
Saint George Harbor Feasibility Study

Appendix D – Cost Engineering

Saint George, Alaska

**Tentatively Selected Plan
August 17, 2018**



**U.S. Army Corps
of Engineers**
Alaska District

NAVIGATION IMPROVEMENTS
ST. GEORGE, ALASKA
COST ENGINEERING

I. BASIS OVERVIEW

This Cost Engineering Basis will be consolidated into the decision document Feasibility Report for St. George, Alaska. The purpose of the feasibility study is to evaluate alternatives for a potential construction contract. This Appendix discusses the cost assumptions, methodology, materials, labor, and equipment, utilized in the contract construction cost estimates.

II. SCOPE - PROJECT TYPE, FEATURES & ALTERNATIVES

This project for St George, Alaska, is intended to construct protective harbor improvement measures. The City of St George, located on the northeast shore of St. George Island, the southern-most of the four Pribilof Islands, 47 miles south of St. Paul Island, 750 air miles west of Anchorage, and 250 miles northwest of Unalaska in the Bering Sea.

St. George falls within the southwest maritime climate zone, characterized by persistently overcast skies, high winds, and frequent cyclonic storms. The climate of St. George is controlled by the cold waters of the Bering Sea. The maritime location results in cool weather year-round and a narrow range of mean temperatures varying from 24 to 52 °F. Cloudy, foggy weather is common during summer months.

St. George is accessible only by air and sea. There are two airstrips; one is owned by the city, and the other is owned by the state. Scheduled flights are provided to St. Paul and the mainland. Most freight and supplies are delivered by ship from Anchorage on a monthly or bimonthly schedule; cargo from Seattle arrives five or six times a year. There are three docks; one is operated by the village corporation. An inner harbor and dock are in Zapadni Bay, 5 miles from the city.

Currently dangerous harbor entrance and inner harbor conditions at Zapadni Bay Harbor in St. George results in underutilization of that harbor. Unsafe conditions reduce subsistence activities from the harbor. Supply delivery barges often have problems with wind and seas, making deliveries difficult. The tug and barge wait for calm weather on the north side of the island or outside Zapadni Bay harbor until the tug can bring it in, and add cost and delays to barge traffic delivering fuel and goods.

The primary purpose for the study is to determine feasibility of navigation improvements that would increase the protection of marine vessels from wind and wave damage. Today, residents are working to develop commercial fisheries and tourism.

The primary project features for Alternative N-3 are a dredged entrance channel/maneuvering basin, a 1730 ft rubblemound breakwater, a launch ram and uplands fill. Preliminary surveys indicate the virgin dredge material may require drilling and blasting before dredging and disposal. Several alternatives for dredging a channel at different depths and footprints were reviewed.

The minor project features are a rock revetment at the shoreline for bank stabilization. The need for bank stabilization will be further investigated during Pre-Construction Engineering and Design (PED) after the wave effects of the final plan are known. The Typical rock rubble mound construction practices will be used to transport and place the components for the slope protection.

III. MAJOR ASSUMPTIONS - COST ESTIMATE BASIS SUMMARY

Documents referenced for Cost Scope of Work include Alternatives Sketches, Geotechnical Survey Drawings, Quantities from Designers, and the Feasibility Report. Quantities and dimensions were provided by the project designers (See Appendix A, *Hydraulics and Hydrology*). Project conditions and construction costing were based upon the alternatives presented. Lands and Damages costs were provided by the Real Estate Branch, POA. The PED, Supervision, Inspection, and Overhead, and Cultural Resources costs were provided by Program Management/Plan Formulation.

Labor rates are based on current Alaska Laborers' & Mechanics' Minimum Rates of Pay. Equipment rates are based on MII Equipment 2018 Region 09. On-Road Diesel was assumed at \$3.75/Gal. Fuel price is volatile in Alaska, and contractors often mobilize the majority of the fuel they expect to use to have a reliable supply and known price because deliveries to remote sites are uncertain and subject to rapid increases.

Construction Prime Contractor Markups include Alaska payroll tax, and WCI for Excavation. A Tug & Barge Sub-contractor was used to calculate mob/demob of assumed plant and equipment. A Drill/Blast Sub-contractor was used, as this work can be specialized, hazardous, and likely executed concurrently with the dredging.

The dredging work is well understood, and access to the entrance channel would be with marine floating equipment. Drilling and blasting in-water has been accomplished a number of times in previous Alaska dredging contracts. In-Water disposal of dredge material is typical for many projects. Range of magnitude (ROM) drill/blast/dredge pricing was based upon prior project bids at Nome and St Paul, and on recent project study estimates at Dutch Harbor.

Quarried material costs were assumed from historical data and previous quotes from quarries. There is no operating local quarry source and little demand for local quarry materials. The rock for the project is assumed likely to be transported by barge from the quarry near St Paul, Alaska, from a Quarry on Unalaska Island, or from the quarry at Sand Point, Alaska. It is not certain that rock of sufficient quantity and size can be produced on St George.

Cape Nome quarry can produce the rock size and quantity, but is high priced and farther to transport. ROM rock pricing was based upon prior project low bids constructed at St Paul Island (2016 and 2009) and Nome Harbor (2005) with escalation to current level (2018). Although Cape Nome rock was used partially or totally for some of these projects, it was transported shorter distances.

Project risks include encountering bedrock and marine debris, mischaracterization of dredge materials, and increased beach erosion. The project dredge depth is only 10 feet below Mean Lower Low Water and is not anticipated to contain scarce or unique cultural, historic, or tribal resources. Weather is a direct impact on working in the marine coastal environment with both land-based and floating equipment. There are marine mammals in the area, there may be environmental windows to complete the work, and marine vessel traffic accessing St George may experience delays. This work has moderate to above average risk.

Contingency for alternative selection was derived from the Abbreviated Risk Analysis (ARA). An ARA defined contingencies for the project budget. Construction Escalation is based on the Civil Works Construction Cost Index System (CWCCIS), EM 1110-2-1304, dated 31 March 2017.

The Construction Contractor will furnish all labor, equipment, supplies and materials to accomplish the work. Contract acquisition is assumed to be by Invitation for Bid. Construction can occur throughout the year. Any exceptions when no in-water work will be performed is being coordinated with concerned agencies. Off-season dredge work may be required, but rock revetment construction in freezing weather is not satisfactory.

IV. COST ESTIMATE SUMMARY – ARA - TPCS

The initial cost range of the N-3 project is \$94-\$123 million at the Contract Cost level. Total Project Cost of the Tentatively Selected Plan (TSP) is expected to be over \$40 million. Initial ARA put the project cost Contingency high because of the lack of field data, and the uncertainty of the need to Drill/Blast. These issues are being reviewed and it is anticipated the data will be refined before and during PED. The current Total Project Cost of the TSPs includes a contingency of 31% and escalation of 9.05%.