

DOUGLAS HARBOR DREDGE MATERIAL DISPOSAL PRACTICABLE ALTERNATIVE ANALYSIS REPORT POA 2000 - 495 - M3

This report is written to evaluate dredge material disposal alternatives resulting from proposed dredging activity at Douglas Harbor in Juneau. Dredging would occur concurrently with replacement of main floats A, B and C including the associated stall floats and anchor piles in the eastern portion of the basin. Dredging is required because many vessels contact the sea floor as a result of insufficient depth. Over the last several decades, the depth in the basin has decreased by several feet, primarily due to glacial rebound. The quantity of dredge material requiring disposal is approximately 30,000 CY.

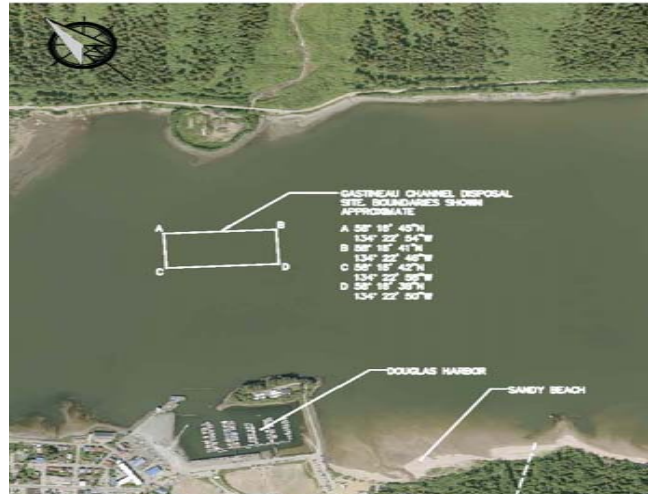
Two separate sediment sampling and testing programs have taken place in 2007 and in 2008-2009. Chemical and biological testing has been performed in accordance with the Inland Testing Manual (ITM) and the Puget Sound Dredge Material Evaluation and Disposal (Users Manual). The City and Borough of Juneau Docks & Harbors Department's (CBJ's) preferred material disposal method and location is unconfined aquatic disposal at a previously utilized Gastineau Channel location near the project site. The results of the chemical and biological testing indicate that the dredged material is suitable for unconfined aquatic disposal.

Pursuant to the Environmental Protection Agency (EPA) and Army Corps of Engineers (COE) document Evaluating Environmental Effects of Dredged Material Management Alternatives—A Technical Framework, the following alternatives have been evaluated as potential disposal sites for the material generated during Douglas Harbor dredging operations:

1. Unconfined aquatic disposal in Gastineau Channel near the project site
2. On-site, intertidal confined disposal behind newly-constructed timber retaining wall extension.
3. On-site, intertidal confined disposal beneath expanded parking lot.
4. Intertidal, confined disposal at Treadwell Mine cave-in.
5. Intertidal, confined disposal at DNR controlled tidelands near the Thane Ore House.
6. Intertidal, confined disposal at Alaska Marine Lines storage yard expansion
7. Upland disposal at Fish Creek Quarry.
8. Upland disposal in various depressions within the Treadwell Mine complex.
9. Upland disposal at the Juneau Waste Management Landfill.
10. Upland disposal in an approved landfill in Washington or Oregon.
11. COE to evaluate practicable alternatives for disposal of material generated during COE maintenance dredging of their harbor.
12. Do nothing.

1. UNCONFINED AQUATIC DISPOSAL IN GASTINEAU CHANNEL NEAR THE PROJECT SITE

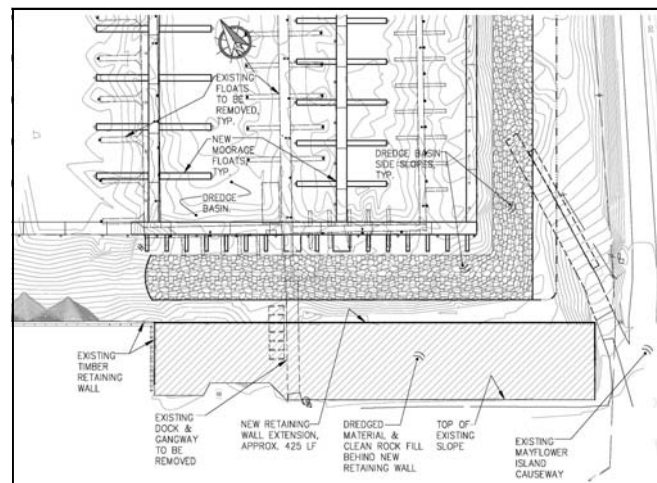
This is the preferred dredge material disposal site and method as it is the most economical and has a recent history of similar use. This site has been utilized during two previous Douglas Harbor dredging operations in 1997 by the COE and again in 2002 by the CBJ. The cost for dredging and unconfined, aquatic material disposal in Gastineau Channel is estimated at **\$900,000**.



Gastineau Channel Disposal Site

2. ON-SITE, INTERTIDAL CONFINED DISPOSAL BEHIND NEWLY-CONSTRUCTED TIMBER RETAINING WALL EXTENSION

A timber-faced geotextile retaining wall currently exists along the southwestern shore of the Douglas Harbor basin. Although not planned in this phase of construction, future plans call for an extension of this wall to the southeast connecting to the Mayflower Island causeway. Dredged material from the harbor could potentially be wrapped in fabric on a geomembrane and placed behind the wall. Unfortunately, less than 10% of the anticipated dredge material volume would fit behind the wall under this plan. An alignment or configuration modification to the proposed wall would not increase capacity to the extent that all of the dredged material could be contained in this manner. As such, this dredge material disposal option is not practicable since it would not fulfill the project purpose.

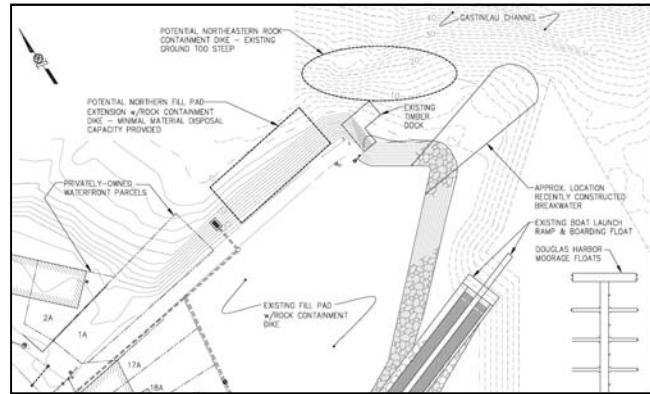


Retaining Wall Extension

3. ON-SITE, INTERTIDAL CONFINED DISPOSAL BENEATH EXPANDED HARBOR PARKING LOT

The existing gravel surfaced parking lot that exists on the west side of the harbor was constructed in 2001 and 2002. Much of the fill material utilized in the construction of this pad consists of dredged material previously removed Douglas Harbor and placed in a confined manner behind a shot rock containment dike with geotextile fabric to separate the dredged material.

The possibility of constructing a new containment dike and extending the fill pad to the north has been examined. As shown in the corresponding drawing, private waterfront parcels 1A and 2A exist to the north of the existing fill. It is not standard practice for the CBJ to fill waterfront tidelands seaward of privately held waterfront parcels nor is it likely that local permits would be issued. Therefore, only a relatively small footprint, both in square footage and depth, is available for possible confined disposal at this location. The dredge material storage capacity at this site is estimated at 4,000 CY, or less than 15% of the capacity required to contain all of the dredged material.



Containment Dike with Parking Lot Expansion, Northern Side of Douglas Harbor Basin

The feasibility of constructing a shot rock containment dike to east and north of the existing timber dock has also been evaluated. While the existing depth at this location would be sufficient to provide significant storage capacity, the seafloor is too steep and slope instability would occur unless confined with extensive sheet pile structures. Therefore, this location is not a practicable alternative for the disposal of dredged material due to constructability.

4. INTERTIDAL, CONFINED DISPOSAL AT TREADWELL MINE CAVE-IN

The Treadwell Mine cave-in site is a roughly circular depression located within the tidal zone, approximately one-half mile from Douglas Harbor. The depression could conceivably be accessed directly by a dredge scow at high tides, approximately +16 M.L.L.W. or higher.



Treadwell Mine Cave-in

Representatives from EPA, CBJ and PND visited the site aboard a CBJ landing craft to gauge the suitability of the site as a potential confined disposal location. Depth soundings were recorded via sonar and horizontal distances were recorded with a range finder. The corresponding capacity is estimated at 10,000 CY, or about one-third of the anticipated dredge material volume. This estimated capacity assumes filling to the low tide line, with dredge material at the base and a layer of imported sand above to form a cap.

Additional hydrologic investigations would need to be conducted to study the potential of groundwater infiltration at this site if this material disposal option were to be fully explored since nearby drainages leading to the site are evident. Additionally, filling activities at this local mining landmark would draw scrutiny from the State Historical Preservation Society and others with historical mining interests.

Due to the limited storage capacity of the site, the potential for groundwater infiltration and historical site issues, this dredge material disposal option is not considered practicable.

5. INTERTIDAL, CONFINED DISPOSAL AT DNR CONTROLLED TIDELANDS NEAR THE THANE ORE HOUSE

The CBJ contacted the Department of Natural Resources (DNR) about the possibility of leasing a portion of DNR controlled tidelands near the Thane Ore House on the Juneau side of Gastineau Channel, to utilize as a disposal site for the Douglas Harbor dredge material. If all of the available land was allowed to be filled, the capacity at this location would be sufficient to contain all of the anticipated dredge material. Unfortunately, DNR does not consider the placement of fill at this location to be a beneficial use of tidelands and as such, denied the request to consider transferring control of the tidelands to the CBJ for this purpose.



DNR Controlled Tidelands

6. INTERTIDAL, CONFINED DISPOSAL AT ALASKA MARINE LINES STORAGE YARD EXPANSION

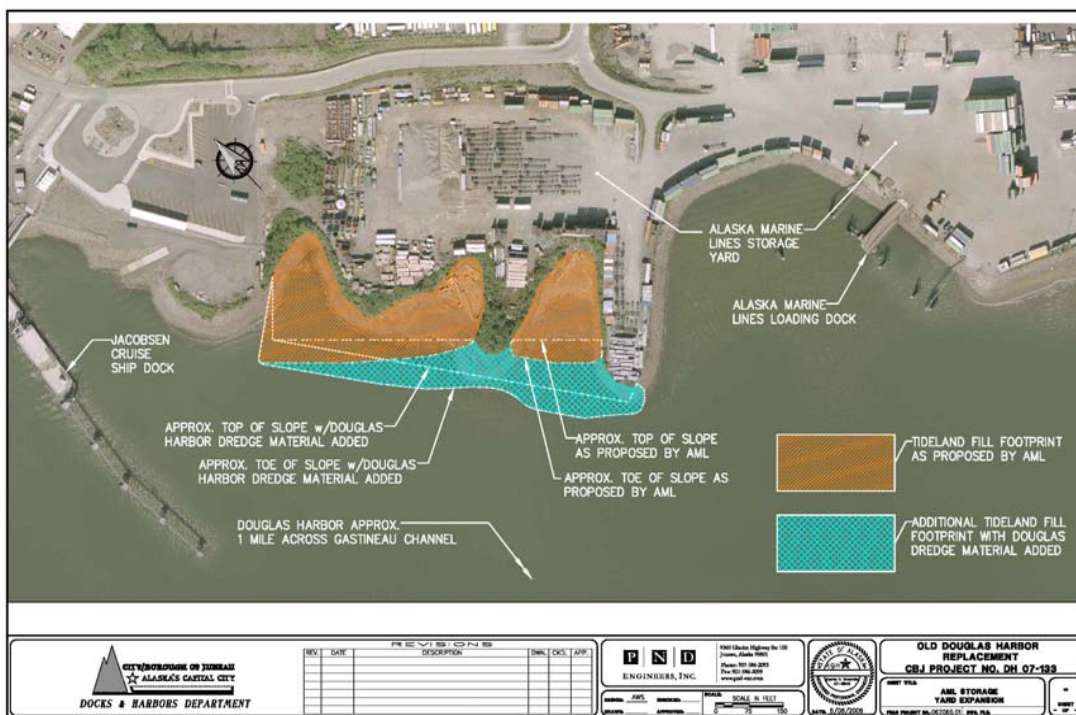
Alaska Marine Lines (AML) is planning an expansion project at their downtown Juneau storage yard whereby 40,000 CY of new fill and 10,000 CY of material dredged from the adjacent tidelands will be placed in a new embankment on existing tidelands, in order to provide an additional 2.75 acres of upland storage space. Currently, federal permits for this work are pending (POA-2006-1979-M2), while state permits for the work have been granted (AK 0811-08J).

Representatives of CBJ and PND met with Don Reid, AML Vice President of Operation and discussed the possibility of donating the Douglas Harbor dredged material for use in the expansion project. Mr Reid is currently amenable to this provided an engineering analysis is performed to verify the suitability of the dredged material for this application in regard to its capacity to support heavy loads and mass stability.

The Douglas dredge material consists primarily of silty-sand with a small amount of gravel. This type of fill is not ideal for placement in coastal embankments that will experience heavy loading as would occur at the AML storage yard. Consequently, any Douglas Harbor dredge material placed within the expanded yard would need to be an engineered fill utilizing geotextiles and capped with layers of imported rock in order to achieve the level of bearing capacity needed to support the anticipated wheel and container loads. Because of this, it is estimated that only one-half of the total AML facility expansion fill material could be comprised of harbor dredge material. Assuming that all 30,000 CY of the Douglas dredge material were placed as part of the storage yard expansion, the corresponding fill volume would need to increase to approximately 60,000 CY. Under AML's current plan, they would expand their yard seaward as they received rock and coarse-grained fill material from various sources over time. If the Douglas dredge material is utilized, the placement of dredged material, geotextiles, and imported rock will need to occur concurrently so it is likely that the CBJ would need to purchase and supply the additional 30,000 CY of imported rock. Additionally, a rock containment dike would need to be constructed around the seaward perimeter of the yard expansion in order to contain and separate the fine grained, harbor dredge material from direct wave exposure.

The following is a summary of the estimated costs to be incurred by CBJ associated with this dredge material disposal option:

- Construction of rock containment dike along seaward perimeter of yard expansion, approximately 25,000 CY = \$800,000
 - Imported shot rock, approximately 30,000 CY = \$600,000
 - Geotextile supply and placement = \$75,000
 - Engineering, permitting, contingency and other indirect costs = \$200,000
 - Harbor dredging and material placement behind rock dike (high tide access only) = \$ 1,100,000
- Total estimated project cost = **\$2,775,000**



Alaska Marine Lines Storage Yard Expansion

These estimated costs associated with Douglas Harbor dredge material disposal as part of the AML yard expansion project represent a \$1.875 million increase over the preferred Gastineau Channel disposal option. The CBJ does not currently possess an additional \$1.875 million to devote to this project, nor is it likely to in the near future. If the (120) current occupants of the floats designated to be replaced were asked to bear this added expense, the cost per vessel would equal \$15,625. If the CBJ were to borrow money, assuming a 10-year loan at 5% interest, stall holders would pay an additional \$2,000 per year. It is unlikely that users would agree to pay this amount as this would represent a 129% yearly moorage fee increase for an average sized vessel (35ft) that currently pays approximately \$1,550 per year. Therefore, this disposal option is not considered practicable due to cost constraints.

7. UPLAND DISPOSAL AT FISH CREEK QUARRY

The Fish Creek Quarry is located on Douglas Island on CBJ owned land approximately 10-miles north of the harbor. The possibility of trucking and placing the dredged material in the quarry has been considered. Unfortunately, CBJ Land & Resources Manager Heather Marlow has stated that this activity will not be allowed because the City intends to construct a community garden and/or an ATV park at this location and the placement of this quantity of dredge material is not in their interests at this time.

8. UPLAND DISPOSAL IN VARIOUS DEPRESSIONS WITHIN THE TREADWELL MINE COMPLEX

Several site reconnaissance visits were conducted in and around the Treadwell Mine Complex southeast of Douglas Harbor in hopes of finding an existing upland depression or series of depressions that could contain the material generated during harbor dredging operations. There were three depressions identified that warranted additional consideration based on the potential capacity.

Two of the three identified depressions contain abandoned mining machinery. Individuals involved in local historical preservation issues have indicated that there is little chance that filling these areas will be allowed. The third depression does not appear to contain significant mining relics of note. The volumetric capacity of this depression is approximately 10,000 CY, or about one-third of the anticipated volume of dredge material. However, indications are that there would still be significant opposition from organizations and individuals with historical interests and from CBJ Parks and Recreation if filling of this depression was proposed. Additionally, because no drivable roads lead to this location, any transport of dredged material to the site would entail a barge landing on tidelands southeast of the Sandy Beach recreation area, temporary road construction across tidelands and wetlands, and rerouting of surface runoff.

Due to insufficient storage capacity, opposition from historical societies and others, and due to tideland preservation concerns, this dredge material disposal option is not practicable.

9. UPLAND DISPOSAL AT THE JUNEAU WASTE MANAGEMENT LANDFILL

PND contacted Eric Vance, Juneau District Manager of Waste Management (WM) about the possibility of disposing the Douglas dredge material at the local, Lemon Creek landfill. WM has not yet made a final determination on whether this material would be accepted locally. The Juneau landfill is typically only approved for disposal of municipal solid waste and construction debris in part because the local landfill does not have a non-permeable liner system, a standard feature for all newly constructed landfills.

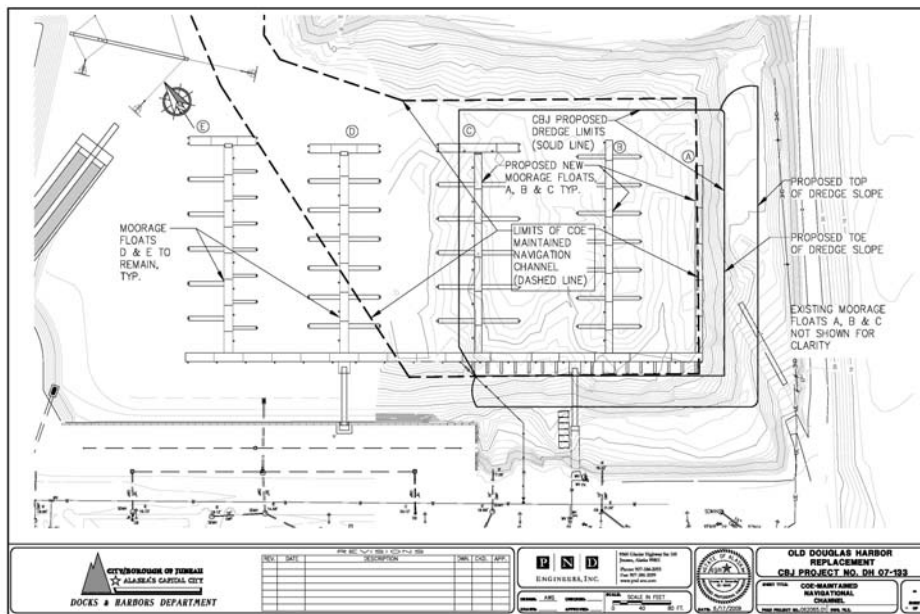
Whether or not Waste Management ultimately deems the Douglas Harbor dredged material suitable for disposal at the local landfill, the costs of this disposal option will preclude it from consideration. The disposal fee at the Juneau landfill was quoted by WM at \$60/ton. 30,000 CY of the Douglas Harbor dredged material will weigh approximately 50,000 tons which equates to a cost of \$3,000,000 for deposit in the landfill. Additional tasks associated with placement at this location would include dredging, offloading, and sea and road transport of the material to the landfill. The total costs associated with this disposal option are estimated at **\$4,100,000**, or an approximate \$3.2 million increase over the preferred Gastineau Channel disposal method and location. \$3.2 million equates to a cost of \$26,700 per vessel if the (120) current harbor occupants were asked to bear the cost. Therefore, this dredge disposal option is not practicable due to cost considerations, regardless of Waste Management's final determination on acceptance.

10. UPLAND DISPOSAL IN AN APPROVED LANDFILL IN WASHINGTON OR OREGON

Steps in this process would consist of initial dredging, placing the material on ocean-worthy watertight barges, barge transport to Seattle, offloading in Seattle, transport by rail to Arlington Oregon or some other suitable landfill, and final deposit into the landfill. Michael Holzschuh, Regional Senior Project Manager with Waste Management has estimated an all inclusive, per ton cost of \$150 per ton of dredge material. For 50,000 tons of Douglas Harbor dredge material, this equates to **\$7,500,000** or \$62,500 per current harbor occupant. Therefore, this disposal option is not practicable.

11. COE TO EVALUATE PRACTICABLE ALTERNATIVES FOR DISPOSAL OF MATERIAL GENERATED DURING COE MAINTENANCE DREDGING OF THEIR HARBOR

Approximately one-half of the total proposed volume of dredged material resides within the COE controlled navigational basin. There has been no transfer of control that would preclude the COE from maintaining responsibility for maintenance dredging within their harbor. This alternative would require the COE to develop a dredging and disposal plan. Since the typical COE project takes 17-years from onset of planning to completion and since the harbor facilities are in dire need of immediate replacement, this alternative is not considered practicable due to time constraints.



COE Maintained Navigation Channel

12. DO NOTHING

The final alternative evaluated is to do nothing. Boats will continue to contact the bottom of the sea floor at low tides which is an unsafe condition that can lead to loss of life, property and environmental damage due to spills. Existing moorage floats A, B and C and the corresponding stall floats are in extremely poor condition. The associated electrical system has become quite dangerous due in part to the lack of moorage float freeboard that leads to submerged wiring and a substantial fire risk. If not replaced, this portion of the harbor will need to be shut down. Closure would result in the loss of (120) permanent and transient moorage slips that generate yearly revenue of approximately \$200,000 for the CBJ. For these reasons, this option is not practicable.

CONCLUSIONS

Besides the preferred Gastineau Channel disposal site, only (3) of the disposal options evaluated meet both the storage capacity and land availability requirements: placement in the AML yard expansion, disposal at the Juneau landfill (if ultimately approved) and disposal at an approved landfill in Washington or Oregon. However, all of these options are cost prohibitive.

Disposal Alternative	Total Estimated Project Cost	Amount Greater than Preferred Disposal Alternative	Estimated Cost per Vessel for Amount Greater than Preferred Alternative
1. Unconfined, Gastineau Channel Disposal (Preferred)	\$900,000	————	————
6. Disposal in Alaska Marine Lines Storage Yard Expansion	\$2,775,000	\$1,875,000	\$15,625
9. Disposal in Juneau Landfill	\$4,100,000	\$3,200,000	\$26,700
10. Disposal in Approved Landfill in Washington or Oregon	\$7,500,000	\$6,600,000	\$62,500

It is likely that if unconfined aquatic disposal at the Gastineau Channel deep water site is disallowed, the realized alternative will be #12, do nothing. In this case, main floats A, B and C will soon need to be closed. All other CBJ owned harbors are currently occupied to near capacity so the displaced vessels will have nowhere to moor if closure occurs. This will cause significant adverse effects to the community.