

Benefits of the Port MacKenzie Barge Ramp and Cargo Handling Infrastructure Project

Port MacKenzie is located in Upper Cook Inlet, approximately two miles across the water from the Port of Alaska in Anchorage. It is accessible via road from the George Parks Highway and sits 40 road miles south of the largest population center in the Matanuska-Susitna Borough (Wasilla, AK). Originally constructed for large-scale industrial use, the port has approximately 9,000 acres of land and boasts both a barge dock and a deep draft dock.

Figure 1. Port MacKenzie



Source: Matanuska-Susitna Borough (undated)

Since opening in 2000, the bulk commodity activity at the port has not materialized in the volume originally envisioned, and the facilities at Port MacKenzie remain underutilized. Northern Economics, Inc., in partnership with R&M Consultants, reached out to potential customers in the local community to better understand why and how the port might better meet their needs. Through a series of interviews, Northern Economics and R&M learned the following:

1. Local users primarily represent barge traffic, and the equipment and facilities currently at the port do not cater to barge operations.
2. While there is a barge dock in place, the current design and placement of the dock make it difficult to use—rocks and debris at low tide, as well as the absence of a ramp, were noted as obstacles (O’Shea 2023; Mulhaney 2023).
3. A loading ramp, portable barge ramps, forklift, telehandler (aka a rough terrain forklift), and facilities for storing and repairing vessels were specifically noted as equipment that would facilitate barge operations (Elvsaaas 2023; Mulhaney 2023; Miller and Weiss 2023).

In response to this information, Port MacKenzie is requesting grant funding for the following improvements and equipment.

Table 1. Port MacKenzie Improvement and Equipment List

Improvement/ Equipment	Details	Purpose	Estimated Cost (\$)
Barge Ramp	200'x300', including contingency, design engineering, and permitting	Barge and boat launch and haul-out	Option 1: 6,046,040 Option 2: 8,056,230
Crawler Crane	Manitowoc MLC250	Cargo/freight handling	2,163,122
		Shipping to Seattle	170,500
		Shipping to Alaska	175,134
Loaded Container Handler	Toyota THD9000-L3	Loads/unloads/stacks shipping containers	928,533
Telehandler	XMFG XR7038	Cargo/freight handling	1,025,250
Skid Steer	ASV RT-135	Moving marine airbags, maintaining ramp, and snow removal	138,165
Diesel Fuel Storage Tank	Anchorage Tank, 7,500 gallons	Fuel storage tank for filling up equipment	73,041
Steel Building	Arctic Fox, 60'x80'x20' with insulation, including labor	Steel building for storage and maintenance of equipment	250,244
Total			10,970,029 – 12,980,219

Source: David Griffin, Moffatt & Nichol (barge ramp)

Summary of Benefits

Increasing Port MacKenzie's ability to handle barge traffic will improve its standing as an alternative to Port of Alaska and will increase traffic through the port from local users.

Economic Advantages of Port MacKenzie

Port MacKenzie is advantageous in its proximity to Alaska's major population centers (the Municipality of Anchorage and the Matanuska-Susitna Borough) relative to other ports of call in the state.

- For each truckload of cargo that is transported to Anchorage via Port MacKenzie instead of Seward, the benefits amount to \$77.84:
 - \$46.46 savings in operating costs
 - \$27.00 in travel time
 - \$4.38 in emissions reductions

- For each truckload of cargo that is transported to Anchorage (including Joint Base Elmendorf-Richardson [JBER]) via Port MacKenzie instead of Port Valdez, the benefits amount to \$365.70:
 - \$221.19 in operating costs
 - \$123.66 in travel time
 - \$20.85 in emissions reductions
- Cargo moving in and out of NANA Construction’s Big Lake facility moves through the Port of Alaska via fully dedicated barges, which are then offloaded onto trucks for transport to Big Lake. By switching to Port MacKenzie, the road transportation distance could be cut in half (from nearly 60 miles to 30 miles, one-way). For each truckload of cargo that is transported to Big Lake via Port MacKenzie instead of Port of Alaska, the benefits amount to \$39.05:
 - \$28.28 in operating costs
 - \$8.10 in travel time
 - \$2.67 in emissions reductions

At 180 trucks per year, this would amount to a savings of \$7,028 annually.

- Port MacKenzie’s remote location (far from any population centers or other major development) and the absence of simultaneous cargo and passenger operations could increase the safety of munitions and explosive cargo movements. These shipments are currently routed through Valdez; if that cargo were destined for JBER, routing through Port MacKenzie would generate \$365.70 in operating costs, travel time and emissions reductions, in addition to increasing safety.

Contribution to freight transportation at, around, and through Port MacKenzie

The improvements outlined in Table 1 will facilitate the transportation of barge traffic, including both containerized shipments and bulk cargo.

- The barge ramp would allow for equipment to drive on and off the barge, increasing ease and efficiency over the current barge dock, which requires that goods be delivered or offloaded alongside using tackle. It would also provide a method of haul-out for boats or barges that need repair or maintenance.
- The crawler crane, container handler, and forklift would allow for the movement of bulk cargo, containers, and pallets between barge and land. Currently, users of Port MacKenzie must either transport their cargo using tackle aboard the barge or bring their own equipment on site. Having on-site equipment that is maintained and available for rent would eliminate this burden.
- Should the crane, container handler, and/or forklift be purchased, fuel and maintenance facilities will be needed for equipment operation and upkeep. The diesel fuel storage tank and steel building are intended for this purpose, while the skid steer would be used to maintain the barge ramp and port site (snow removal, gravel movement, etc.)

Overcoming the Competitive Disadvantage of the port

- Port MacKenzie is challenged by the harsh conditions of Cook Inlet. Rocks and debris are moved by the strong tides and can interfere with port operations. Current users complain of rocks that act as obstacles at low tide. Current users must either offload rapidly within a short tidal window or wait and reposition during low tides. The barge ramp would allow for barges to pull partially or fully out of the water, providing greater stability during tidal swings and preventing the need for repositioning during cargo operations.

Port MacKenzie Opportunities and Benefits

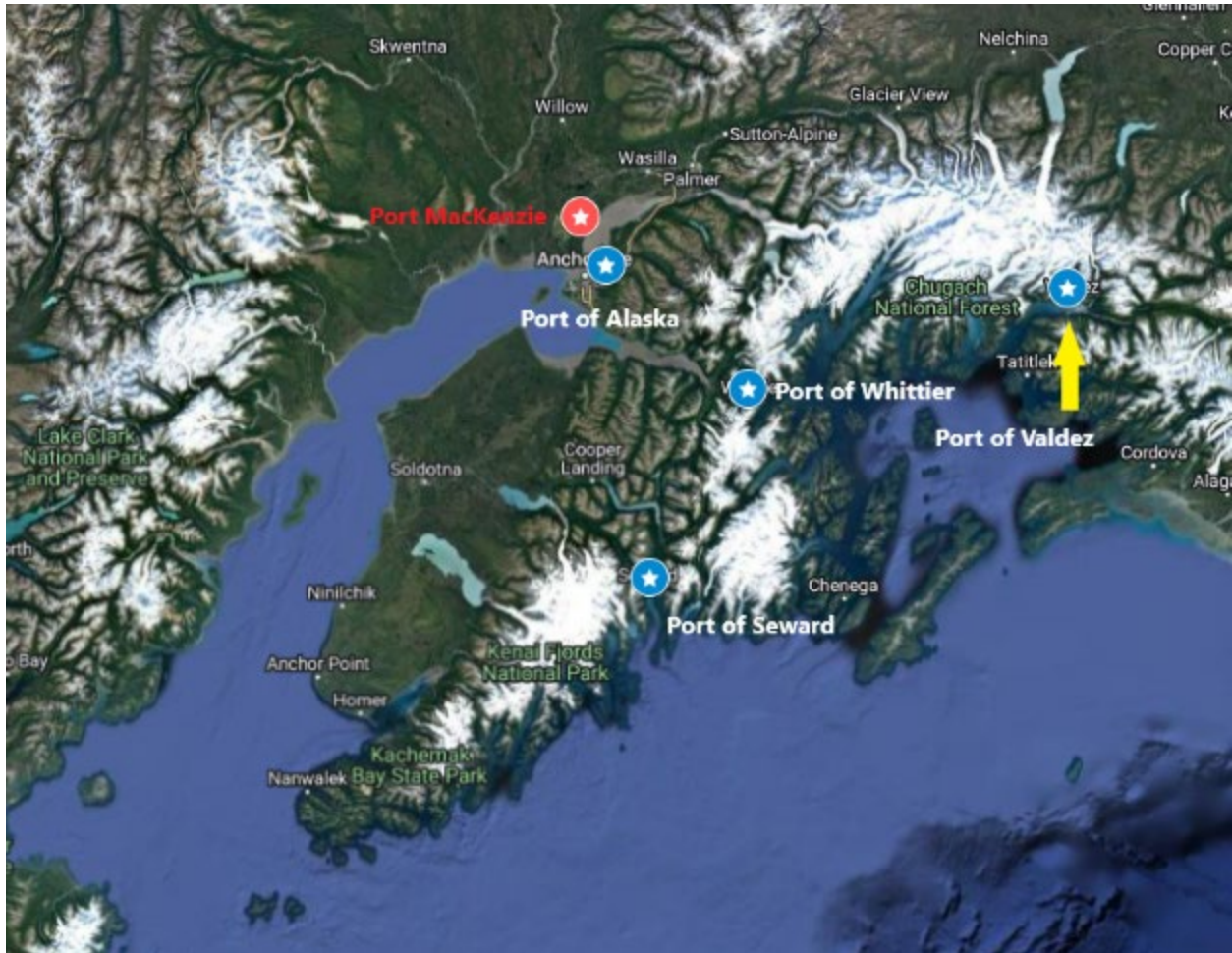
The project team asked interviewees and Port MacKenzie representatives to describe the advantages Port MacKenzie has over other ports of call and which operations that would feasibly be conducted there. The following sections summarize these potential operations and their benefits.

Location and Redundancy

The Port of Alaska is undeniably the major cargo hub for the state, accommodating 1.55 million tons of cargo each year (McDowell Group 2020). In the event of disruption at the port (due to a natural disaster, such as an earthquake or a manmade catastrophe, such as a cargo incident) or to road or rail supply lines, there would be significant disruption to the flow of Alaska fuel, freight, and passengers. In this instance, Port MacKenzie could operate as a valuable back-up facility (Griffin 2023).

Port MacKenzie is advantageous in its proximity to Alaska's major population centers (the Municipality of Anchorage and the Matanuska-Susitna Borough) relative to other ports of call in the state. A 2020 analysis of cargo movements through the Port of Alaska showed that "Between 70% and 75% of freight moving into the state through PoA stays in the Anchorage/Mat-Su area," (McDowell 2020). Port MacKenzie is approximately 80 road miles from Anchorage via the Glenn Highway and is within 55 miles of both major population centers in the Mat-Su valley (Wasilla and Palmer, AK).

Figure 2. Major Ports of Call in Southcentral Alaska



Source: Google My Maps 2023

The McDowell (2020) analysis also notes:

If PoA was unavailable, and Seward had to serve as the state’s primary inbound port, trucking freight the 128 miles from Seward to Anchorage would add about 3 cents per pound to total shipping costs. Multiplied by all the van and container tonnage that now moves through PoA, that 3-cent increase translates into an annual cost of \$78 million.

While the analysis concluded that bringing cargo into the state via Port MacKenzie would be considerably more expensive than to the Port of Alaska, it also acknowledged that with regard to transportation costs, it would be the most cost-effective of the available alternative ports (McDowell Group 2020).

Even in the absence of a shut-down, Port MacKenzie could provide a necessary outlet for barge traffic. It was noted that the Port of Alaska is busy and scheduling can be a constraint for intermittent users (Elvsaas 2023). The investments supported by this grant will enhance Port MacKenzie’s ability to

accommodate barge cargo—whether bulk or containerized—should it need to be used as an alternative for any reason.

For every instance in which cargo destined for Anchorage is transported through Port MacKenzie rather than the Seward or Port Valdez, benefits from reduced road mileage will be obtained, (as shown in Table 2.

Table 2. Per Truck Benefits of using Port MacKenzie over Seward or Valdez for Anchorage Cargo

Calculation Step	Port MacKenzie	Seward	Port Valdez
Distance to Anchorage (miles)	82	128	301
Average Travel Time (hours:minutes)	1:36	2:26	5:25
Distance saved by Using Port MacKenzie (miles)	-	46	219
Travel Time Saved (hours:minutes)		0:50	3:49
Emissions Reductions ¹ (CO2 metric tons)		0.0782	0.3723
Operating Cost Savings ²		\$46.46	\$221.19
Travel Time Savings ³		\$27.00	\$123.66
Emissions Reduction Benefits ⁴		\$4.38	\$20.85
Total Savings per Trip		\$77.84	\$365.70

Notes: ¹1,700 grams per mile CO2; ²\$1.01 per mile; ³\$32.40/hour; ⁴\$56 per metric ton

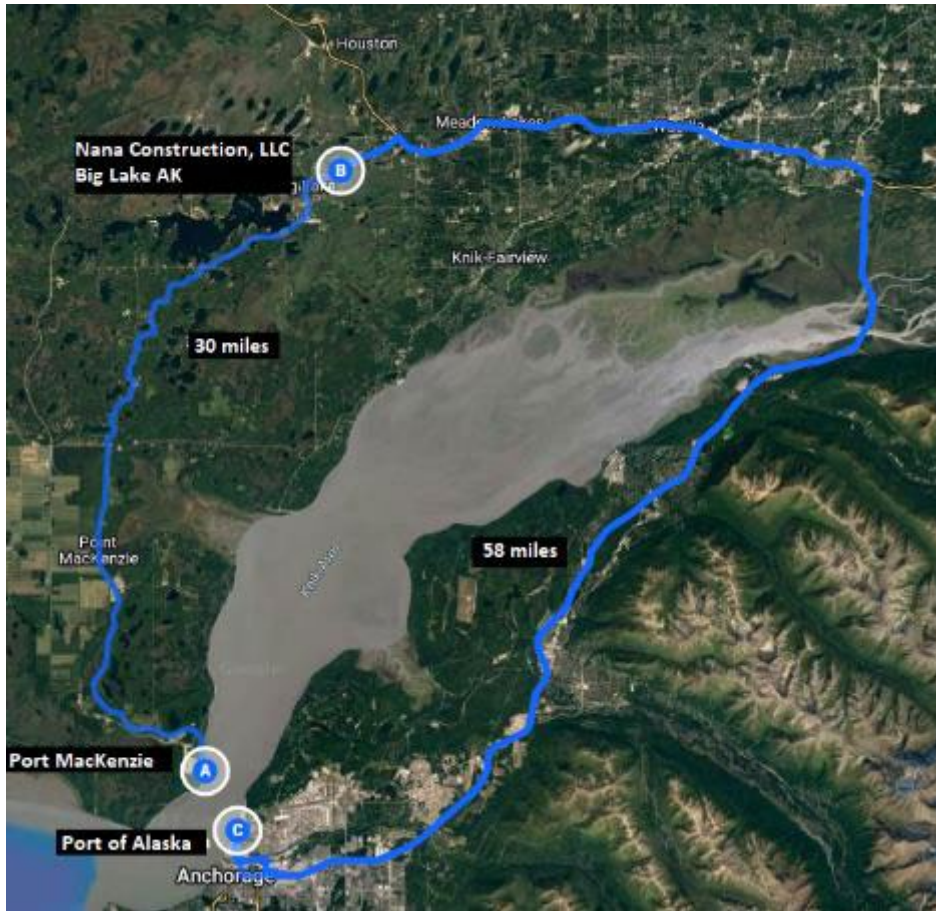
Construction Traffic

Construction activities pose a significant opportunity for Port MacKenzie. Cargo used for construction can take many forms, from large, finite equipment moves/builds to the seasonal transportation of materials.

NANA Construction owns a fabrication facility in Big Lake, AK. As noted on its website, “NANA Construction’s fabrication facility in Big Lake is one of the largest and most modern in Alaska, equipped with the most advanced equipment and the most experienced personnel in the state,” (NANA Construction 2023). The facility is capable of fabricating large equipment, such as that used on the North Slope or for other oil and gas applications, as well as residential products like modular housing. On the list of potential projects is a 400-ton sea lift module for Conoco-Philips that would be fabricated at the Big Lake facility, then transported to the Port of Alaska for final assembly and shipment (Elvsaaas 2023).

Cargo moving in and out of the Big Lake facility moves through the Port of Alaska via fully dedicated barges, which are then offloaded onto trucks for transport to Big Lake. By switching to Port MacKenzie, the road transportation distance could be cut in half (from nearly 60 miles to 30 miles, one way) (Figure 3).

Figure 3. Distance from Port MacKenzie and Port of Alaska to Big Lake, Alaska



Google My Maps 2023

NANA Construction accounts for \$60-\$70 million worth of lumber, steel, pilings, and other supplies each year; daily trucks move product between Anchorage and Big Lake during manufacturing season, which begins at the end of March and continues through September. At 180 trucks per year, annual savings would amount to \$7,028.

Table 3. Benefits of Using Port MacKenzie for Big Lake, AK Cargo

Calculation Step	Port MacKenzie	Port of Alaska
Distance to Big Lake, AK (miles)	30	58
Average Travel Time (hours:minutes)	0:54	1:09
Distance saved by Using Port MacKenzie (miles)		28
Travel Time Saved (hours:minutes)		0:15
Emissions Reductions ¹ (CO2 metric tons)		0.0476
Operating Cost Savings ²		\$28.28
Travel Time Savings ³		\$8.10
Emissions Reduction Benefits ⁴		\$2.67
Total Savings per Trip		\$39.05
Trucks per year (1 per day, April-Sept)		180
Total Savings per Year		\$7,028.21

Notes: ¹1,700 grams per mile CO₂; ²\$1.01 per mile; ³\$32.40/hour; ⁴\$56 per metric ton

A second local construction company that could bring potential cargo volumes to Port MacKenzie is Colaska/QAP. Colaska is part of the Colas Group, a world leader in transport infrastructure construction and maintenance. Within Alaska, Colaska operates several companies, including QAP out of Anchorage. QAP constructs major infrastructure projects such as roads and airports and specializes in logistics operations that facilitate project completion in remote areas of Alaska (Colaska 2023).

QAP moves gravel and heavy equipment via barge on a yearly basis. Were Port MacKenzie better equipped to support barge traffic, QAP anticipates using the port for gravel importation, the mobilization and demobilization of heavy equipment, and storage. Currently, QAP estimates doing 90% of its port operations out of Seward, 5% out of the Port of Alaska, and 5% out of Port MacKenzie. While QAP is a current Port MacKenzie customer, representatives note that the lack of a barge loading ramp free of rocks and debris, along with the absence of portable barge ramps and a large capacity forklift are obstacles to expanded use (Mulhaney 2023).

QAP operates a Western Alaska Division and is contracted for construction projects around the state. Each year the workload and project location vary, and forecasted cargo estimates for Port MacKenzie were not available.

Cruz Construction, Inc. is another local company, and operates out of the Matanuska-Susitna Borough. With an office in Palmer, AK, Cruz describes itself as an Alaska oilfield support and heavy civil construction company and boasts projects ranging from ice road construction to airport rehabilitation and spanning all areas of the state (Cruz Construction 2023).

Cruz Construction currently offloads three to four barges a year at Port MacKenzie. With the addition of a barge ramp, company representatives expect local traffic volume to increase substantially by

additional companies starting to use the port. They think the number of barges could be four times what it is now after a year and 15 times what it is after three years (Miller and Weiss 2023).

As commercial operators in the vicinity who know the local market well, they also believe there is pent up demand within the local fishing industry that would be realized with a barge ramp. While not known for its maritime support industry, the Mat-Su Borough has a skilled workforce with expertise in the kinds of work that fishing vessels could require, as well as a local boatbuilder.

Munitions and Explosive Cargo

Lonny Bower, Government Services Executive for Carlile Transportation, noted the opportunity to transport munitions and explosives via Port MacKenzie. Munitions and explosive cargo are prohibited at the Port of Alaska; Carlile currently moves these shipments through Valdez (Bower 2023). While cargo destination was not divulged, it is common knowledge that the three primary army facilities in Alaska are JBER in Anchorage, Fort Wainwright in Fairbanks, and Fort Greely in Delta Junction. While the distance from Port MacKenzie to Fairbanks/Delta Junction is similar to that of Valdez to Fairbanks/Delta Junction (no advantage), any cargo destined for JBER would see a significant mileage reduction. The distance from Valdez to JBER via road is approximately 290 miles, while the distance from Port MacKenzie to JBER is only 74 miles. Offloading JBER hazardous cargo at Port MacKenzie would provide for a 216 road-mile reduction.

Table 4. Trucking Benefits of Using Port MacKenzie over Port Valdez for JBER Cargo

Calculation Step	Port MacKenzie	Port Valdez
Distance to Anchorage (miles)	82	301
Average Travel Time (hours:minutes)	1:36	5:25
Distance saved by Using Port MacKenzie (miles)		219
Travel Time Saved (hours:minutes)		3:49
Emissions Reductions ¹ (CO2 metric tons)		0.3723
Operating Cost Savings ²		\$221.19
Travel Time Savings ³		\$123.66
Emissions Reduction Benefits ⁴		\$20.85
Total Savings per Trip		\$365.70

Notes: ¹1,700 grams per mile CO2; ²\$1.01 per mile; ³\$32.40/hour; ⁴\$56 per metric ton

It is also worth noting that when a munitions or explosives load is moved, additional safety precautions must be taken. This includes shutting down adjacent docks/operations and evacuating buildings within an explosion risk radius. Once offloaded, munitions and explosive loads sitting at the port must be segregated in the event of an explosion. Port MacKenzie's remote location (far from any population centers or other major development) and the absence of simultaneous cargo operations could provide increased safety.

References

- Bower, Lonny. Government Services Executive, Carlisle Transportation. 2023. Telephone interview. 16 March 2023.
- Colaska. 2023. Companies Page. colaska.com/companies/. Accessed April 8, 2023.
- Cruz Construction. 2023. Website. www.cruzconstruct.com. Accessed April 6, 2023.
- Elsvaas, Fred. General Manager, Nana Construction. 2023. Telephone interview. 23 February 2023.
- Griffin, David. Port Operations Manager, Port MacKenzie, Matanuska-Susitna Borough. 2023. Personal communication. February–March 2023.
- Matanuska-Susitna Borough. Undated. Photo of Port MacKenzie. matsugov.us/images/jumbotron/13880/Dalarna-Atlas.png.
- Mathers, Jason, Elena Craft, Marcelo Norsworthy, and Christina Wolfe. 2019. “The Green Freight Handbook.” Environmental Defense Fund (EDF). storage.googleapis.com/scsc/Green%20Freight/EDF-Green-Freight-Handbook.pdf. Accessed April 9, 2023.
- McDowell Group. 2020. *The Logistical and Economic Advantages of Alaska’s Primary Inbound Port*. Prepared for Port of Alaska. www.portofalaska.com/wp-content/uploads/PortofAlaska_benefits_McDowell_Oct2020_sm.pdf. Accessed April 1, 2023.
- Miller, Jeff (Senior Executive Vice President of Operations) and Kevin Weiss (Director). Cruz Construction. 2023. Telephone Interview. March 16, 2023.
- Moffatt & Nichol. 2023. Port Mackenzie Vessel Haulout Facility, Opinion of Probable Construction Cost (OPCC), Preliminary Design.
- Mulhaney, Jim. Area Manager, QAP/Colaska. 2023. Written interview. March 10, 2023.
- NANA Construction. 2023. Facilities Page. www.nanaconstruction.com/facilities/. Accessed April 8, 2023.
- O’Shea, Mike. VP Planning & Business Development, Cook Inlet Tug and Barge. 2023. Telephone interview. February 27, 2023.
- Port of Alaska in Anchorage. 2023. Fact Sheet. www.portofalaska.com/wp-content/uploads/PortOfAlaska_fact_sheet_Sept2020.pdf. Accessed April 2, 2023.
- Rueter, Tom. General Manager at Alaska Maritime. 2023. Telephone interview. March 14, 2023.