Endangered Species Act Section 7 formal consultation and related procedural filings with the U.S. Fish and Wildlife Service.
- Fish sampling, laboratory analysis, and quarterly monitoring for mercury concentrations in fish tissue and resultant bio-uptake during construction and implications to ecological and human health food chain.
- Federal and Commonwealth Section 106 studies and mitigation including negotiations held by the Advisory Council on Historic Preservation in Washington, DC.
- Technical support for Federal and Commonwealth judicial proceedings initiated by project opponents including pre-construction filings and requests for 'stop work orders' during construction.
- Wetland Mitigation Plan development including new construction of about 15 acres of wetlands to compensate for jurisdiction wetlands filled to create one of the upland Confined Disposal Facilities.
- Reservoir maintenance projections, sediment disposal, storage capacity allotment, disposal frequency.
- Drinking water intake clearing, near dam dredging and dam sustainability assessment.
- Land assemblage, independent value assessment, technical support to real estate options to purchase and subsequent purchase agreements, technical support and locations for permanent and temporary construction easements.
- Writing of the Construction Contract and technical specifications covering, but not limited to, dredging depths and locations;
- Construction Contract Bid support, bidder question/answer, bid addenda, bid evaluation and selection recommendation.
- Construction Contract Administration (\$42 million) including resident engineer/construction inspector oversight on water for dredge inspection, on land for earthworks construction, and along pipeline for welding inspection and easement compliance; before dredge and after dredge hydrographic surveys; debris payment requests; underwater obstacle evaluation; payment request evaluation and recommendations for payment; change order evaluation, negotiation, and approval; substantial completion punch lists; administrative file management; health and safety oversight; and permit compliance water quality sampling.

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Lago Garzas Dredging Project	
Client	Puerto Rico Electric Power Authority; Black & Veatch
Location	Adjuntas, Puerto Rico
Dates	1999 to 2002
Contact	Todd Stockberger, PE (currently employed by Halcrow); office phone = 813.876.6800
Team Member	Corry Platt, CEP
Services Provided	Feasibility analysis, environmental assessment



C2D conducted a Feasibility Analysis including horizontal and vertical delineation of dredging, dredged material disposal alternatives identification including aquatic (in-reservoir) disposal (within dead storage), aquatic pits, nearshore, and upland disposal; forebay and tributary sediment trap identification and



conceptual design; Tier I Evaluation and testing exclusion application documentation; analysis of sediment physical characteristics; equipment mobilization routing and considerations due to limited, mountainous access; and cost estimating.

Dredging Program – Weaver’s Cove Energy	
Client	Weaver’s Cove Energy, LLC – a subsidiary of Hess LNG
Location	Fall River, Massachusetts
Dates	2002 to <i>ongoing</i>
Contact	Ted Gehrig, President; office phone = 508.675.9470
Team Member	Corry Platt, CEP
Services Provided	Feasibility analysis, environmental permitting, water quality analysis and monitoring plan development; sediment volume estimation; confined aquatic disposal alternatives; upland confined disposal facility alternatives; stabilized dredged material testing; preliminary design oversight; environmental permitting; and multiple Tier III Evaluations for sediment characterization and water quality assessment.

C2D began working on the dredging and dredged material disposal for Weaver’s Cove Energy’s proposed redevelopment of an idle oil import terminal into a liquefied natural gas import terminal in 2002 with a Feasibility Study conducted in association with Han-Padron Associates. Subsequent to the initial Feasibility Study that inter-related dredging, disposal, handling, construction duration, and costs of several development scenarios, C2D has independently provided the following:

- Coordinate multi-disciplinary teams spanning environmental, civil, structural, geotechnical, and marine practice areas.
- Responsible for the management of the Dredging Program, which includes maintenance and improvement dredging of greater than 2.5 million cubic yards. Stabilization and upland reuse as engineering fill as well as offshore disposal.
- Environmental permitting and documentation modification to liquefied natural gas (LNG) import terminal including cryogenic pipe-in-pipe LNG transfer system with trenching for 4.25-mile subsea installation and offshore berth/offloading platform. Represent the Owner’s interests and permitting strategy working with host of local consultants to perform sediment characterization; cement stabilization; upland placement; offshore disposal; polluted berth sediments removal; dredge-induced suspended sediment plume dispersion and concentration; benthic and essential fish habitat assessments; and alternative analyses.



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- Coordinate geotechnical evaluations and contractor-review of Feasibility Study including laboratory testing, field testing, and pilot study of stabilizing dredged material with cement and lime to create engineered fill suitable for construction.
- Responsible for self-performance and coordination of applicable Federal Energy Regulatory Commission filings, US Army Corps of Engineers applications per Clean Water Act and Rivers and Harbors Act, US Environmental Protection Agency offshore disposal Suitability Determination, Massachusetts and Rhode Island permits, water quality certificates, and host of land-based environmental regulations.
- Self-performance of dredging, dredged material disposal, and in-water structures descriptions, forecasting, and impact assessment for FERC Resource Reports; USACE permit application and drawings; Massachusetts Chapter 91 license applications; multiple municipal Conservation Commission applications.
- Coordination of pre-engineering evaluations with host of specialty contractors and material suppliers.
- Coordination of bathymetry, sub-bottom profiling, side scan sonar and related obstacle identification.
- Quantity calculations for dredging, backfilling, and disposal.
- Dredge production forecasting and implications/inputs for suspended sediment dispersion modeling. Floating fleet forecasting and thermal change from vessel cooling waters.
- Sediment characterization with biological analyses for offshore disposal of over 3 million cubic yards of dredged material to support USACE/EPA Suitability Determination application.

