TALKEETNA FLOOD RISK MANAGEMENT

SECTION 205 CAP PROJECT FACT SHEET

- 1. Project Name: Talkeetna, Alaska Section 205 Flood Risk Management
- Army Corps of Engineers District and Participating Sponsor:
 a. Corps District and POC: Alaska District, Leif Hammes
 b. Sponsor and POC: Mat-Su Borough Public Works, James Jenson
- 3. Congressional Delegation:
 - a. Senator Lisa Murkowski (R-AK)
 - **b.** Senator Dan Sullivan (R-AK)
 - **c**. Representative Don Young (R-AK)

4. Location: Talkeetna is a community of about 900 people located in the Matanuska-Susitna (Mat-Su) Borough 115 road miles (75 air miles) north of Anchorage (Figure 1). It is one of the most sought after tourist destinations in Alaska, with approximately 240,000 people visiting the "Gateway to Denali" annually. The city is unincorporated and falls under the jurisdiction of the Mat-Su Borough.



Figure 1: Vicinity Map of Talkeetna, Alaska.

Talkeetna Flood Risk Management Section 205 CAP Project Fact Sheet

The downtown is constructed near the confluence of the Talkeetna River and Susitna River (Figure 2). Both rivers are large, glacially fed, braided rivers. At the confluence, the Susitna River is the larger of the rivers with a braided channel width of approximately one mile. The Talkeetna River channel width is approximately a half-mile wide and is braided until it narrows to a single-channel just upstream of the confluence with the Susitna River.



Figure 2: Confluence of the Susitna and Talkeetna Rivers. The mixing zone is seen in the change in turbidity.

5. Existing Projects: The U.S. Army Corps of Engineers (USACE) constructed a timber and brush fascine in 1951 in an emergency effort to arrest bank erosion of the Talkeetna townsite. The fascine began at the Alaska Railroad embankment and extended 1,000 feet downstream along the left bank of the Talkeetna River. The fascine had deteriorated and consequently USACE constructed a sand and gravel dike and rock revetment in the mid-1970's to prevent bank erosion by floodwaters of the Talkeetna and Susitna Rivers under the authority of the Flood Control Act of 1958 (Public Law 85-500 dated July 3, 1958) (Figure 3). The completed project was turned

over to the Matanuska-Susitna Borough for operation and maintenance in 1979. The improvements are subject to periodic inspection by the Corps.



Figure 3: Existing erosion control dike and revetment constructed by USACE under Flood Control Act of 1958.

6. Problem: The Susitna River's channel is migrating east, towards Talkeetna. The Susitna River's migration is causing backwater up the Talkeetna River, increasing flood risk in downtown Talkeetna. Flooding threatens critical infrastructure such as the drinking water treatment facility, public businesses, private residences, and the life, health, and safety of the community. A USACE revetment and dike constructed in the mid-1970s continues to direct the flow of the Talkeetna River. However, as a permeable structure, the revetment provides minimal protection from the backwater conditions resulting from the Susitna River migration.

7. Alternative Plans Considered: During the Continuing Authorities Program (CAP) Federal Interest Determination (FID), an initial investigation took place. A number of initial alternatives were considered, including construction of a levee, relocation and flood proofing, and a flood wall. A more in-depth investigation of alternatives would be conducted if a Federal interest exists to develop a flood risk reduction project at Talkeetna, Alaska.

Talkeetna Flood Risk Management Section 205 CAP Project Fact Sheet

Levee: This alternative would involve the construction of a levee along the banks of the Talkeetna and Susitna Rivers. The levee would be approximately 2700 feet long, running from the railroad bridge along the Talkeetna River and then following the bank around the Susitna River.

Relocation and Flood Proofing: This alternative would involve the relocation of critical infrastructure and retrofitting structures to minimize flood damage. Retrofitting could include a combination of increasing base floor elevations and structural changes to prevent floodwater from entering the building.

Flood Wall: This alternative would involve the construction of a wall along the banks of the Talkeetna and Susitna Rivers. Several variations were considered: a permanent structure, a removable wall or barrier, or a combination of permanent and removable barriers.

8. Description of Likely Recommended Plan: The likely recommended plan proposes constructing a levee originating at the railroad bridge along the Talkeetna River, following the shore around the confluence of the Susitna River, and terminating along a small side channel of the Susitna River (Figure 4). The proposed levee is just over 2700 feet long and 15 feet wide with a 2:1 slope. The levee would be targeted to meet additional needs for flood control (ER 1165-2-119). The existing, maintained, USACE revetment and dike would remain as-built, where possible. The termination point was chosen to prevent the levee from being flanked by Susitna River floodwaters. Based on LiDAR, this option would reduce the risk of flooding in the low lying areas in downtown Talkeetna. Congressional authorization is likely to be required if the proposed improvements replace any portion of the existing project specifically authorized by Congress.

The Susitna and Talkeetna rivers freeze in the winter and have ice floe during the spring thaw (Figure 5). In addition, both rivers carry large woody debris. A levee would be designed to provide flood risk reduction while withstanding the forces of ice and debris impacts. Due to the wide and braided nature of both rivers, no significant impacts are expected on the opposite bank due to the construction of a levee at Talkeetna.



Figure 4: Map of Talkeetna with likely recommended plan, levee footprint, in red.



Figure 5: Typical breakup conditions and ice floe on the Susitna River.

9. Estimated Cost & Proposed Schedule for Feasibility:

Table 1 summarizes the feasibility budget estimates for the Talkeetna study. The budget encompasses team and sponsor engagement, data collection, modeling, and document development to complete the feasibility level design. A Federal Cost Share Agreement (FCSA) would be developed prior to study initiation.

Budget By Section	Cost
Project Management	\$70,000
Plan Formulation	\$82,000
Economics	\$90,000
Environmental & Cultural Resources	\$95,000
Branch Oversight (13%)	\$43,810
Civil Works Subtotal	\$380,810
Geotechnical & Drilling	\$300,000
Hydraulics & Hydrology	\$300,000
Survey and Geomatics	\$176,000
Cost Engineering	\$65,000
Real Estate	\$70,000
Engineering Branch Oversight	\$16,000
Subtotal	\$1,307,810
Agency Technical Review	\$70,000
Contingency (10%)	\$130,781
Total	\$1,508,591
Local Share (50%)	\$754,295
Federal Share (50%)	\$754,295

Table 1	Budget for	Feasibility	/ Study
	Dudgetion	i casibility	, oluay.

The proposed schedule for this feasibility study is shown in Table 2.

Milestone	Date
Federal Interest Determination	February 2020
Execute FCSA	April 2020
MSC Milestone Meeting	October 2022
Decision Document (with EA FONSI)	December 2022
Division Approval	March 2023

Table 2. Proposed Feasibility Study Schedule.

Given prior estimates of similar projects, construction of the likely recommended plan would cost approximately \$6.9 million. Other alternatives developed in the study may have different costs associated. The Alaska District recommends proceeding with the Feasibility Study for the Talkeetna Project.

10. As of the date of this fact sheet, are there any policy waivers required, including a waiver for deviation from the NED plan? None at this time.

11. Authorization, appropriations act, or report language: The investigations summarized in this report will be undertaken through the authority of Section 205 of the Flood Control Act of 1948 as amended (33 U.S.C. 701s).

"The Secretary of the Army is authorized to allot from any appropriations heretofore or hereafter made for flood control, not to exceed \$68,750,000 for any one fiscal year, for the implementation of small structural and nonstructural projects for flood control and related purposes not specifically authorized by Congress, which come within the provisions of section 701a of this title, when in the opinion of the Chief of Engineers such work is advisable. The amount allotted for a project shall be sufficient to complete Federal participation in the project. Not more than \$10,000,000 shall be allotted under this section for a project at any single locality. The provisions of local cooperation specified in section 701c of this title shall apply. The work shall be complete in itself and not commit the United States to any additional improvement to insure its successful operation, except as may result from the normal procedure applying to projects authorized after submission of preliminary examination and survey reports.

(June 30, 1948, ch. 771, title II, § 205, 62 Stat. 1182; May 17, 1950, ch. 188, title II, § 212, 64 Stat. 183; July 11, 1956, ch. 558, 70 Stat. 522; Pub. L. 87–874, title II, § 205, Oct. 23, 1962, 76 Stat. 1194; Pub. L. 93–251, title I, § 61, Mar. 7, 1974, 88 Stat. 29; Pub. L. 94–587, § 133(b), Oct. 22, 1976, 90 Stat. 2928; Pub. L. 97–140, § 2(a), Dec. 29, 1981, 95 Stat. 1717; Pub. L. 99–662, title IX, § 915(a), Nov. 17, 1986, 100 Stat. 4191; Pub. L. 106–53, title II, § 201, Aug. 17, 1999, 113 Stat. 285; Pub. L. 106–541, title II, § 218, Dec. 11, 2000, 114 Stat. 2596; Pub. L. 110–114, title II, § 2021, Nov. 8, 2007, 121 Stat. 1078; Pub. L. 113–121, title I, § 1030(e), June 10, 2014, 128 Stat. 1232; Pub. L. 115–270, title I, § 1157(e), Oct. 23, 2018, 132 Stat. 3794.)"

The requirements for Federal review and funding are less stringent than for projects specifically authorized by Congress. Other legal requirements still apply, such as those in the National Environmental Policy Act of 1969 (P.L. 91-190), as amended, and various other laws and associated Federal regulations concerning environmental quality.

12. Financial Information:

a. Feasibility Study Cost: \$1,508,000 (Federal share: \$754,000) (Note: The initial \$100,000 for the Federal Interest Determination (FID) is fully federally funded. The remaining funds from the initial \$100,000 will be utilized for scoping, FCSA negotiations, and contingency.) The \$100,000 for the FID is not included in Table 1 above. The

feasibility phase is cost-shared 50/50 with the non-Federal sponsor. As confirmed in a Letter of Intent (LOI) from the Mat-Su Borough dated 8 August 2019, the non-Federal sponsor is aware of the cost sharing requirements of the study and have indicated they have sufficient funds to support its completion.

b. Construction Costs: Table 3 shows the construction cost estimate for the recommended plan. The estimate includes a 40% contingency, which would be revised during the Feasibility phase. The Design and Implementation (D&I) phase of the project would have a 35% Local-65% Federal cost-share.

WBS No.	FEATURE ACCOUNT / ITEM DESCRIPTION	UOM	QUANTIT Y	UNIT COST	TOTAL COST
11	LEVEES & FLOODWALLS				
	Mob, Demob, Site Preparation	JB	1	\$1,000,000	\$1,000,000
	Clear and Grub for access road and embankment	AC	3.5	\$50,000.00	\$175,000
	Excavation, Fill, Grade & Compaction, and Haul Unused Soil	CY	20627	\$28.13	\$580,236
	Embankment Preparation	CY	10678	\$31.89	\$340,532
	Filter Rock	CY	4449	\$151.66	\$674,781
	RipRap	CY	2670	\$223.60	\$596,918
	Sub-Total				\$3,367,466
	Profit			10%	\$336,747
	Sub-Total				\$3,704,213
	Escalation 2019 to 2024 @ 1.8% per year			9%	\$333,379
	Sub-Total				\$4,037,592
	Estimator's Contingency			40%	\$1,615,037
	Sub-Total				\$5,319,250
	PED			12%	\$638,310
	Contingency			10%	\$531,925
	S&A			7.5%	\$398,944
	Total				\$6,888,429

Table 3. Construction Cost Estimate for the likely Recommended Plan.

c. LERRD costs: <\$100,000 There are no utilities currently identified in the project area. The non-Federal sponsor would be required to provide the real property interests, placement area improvements, and relocations required for construction, operation, and maintenance of any approved project. The value of any real property interests, placement area improvements, or relocations provided by the non-Federal sponsor would be included in construction costs and credited towards the non-Federal sponsor's share of those costs. Most of the lands in the vicinity are owned by local government or the Alaska Railroad Corporation.

d. Ultimate Federal Cost: Approximately \$5.1 million (\$700,000 Feasibility Phase and \$4,480,000 D&I Phase)

e. Benefit/Cost ratio: Not estimated (see economic analysis section below)

f. Average Annual O&M Costs: Approximately \$6,700 per year. This is consistent with several-similar sized projects in Alaska.

Table 4. Complete Funding History by FY.			
	AMOUNTS	NET	
	SPECIFIED	ALLOCATIONS	
	CONGRESS)	YEAR	
FY 2019	\$0	\$49,999	

13. Complete Funding History by Fiscal Year (FY) (Include one line for each additional FY): See table 4.

14. Supplemental Information:

a. Environmental Setting: This study has the potential to impact anadromous waters under the regulatory authority of the Alaska Department of Fish and Game (ADFG). All five species of Pacific salmon have been documented in the Talkeetna River at various life stages. In-water work would require coordination with the ADFG Habitat Division in order to obtain a Fish Habitat Permit (FHP) by the local sponsor. The placement of fill material in the water of the United States, including wetlands, would require analysis under Section 404 of the Clean Water Act (CWA). There are likely wetlands in the project area, and almost any alternative would require work below the ordinary high water mark in the Talkeetna River. There are no Endangered Species Act (ESA) listed species in the proposed project area. Several species of migratory birds under the protection of the Migratory Bird Treaty Act (MBTA) and eagles under the proposed project area. As the environmental impact of the proposed project is expected to be minimal, an Environmental Assessment is anticipated to be sufficient to meet the National Environmental Policy Act (NEPA) requirements.

b. Cultural Resources: This study has the potential to impact cultural resources within the community of Talkeetna. There are 44 sites listed on the Alaska Heritage Resources Survey (AHRS) within the community or immediate vicinity, including the Talkeetna Historic District (TAL-033), which is listed on the National Register of Historic Places (NRHP). In total, there are four sites listed in NRHP, five contributing properties to TAL-033, and two sites determined to be not eligible. The eligibility of the remaining 33 sites for the NRHP has not yet been evaluated. Under the National Historic Preservation Act (NHPA), a survey will be required to determine the eligibility of sites within the project's area of potential effect (APE) for inclusion on the NRHP. Previous work in the tentative APE did not conduct any subsurface testing, so a Phase I survey is recommended to identify any previously undiscovered cultural resources.

c. Economic Analyses: Preliminary evaluation of project costs and potential benefits indicates that there is likely at least one alternative that would reduce flood risk in Talkeetna and result in positive net National Economic Development (NED) benefits. This initial evaluation is based on a qualitative assessment of potential project benefits and the Rough Order of Magnitude (ROM) construction cost of approximately \$6.6 million, which is within the Federal CAP authority limit.

The total economic cost includes the construction cost noted above plus estimated costs of interest during construction (IDC) and operations and maintenance (O&M). Calculations for IDC assume a 2-year construction window, and O&M costs are assumed to be 10 percent of the initial cost of the levee. As with benefit cash flows, costs are discounted/indexed to a base year and amortized for comparison against annual benefits. An alternative with annual benefits greater than annual costs is considered to have Federal interest and warrant further investigation. This analysis uses the FY20 discount rate of 2.750 percent and a 50-year period of analysis to estimate average annual costs (Table 5).

Cost Description	Cost of Proposed Levee Alternative
Construction Cost	\$6,622,000
Interest During Construction	\$183,000
Operations and Maintenance Costs	\$337,000
Total Economic Cost	\$7,142,000
Average Annual Economic Cost	\$265,000

Table 5. Rough Order of Magnitude Economic Costs.

Potential benefits were evaluated qualitatively at this time, primarily due to a lack of information about the flood stage-frequency relationship. Flood stage refers to the depth of flooding and, as water depth increases, so do flood damages. As such, this relationship is a key component to estimating avoided damages and potential benefits. This evaluation included an assessment of the flood history of the area, the population at risk (including residents and tourists), structures and infrastructure, and the types of NED benefits that would be analyzed in greater detail during the feasibility phase.

Reducing flood risk in Talkeetna is expected to generate benefits from:

- Avoided damages to structures, contents, and vehicles
- Avoided damages to public infrastructure including the wastewater treatment facility and water treatment plant
- Reduced emergency response costs including the costs of evacuation and reoccupation, clean up, disaster relief, and increased costs of operations during flood events
- Improved recreational experience

Additionally, reducing flood risk is expected to:

- Improve public health and safety for the population in the area
- Reduce risk to cultural resources within the area, including the Talkeetna Historic District which is listed on the (NRHP)
- Potentially reduce costs associated with disruptions to the operations of the Alaska Railroad, which provides service to military installations, Denali National Park, Fairbanks, and other communities in interior Alaska.

There are 36 structures in the proposed project area shown in Figure4, with a total taxassessed value of approximately \$3.3 million. According to Mat-Su Borough tax records, most are single-story structures without basements (21), while about one-third are two-story structures without basements (13). The structures are a mix of residential and commercial and include a number of historic and potentially historic structures, single-family houses, a church, a brewery, a National Park Service visitor center and ranger station, and other private businesses such as restaurants, bars, hotels, bed and breakfasts, gift shops, and tour companies. While these businesses serve the local population of about 900 people, they cater primarily to the approximately one-quarter of a million people who visit Talkeetna – the "Gateway to Denali" – each year.

Note that the structure inventory assessed for the FID does not include structures outside of the proposed project area shown in Figure 3. However, there are structures located east of the railroad bridge that are also at risk of flooding from the Talkeetna River and the backwater effects of the Susitna River. Based on FEMA flood insurance rate maps (FIRM), approximately 75 percent of the town would be inundated during the 100-year (1% annual exceedance probability) flood event. Using FEMA data, the Mat-Su Borough identified flood zones, which are shown in Figure 6 below. While more information is needed about the magnitude of flooding in these areas, this figure is meant to demonstrate that there are other areas outside of the proposed project area that may also benefit from a project.

Considering the breadth of the areas at risk of flooding in Talkeetna, non-structural measures to reduce flood risk may be more cost-effective than structural alternatives alone. Such measures would be considered in the feasibility phase.



Figure 6. Talkeetna Flood Zones. Source: Mat-Su Borough and FEMA FIRM Maps.

Based on the estimated economic cost of the likely recommended plan, the scenario shown in Table 6 below demonstrates the level of NED benefits required to support the proposed levee alternative. Flood risk management benefits refer to physical and non-physical losses that could be avoided or reduced with a project in place. These include avoided damages to structures, contents, and infrastructure as well as reduced emergency costs. Incidental recreation benefits may be considered if the project is formulated for other primary purposes (i.e., flood risk management), and the recreation benefits are less than 50 percent of the total benefits required to justify the project. For the proposed levee alternative, approximately \$265,000 in annual benefits would need to be generated to result in positive net benefits. This is considered to be a reasonably plausible scenario if a project were built to reduce the risk of flooding in Talkeetna, so further investigation is warranted.

Description	Potential Total Benefit	Potential Annual Benefit
Flood Risk Management benefits	\$3,571,000	\$132,500
Incidental Recreation benefits	\$3,571,000	\$132,500
Total Benefits	\$7,142,000	\$265,000
Total Costs	\$7,142,000	\$265,000
Benefit-Cost Ratio		1.0

A key uncertainty in this analysis is the flood stage-frequency relationship. Once that relationship is developed, one can analyze flood magnitude, location, timing, and duration, all of which are important components of the economic analysis and estimation of project benefits.

d. Real Estate: There are no identified real estate issues that will prevent a project in this location at this time. The Mat-Su Borough controls much of the land in the project area, along with the Alaska Railroad Corporation. A more in-depth investigation would be conducted during the Feasibility Phase.

15. Project Map: See Figure 1, found on page 1 of this document.