

**APPENDIX A**

**SECTION 404(b)(1) EVALUATION**



**EVALUATION UNDER  
SECTION 404(b)(1) CLEAN WATER ACT 40 CFR PART 230**

**Kenai Bluffs Bank Stabilization  
Kenai, Alaska**

**I. Project Description and Background**

A. Location: The project site extends about 5,000 feet along the north shore of the Kenai River estuary, just east of the river's discharge into Cook Inlet, within the City of Kenai, Alaska (figure 1).



**Figure 1.** Location of the Kenai Bluffs erosion project.

B. General Description: Currently, the bluff fronting the north bank of the Kenai River near its mouth at Cook Inlet is eroding at an average rate of three feet per year. This bluff retreat has already destroyed or forced relocation of multiple structures and associated infrastructure. Storm surges and wave attack at the toe of the bluff within the mouth of the Kenai River mobilize fine particles within an exposed layer of clay. This mobilization is exacerbated by other forces. Ground water seepage at the confluence of two soil layers and surface flow over the top of the bluff move soils from the upper slope to the bottom of the bluff. Tidal action mobilizes fine particles during flood tides and carries them

away during ebb tides. Combined, these processes cause over-steepening which leads to collapse of the bluff face and inland retreat of the top of the bluff.

The project preferred alternative is a protective rock berm constructed along the toe of the eroding bluff. The berm is designed to prevent flood tides from washing away the material that collects at the bluff toe and prevent storm damage to the lower portion of the bluff. The berm would extend roughly 5,000 feet long, be about 50 feet wide at the base, and be built tall enough to prevent overtopping by storm surges at high tides (varying from approximately 20 feet high at the west end to 10 feet high at the east end).

C. Authority: This project is conducted under the authority of Section 116 of the Energy and Water Development and Related Agencies Appropriations Act of 2010.

D. General Description of Dredged or Fill Material: Construction of the protective berm alternative would require approximately 13,100 cubic yards of gravel, 33,200 cubic yards of B rock, and 42,400 cubic yards of armor stone. Typical cross-sections of the berm are shown in figure 2.

E. Description of the Proposed Discharge Site: The material for the protective rock berm would be placed on a bench of intertidal land running along the base of the bluff. The intertidal sediments in this area are compacted silty sand, with scattered cobbles, boulders, and building debris fallen from the eroding bluff (figure 3). The berm will have a footprint of approximately 8.25 acres.

F. Description of Disposal Method: There are limited options for accessing the base of the bluff with construction materials. The contractor may propose to deliver the rock and gravel to the project site by barge at high tide, then use land-based equipment to manipulate the material in the dry. Alternatively, the berm may be built incrementally starting at one or both ends, with the rock and gravel delivered overland by truck.

## **II. Factual Determinations**

### A. Physical Substrate Determinations:

The bluff at the mouth of the Kenai River is composed of three distinct material types: an organic mat top layer that is approximately 2 feet thick, an alluvial deposit layer that is approximately 37 feet thick over glacial till separated by a layer of lag gravel. Bedrock is located at a considerable depth below the toe of the bluff. The lower material, including the sediment exposed at the intertidal zone of the project site, is believed to be composed of marine deposits that were compacted by a tidewater glacier.

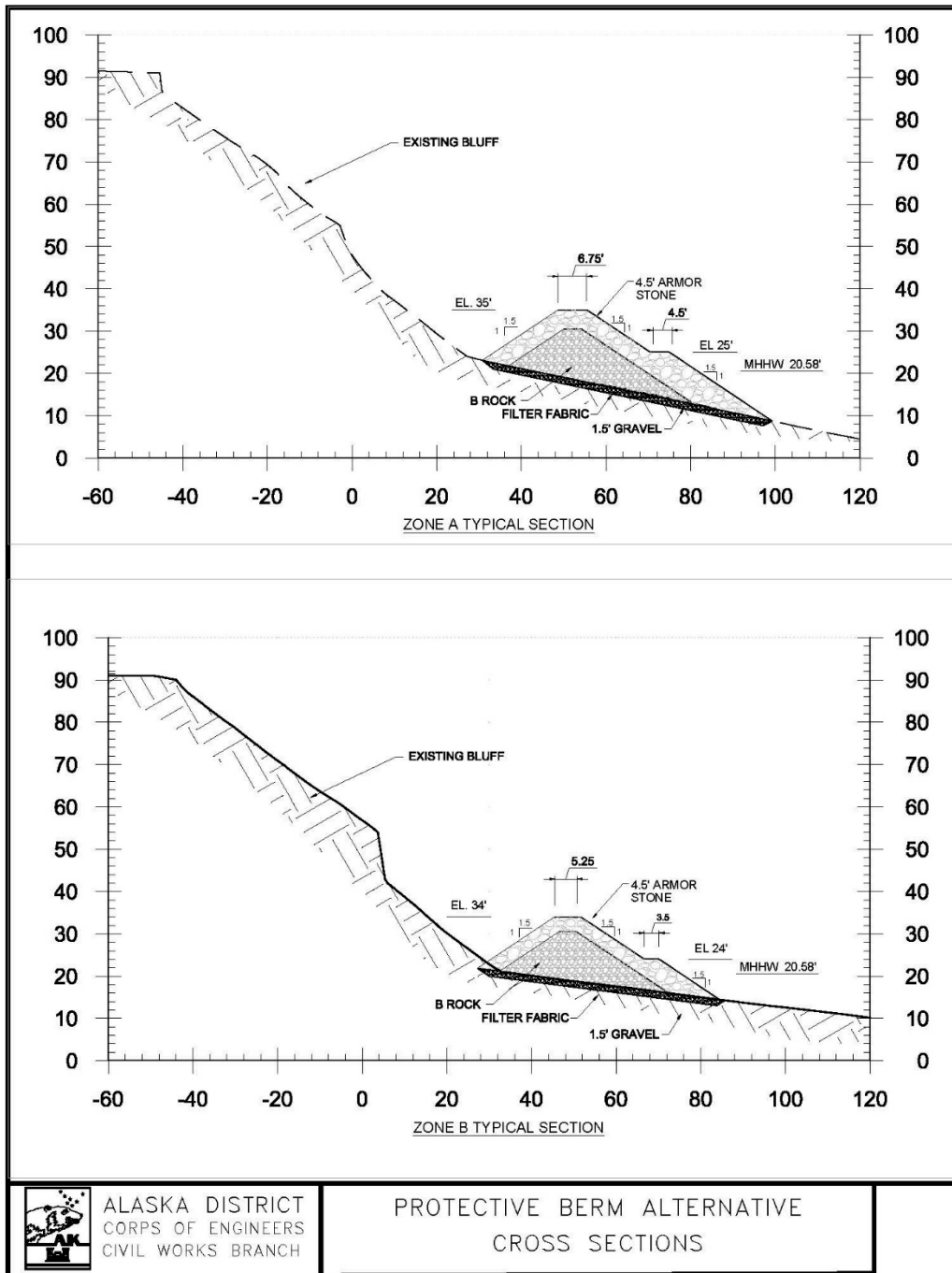


Figure 2. Typical cross-sections of protective berm.



**Figure 3.** Photograph dated April 2016, showing the project site intertidal zone at a low tide near 0.0 ft mean lower low water (MLLW)

B. Water Circulation, Fluctuations, and Salinity Determinations: The berm will be constructed along the base of the existing bluff, away from the main channel or mouth of the river. The Corps does not anticipate that the berm will have a discernable effect on existing patterns of water circulation, river flow, or tidal influence. The berm will not impinge upon or modify the three surface water drainages that flow through or near the project area.

C. Suspended Particulate/Turbidity Determinations: The waters of the Kenai River estuary are naturally turbid, from the load of fine glacial silt carried by the river and from similarly turbid marine waters entering the estuary from Cook Inlet. The Alaska Department of Fish and Game (ADFG) measured turbidity in the river channel adjacent to the proposed project site, and found a pronounced gradient of lesser turbidity near the surface (between 50 and 100 NTU) and greater turbidity near the bottom (roughly 150 to 200 NTU) on two sampling events in April 2003. Within the estuary, this gradient is probably explained by the lofting of sediment from the muddy channel bottom by tidal action. Construction on the compacted silty sand at the project site is unlikely to mobilize sufficient additional sediment to cause a measureable increase in turbidity within the river, especially if construction work is done in-the-dry as much as possible. The finished project will greatly reduce the contribution of sediment to the river from the eroding bluff.

D. Contaminant Determinations: The rock and gravel placed for the breakwaters will be clean material free of contaminants. The finished project will not introduce new contaminants. There is no known source of contamination at or near the project site that would be mobilized or exacerbated by this project.

E. Aquatic Ecosystems and Organism Determinations: The project site appears to be of low ecological value. It hosts no established vegetation; site surveys found no benthic organisms living within the dense, compacted intertidal sediment, and few birds or other animals foraging within the project area. Productive mud flats exist across the river along Chinulna Point. In the Corps' assessment, the project site does not contain special aquatic sites.

F. Proposed Disposal Site Determinations: No dredging is associated with the proposed project. Construction operations associated with installing the project would have only a temporary effect on the water column. The proposed action would comply with applicable water quality standards and would have no appreciable detrimental effects on municipal and private water supplies, recreational and commercial fisheries, water-related recreation, or aesthetics.

G. Determination of Cumulative and Secondary Effects on the Aquatic Ecosystem: The completed project will add to the degree of "hardening" of the outer bend of the Kenai River Estuary. Small areas of riprap or other forms of revetment exist along the river bank from the city dock to Pacific Star Seafoods. No similar large projects are known to be planned for the future, although it is likely that some revetments fronting some existing development in that area may need to be replaced.

### **III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge**

A. Adaptation of the Section 404 (b)(1) Guidelines to this Evaluation: The proposed project complies with the requirements set forth in the Environmental Protection Agency's Guidelines for Specification of Disposal Sites for Dredged or Fill Material.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem: The principle discharge to waters of the U.S. proposed in this project would be the placement of rock for the berm. The project requires an energy attenuation measure of some sort placed in part below the high tide line to protect the base of the bluff from storm surge and

floodtides. A floating breakwater would not function well in the river current. Groins or rock vanes would not protect against storm surge or flood tides.

LEDPA. The preferred alternative, the protective rock berm (alternative 5), is the “least environmentally damaging practicable alternative”, or LEDPA, because its installation would be less physically invasive than the other construction alternatives. The longitudinal extent of the berm (approximately 1 mile) is similar to that of the revetment alternatives: buried toe revetment (alt. 3); and weighted toe revetment (alt. 4). The direct-impact footprint of the berm would be approximately 8.25 acres; the footprints of the revetment rockwork alternatives are similar, although the reshaping of the bluff face under alternatives 3 and 4 brings the area of direct impact to 12.25 acres. Constructing the berm will require little or no excavation of existing sediment or soil, whereas the revetments would require excavation of the intertidal zone and bluff face to key-in the stonework, and more machinery working in the intertidal zone. Reshaping the bluff slope under alternatives 3 and 4 would require cutting 180,000 and 80,000 cubic yards of material from the upper bluff face respectively, and placing it as fill along the base of the bluff. In addition, imported granular backfill for alternative 3 and 4 would be 10,000 and 273,000 cubic yards, respectively. The preferred alternative will require a total of 92,900 cubic yards of rock and gravel to be imported to the site, compared to 27,200 cubic yards of rock for alternative 3, and 37,280 cubic yards for alternative 4.

The alternative to relocate the mouth of the Kenai River away from the eroding bluff (alt. 2) has not been pursued extensively, due to its readily-apparent financial, environmental, and acceptability hurdles. This alternative would involve excavating and disposing of about 2,400,000 cubic yards of material to create a new river channel 1,000 feet wide and 5,800 feet long through Chinulna Point and out into Cook Inlet, and placing approximately 1,042,000 cubic yards of rock and gravel to construct jetties and dikes. While not examined closely in the environmental assessment, alternative 2 would not be the LEDPA when compared to the other alternatives.

In its July 2016 Fish and Wildlife Coordination Act Report for this project, the USFWS also identified the protective rock berm alternative as the LEDPA.

C. Compliance with Applicable State Water Quality Standards: The proposed construction project would not be expected to have an appreciable adverse effect on water supplies, recreation, growth and propagation of fish, shellfish and other aquatic life, or wildlife. It would not be expected to introduce petroleum hydrocarbons, radioactive materials, residues, or other pollutants into the waters of the Kenai River. A temporary increase in turbidity would result from construction activities. The project would comply



with State water quality standards. Adherence to water quality standards would be monitored.

D. Compliance with Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act: No toxic effluents that would affect water quality parameters are associated with the proposed project. Therefore, the project complies with toxic effluent standards of Section 307 of the Clean Water Act.

E. Compliance with Endangered Species Act of 1973: The Corps is in informal consultation with the National Marine Fisheries Service (NMFS), finalizing avoidance and minimization measures to protect Cook Inlet beluga whales. No ESA-listed species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) are present, or are likely to be effected, in the project area.

F. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972: Not applicable; no marine sanctuaries are present near the project site.

G. Evaluation of Extent of Degradation of the Waters of the United States: There are no municipal or private water supplies or freshwater bodies in the area that could be negatively affected by the proposed project. There would be no significant adverse impacts to plankton, fish, shellfish, or wildlife.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Environment: Incorporating the following avoidance, minimization, and conservation measures into the proposed project would help to ensure that no significant adverse impacts will occur:

- The Corps will comply with timing restrictions on in-water work that may be recommended or stipulated by the NMFS or the ADFG. The Corps has proposed to suspend in-water work during the period 15 March through 15 May to protect Cook Inlet beluga whales, and is awaiting concurrence from the NMFS.
- Workers conducting in-water construction will be instructed to watch for marine animals, and cease work if an animal approaches within 50 meters.
- Project vessels will be limited to a speed of 8 knots within the river, where consistent with safe navigation and ship-handling, to reduce the risk of collisions with protected species.

- The selected contractor will include an Oil Spill Prevention and Control Plan in its Environmental Protection Plan, which is submitted to the Corps for review and approval.

I. On the Basis of the Guidelines the Proposed Site for the Discharge of Fill Material is: Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

FINDING OF COMPLIANCE  
for  
Kenai Bluffs Bank Stabilization  
Kenai, Alaska

1. No significant adaptations of the guidelines were made relative to this evaluation.
2. The principle discharge to waters of the U.S. proposed in this project would be the placement of rock for a protective berm.
3. The planned discharge would not violate any applicable State water quality standards, or violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
4. Use of the selected discharge site will not harm any endangered species or their critical habitat.
5. The proposed discharge will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.
6. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems include: suspending in-water work during the period 15 March through 15 May to protect Cook Inlet beluga whales during their period of peak use; instructing site workers to watch for marine mammals and cease work if an animal approaches within 50 meters; limiting project vessels to a speed of 8 knots or less, where consistent with safe navigation and ship-handling, to reduce the risk of collisions with protected species; requiring the contractor to prepare an Oil Spill Prevention, Control, and Countermeasure Plan in its Environmental Protection Plan, to be submitted to the Corps for review and approval
7. On the basis of the guidelines, the proposed site of construction and discharge is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.