Benefit-Cost Analysis of the Lutak Dock Replacement

Prepared for

Haines Borough

December 2016

Prepared by

Northern Economics

Anchorage
880 H Street
Suite 210
Anchorage, Alaska 99501
Phone: 907.274.5600
Fax: 907.274.5601

Seattle
1455 NW Leary Way
Suite 400
Seattle, WA 98107
Phone: 206.747.8475

Email: mail@norecon.com

PROFESSIONAL CONSULTING SERVICES IN APPLIED ECONOMIC ANALYSIS

Principals:
Patrick Burden, M.S. – Chairman
Marcus L. Hartley, M.S. – President
Jonathan King, M.S. – Vice President
Michael Fisher, MBA – Principal
Diane Steele – Office Manager

Consultants:
Logan Blair, M.S.
Leah Cuyno, Ph.D.
Michael Downs, Ph.D.
Gary Eaton, M.S.
Michelle Humphrey, M.S.
Don Schug, Ph.D.
Stephen Weidlich, M.S.
Katharine Wellman, Ph.D.

Administrative Staff:
Terri McCoy, B.A. – Editor

Northern Economics

880 H Street, Suite 210
Anchorage, Alaska 99501
Phone: 907.274-5600
Fax: 907.274-5601

1455 NW Leary Way, Suite 400
Seattle, WA 98107
Phone: 206.747.8475
Email: mail@norecon.com

Preparers

Team Member	Project Role
Michael Fisher	Principal in Charge
Michelle Humphrey	Primary Analyst & Author
Terri McCoy	Technical Editor

Please cite as: Northern Economics, Inc. *Benefit-Cost Analysis of the Lutak Dock Replacement*. Prepared for Haines Borough. December 2016.

Contents

Abbreviations

AIS	Abbreviated Injury Scale
BCA	Benefit-Cost Analysis
NPV	Net Present Value
PND	PND Engineers, Inc.
USACE	United States Army Corps of Engineers
VMT	Vehicle Miles Traveled

Executive Summary

Lutak Dock plays an integral role in the supply chains that service Haines Borough and the surrounding area. The dock accommodates regularly scheduled shipments of fuel and freight, both of which support consumer and industrial activities in the region.

Originally constructed in 1953 by the U.S. Army Corps of Engineers, the Lutak Dock is in need of repairs, and has reached the end of its credible 60-year service life. Repairing the existing facility is no longer a viable option due to the dock's current level of deterioration and it has been recommended that the borough start planning for a full replacement of Lutak Dock as soon as feasibly possible.

It is likely that the dock will fail in within the next decade, and if that were to happen it would cause significant disruptions to freight and fuel supply chains in the region. Fuel and consumer goods would be diverted to less efficient transportation routes and modes and the costs associated with transporting goods to Haines would increase. The increase in transportation costs is expected to impact the cost of goods and services in Haines for both consumer and industrial end users.

The following benefit-cost analysis attempts to monetize the benefits associated with the replacement of Lutak Dock. The analysis considers three different sets of baseline assumptions and results are presented as the Net Present Value of the benefit or cost over a 35 year study period (2016-2050). The benefits considered in this analysis are realized through the continuation of the current level of operations occurring at Lutak Dock, and do not assume an increase in the level or types of activities supported by Lutak Dock. The primary benefits analyzed are:

1. Avoided transportation costs of freight resulting from a modal shift from barge to truck
2. Avoided pavement maintenance costs resulting from increased truck traffic
3. Avoided safety costs resulting from increased truck traffic
4. A reduction in the likelihood of facility closures due to structural failures.

This project is still in the development phase and three alternative designs and costs for the replacement of Lutak Dock are considered in this analysis. Table ES-1 summarizes the findings of the benefit-cost analysis for the replacement of Lutak Dock.

Table ES-1. Benefit-Cost Analysis Summary Results (millions $2015)

	Discounted at 3%			Discounted at 7%		
Measure	**Scenario A**	**Scenario B**	**Scenario C**	**Scenario A**	**Scenario B**	**Scenario C**
Benefit NPV						
Transportation Costs	30.7	40.3	46.8	13.7	20.5	25.9
Maintenance	0.2	0.2	0.2	0.1	0.1	0.1
Safety	1.9	2.5	2.9	0.8	1.3	1.6
Total Benefits	32.8	43.0	50.0	14.6	21.9	27.6
Cost NPV						
Capital Costs	33.0	28.0	21.3	28.6	24.2	18.5
O&M Costs	7.3	6.2	4.7	3.8	3.2	2.5
Total Costs	40.3	34.1	26.0	32.4	27.4	20.9
B/C Ratio	**0.81**	**1.26**	**1.92**	**0.45**	**0.80**	**1.32**

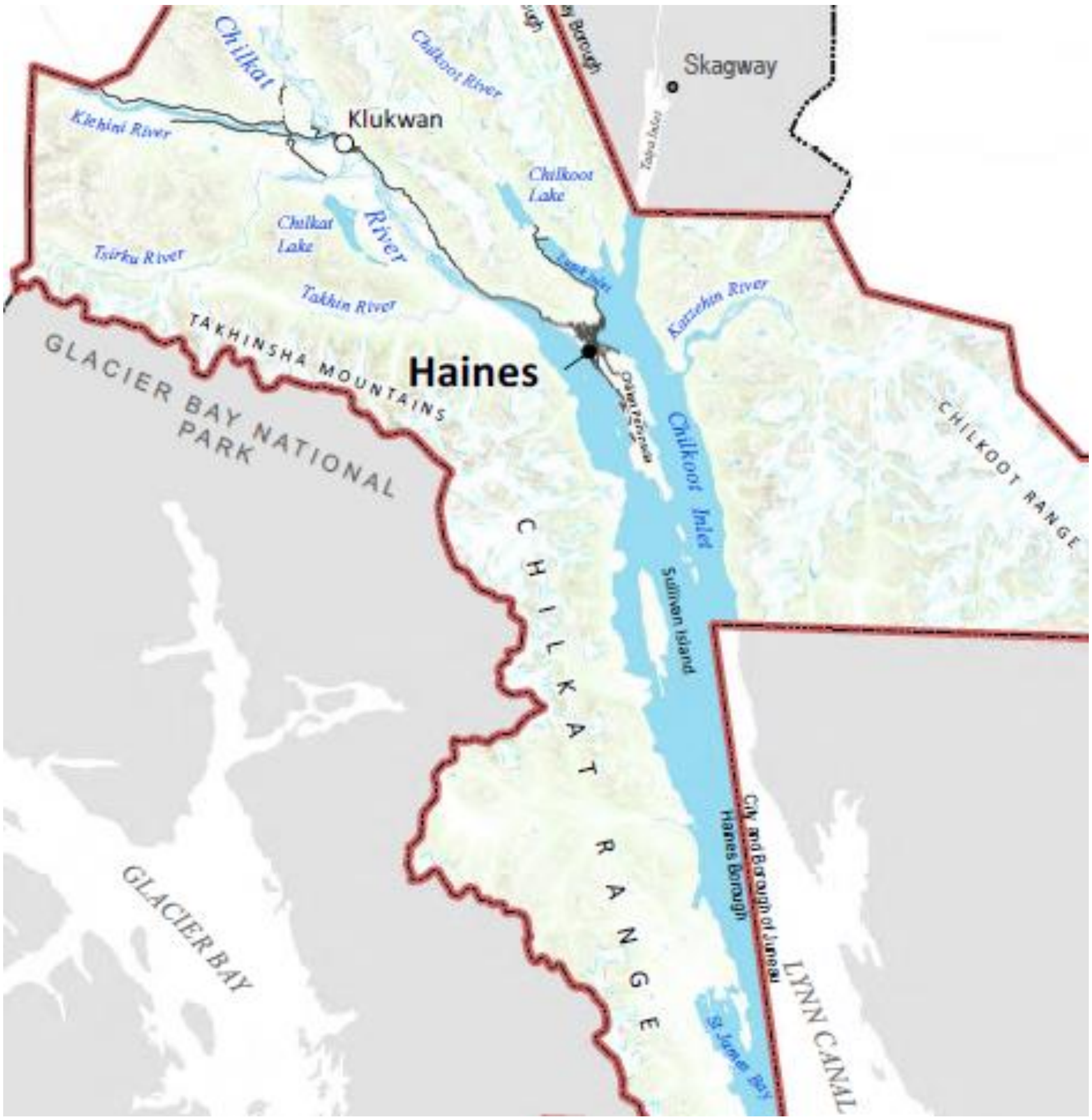
Source: Northern Economics, Inc. 2016.

This page intentionally left blank

1 Project Description

Haines is located between the Chilkoot and Chilkat rivers on Chilkoot Inlet, approximately 150 road miles south of Haines Junction and at the end of the Haines Highway (Figure 1). It has a maritime climate, with temperatures ranging from 10°F to 70°F, and is accessible by water, road, and air (DCCED 2016). The moderate climate, ice-free deep-water port, and year-round road access are advantageous, and support the borough's role as a local transportation hub.

Figure 1. Haines Borough General Location Map



Source: Adapted from Haines Borough 2012a

The Alaska Marine Highway System (AMHS) Terminal and Lutak Dock (Figure 2 and Figure 3) are located near the mouth of Lutak Inlet, roughly four miles north of Haines. Ownership of the dock is split; the borough owns approximately 75 percent of the dock and the State of Alaska owns the remainder of the dock (the portion used as the AMHS Terminal).

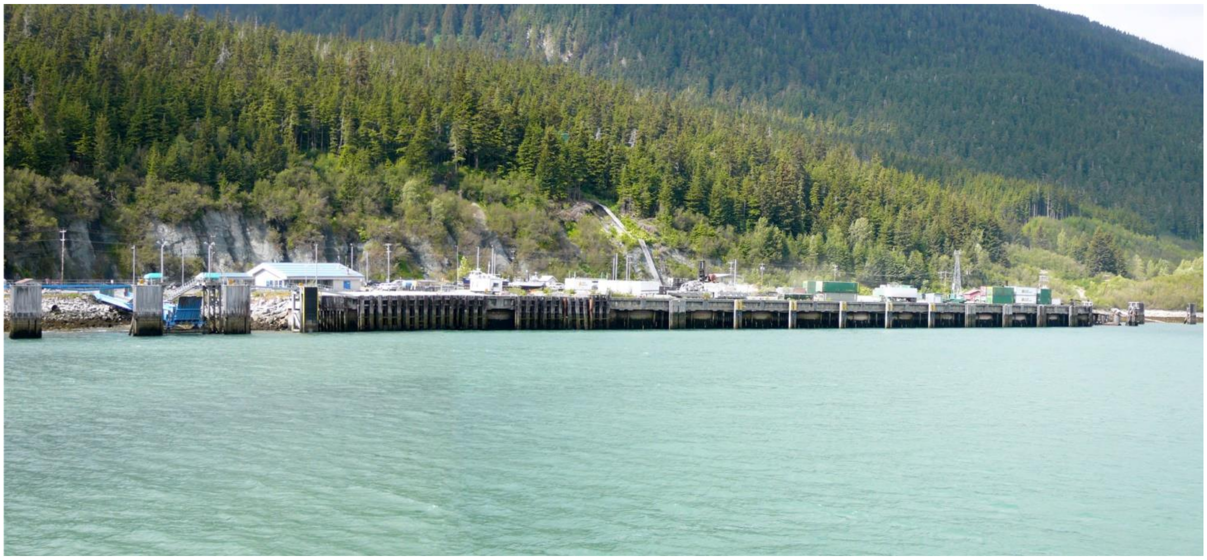
Figure 2. Aerial Photo of the AMHS and Lutak Dock

Source: R&M Consultants, Inc. 2016.

Lutak Dock is Haines' primary industrial facility; it is an ice-free dock that accommodates regularly scheduled shipments of fuel and freight for the borough and surrounding area.

Originally constructed in 1953 by the U.S. Army Corps of Engineers, Lutak Dock is a closed cell sheet pile dock with a concrete cap along the seaward perimeter of the cells (PND 2010). The dock offers four acres of storage space, 750 feet of berthing space, and has a depth ranging from 24 feet on the north end to 33 feet on the south end. A number of forklifts (owned by Alaska Marine Lines) are available for use at the dock, including two 35-ton diesel forklift trucks (Northern Economics, Inc. 2012).

Figure 3. AMHS and Lutak Dock



Source: Northern Economics 2011

Lutak Dock currently operates year-round and is equipped to handle loading and unloading operations for bulk cargo, breakbulk cargo, roll-on roll-off cargo, petroleum products transshipment, and passenger operations (Haines Borough, 2012). The two primary users of Lutak Dock are Alaska Marine Lines (AML) and Delta Western, which move cargo and bulk fuel respectively. In fiscal year 2016, the dock generated approximately $421,600 in dockage and wharfage revenues (Haines Borough, 2016).

According to a marine facilities structural assessment undertaken by PND Engineers, Inc. (PND) in 2014, Lutak Dock is in need of repairs, and it is the opinion of PND that the structure has reached the end of its credible 60-year service life.

1.1 Lutak Dock Replacement Alternatives

The borough and their team of consultants are in the development phase of the Lutak Dock Replacement project and three design alternatives are currently being considered.

Alternative 1: Berthing Dolphins

The first alternative evaluated in the benefit-cost analysis (BCA) includes removing the entire existing dock and laying the slopes back and armoring them at a 2:1 slope. Berthing dolphins would then be constructed and access provided via a transfer bridge. The berthing dolphins are a stand-alone, pile-supported structure that includes a fender system. Below are some important points regarding Alternative 1:

- The entire existing cell structure is removed.
- This alternative reduces the amount of available uplands by about 1.7 acres.
- This alternative eliminates the multi-purpose capabilities of the dock.
- This alternative limits cargo barge operations to only using the transfer bridge for roll-on roll-off.

The estimated cost for design, permitting, and construction of Alternative 1 is $24.1 million.

Alternative 2: Encapsulated Cells with Modified Diaphragm

This alternative involves constructing a new sheet pile cell around the existing cells. The new cells would have semicircular front and backs with straight walls connecting these. The shape of this is termed a "modified diaphragm" and has been outlined in design manuals dating back to the 1980s and prior. The straight wall sections would go in between the existing cells where the closure arcs now stand. Below are some important points regarding Alternative 2:

- This alternative maintains the same general footprint and use as the existing dock.
- Demolition is limited to the existing pile cap, closure arcs, and top section of existing fill. This saves cost.
- There are some challenges and risk associated with driving new sheets through the old closure arc area. Obstructions such as boulders would be difficult to remove in the tight space.

The estimated cost for design, permitting, and construction of Alternative 2 is $31.6 million.

Alternative 3: Encapsulated Cells with Modified Diaphragm and Reclaimed Uplands

Alternative 3 is almost identical to Alternative 2, but also includes the reclamation of several cells that have been partially excavated and are owned by the borough. The reclamation of these cells would result in about one-half of an acre of additional reclaimed uplands compared to Alternative 2.

The estimated cost for design, permitting, and construction of Alternative 3 is $37.3 million.

2 Analysis Approach

The BCA for this project was prepared according to *Benefit-Cost Analysis Analyses Guidance for Applicants for FASTLANE Grants*, published November 17, 2016, and with reference to OMB Circulars A-4 and A-94 concerning benefit-cost analysis.

This BCA considers all reasonable project costs and monetizable benefits over a 35-year horizon (2016–2050). All values are expressed in constant 2015 dollars.

2.1 Baseline Scenarios

The BCA quantifies the public benefits that will accrue if the existing freight and passenger operations continue resulting from the replacement of Lutak Dock. The "without project," or baseline, scenario assumes that the existing dock will become nonoperational in three to ten years, and that freight and passenger activities will be diverted to other modes of transportation.

Due to the uncertainty surrounding the existing dock's operational sustainability and feasible logistical alternatives to the activities currently taking place at Lutak Dock, this BCA considers three baseline scenarios. Table 1 summarizes the assumptions used for each baseline scenario.

Table 1. Baseline Assumptions

Baseline Assumption	Scenario A (low)	Scenario B (mid)	Scenario C (high)
Operational closure (year)	2027	2022	2019
Annual maintenance costs ($)	4,000	4,000	4,000
Diverted freight originating in Seattle (%)	45	45	45
Diverted freight originating in Anchorage (%)	10	10	10
Diverted freight originating in Valdez (%)	45	45	45
Project Replacement Alternative	Alt. 3	Alt. 2	Alt. 1

Source: Northern Economics, Inc., 2016.

Operational Closure

Based on structural assessments conducted by PND in 2010 and 2014, Lutak Dock is believed to have exceeded its expected service life and is considered to be operating on "borrowed time." The BCA considers operational closure due to structural failure after 10 years (2026), 5 years (2021), and 3 years (2019). The level and rate of corrosion recorded in the structural assessments of Lutak Dock suggest that these are reasonable assumptions.

Annual Maintenance Costs

In fiscal years 2015 and 2016, Haines Borough budgeted $4,000 for dock maintenance and repairs, but historically funds have not been set aside for maintenance activities on an annual basis. Moving forward, the borough estimates allocating the same level of spending for annual maintenance and repair of the existing dock.

Diverted Freight Routes

Lutak Dock is Haines' primary industrial facility and plays a critical role in the importation of freight that is used to support local businesses in Haines as well as industrial activities—primarily mines—in the surrounding region. AML is one of the primary users of Lutak Dock, providing weekly freight service between Seattle, Washington and Haines. If Lutak Dock were to become nonoperational, freight that is currently brought into Haines over the dock would most likely be transported via truck or a combination of barge and truck. Logistically, there are three feasible transportation route alternatives:

- Freight is trucked directly from Seattle to Haines (approximately 1,805 road miles)
- Freight is shipped from Seattle to Anchorage (weekly service provided by AML) and then trucked from Anchorage to Haines (756 road miles)
- Freight is shipped from Seattle to Valdez (weekly service provided by AML), and then trucked from Valdez to Haines (691 road miles)

All three freight transportation alternatives would involve a modal change from barge to truck for at least a portion of the route. It is likely that industry would seek out the most cost-effective means of transportation for the different types of freight that are currently being transported by AML, and all three routes would be used to some degree. The BCA assumes that 45 percent of the forecasted freight volumes would be trucked directly from Seattle to Haines, 10 percent of freight would get barged to Anchorage and then trucked to Haines, and 45 percent of freight would be barged to Valdez and then trucked to Haines. The distribution of diverted freight over the three alternative routes is based on existing transportation networks, and the transportation services and facilities available along each route.

2.2 Economic Benefit and Costs

Following the development of the baseline and project scenarios, the following impacts were considered and monetized for the BCA:

5. Avoided transportation costs of freight resulting from a modal shift from barge to truck;
6. Avoided pavement maintenance costs resulting from a modal shift from marine transport (primarily barge) to road;
7. Avoided safety costs resulting from a modal shift from marine transport to road;
8. A reduction in the likelihood of facility closures due to structural failures.

The Project Summary matrix (Table 2) provides a summary of the population impacted, the benefits of the project, and a reference to where each impact is discussed in this report. It should be noted that this BCA does not include any impacts to Canadian mining operations in the surrounding region that frequently use Lutak Dock to import supplies.

Table 2. Project Summary Matrix

Current Status/ Baseline & Problem to be addressed	Change to Baseline/ Alternatives	Type of Impacts	Population Affected by impacts	Economic Benefit	Summary of Results	Page Reference in BCA
Primary port for cargo, fuel, and passengers in Haines has reached the end of its credible service life and does not meet current USACE minimum factors of safety for cellular structures	Replace the existing dock (see Section 1.1 Lutak Dock Replacement Alternatives)	(1) Transportation	Businesses and consumers in Haines and surrounding region. (Industrial and consumer goods)	Reduced freight transportation costs	Estimated transportation cost savings	Section 3.2 Page 9
		(2) Maintenance	Motorists using routes connecting Haines to Seattle, Valdez, or Anchorage	Reduced maintenance cost resulting from lower traffic volumes	Estimated maintenance cost savings	Section 3.3 Page 9
		(3) Safety	Motorists using routes connecting Haines to Seattle, Valdez, or Anchorage	Reduced costs associated with lower crash rates and resulting injuries	Estimated accident cost savings	Section 3.4 Page 10
		(4) State of Good Repair	Organizations using Lutak Dock and residents of Haines that rely on goods moved across Lutak Dock	Reduce frequency of facility closures due to disrepair and safety risk	Qualitative assessment	Section 3.5 Page 11

Source: Northern Economics, Inc., 2016.

3 Results of Benefit-Cost Analysis

This BCA was prepared under the guidelines of the U.S. Department of Transportation for a FASTLANE Grant Application. The following section summarizes the results and outlines the project costs, benefits, and assumptions used in this analysis.

The proposed replacement of Lutak Dock will result in a variety of monetizable benefits, the sum of which exceed the project costs under three of the six scenarios considered in this analysis. It is important to note that there are also non-quantifiable social benefits that would result from the replacement of Lutak Dock that are not considered in the benefit-cost calculations. Table 3 summarizes the findings of the BCA. The ratio of monetized benefits to costs (B/C ratio) ranges from 1.92 to 0.45 depending on the discount rate and assumptions applied. The average B/C ratio is 1.33 when discounted at 3 percent, and 0.86 when discounted at 7 percent. The following sections describe the costs and benefits used to calculate the values displayed in the table below.

Table 3. Summary of Benefits and Costs (millions $2015)

	Discounted at 3 Percent			Discounted at 7 Percent		
Measure	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
Benefit NPV	32.8	43.0	50.0	14.6	21.9	27.6
Cost NPV	40.3	34.1	26.0	32.4	27.4	20.9
B/C Ratio	0.81	1.26	1.92	0.45	0.80	1.32

Source: Northern Economics, Inc., 2016.

The results of the BCA are presented using the summary measurement of net present value (NPV). The NPV shows the present value of the cash flows that occur over the analysis period (2016–2050) under the discount rates of 3 and 7 percent. The discount rate is used to discount future cash flows to the present. The discount rate takes into account the time value of money and the uncertainty associated with future cash flows (put simply, the principle of discounting works on the assumption that a dollar today is worth more than a dollar a year or more in the future). The discount rates of 3 and 7 percent follow the guidance of OMB Circular A-4 (OMB, 2016).

3.1 Project Costs

Design, permitting, and construction of the Lutak Dock replacement are scheduled to occur over a three-year period from 2017–2020. The existing barge ramp will remain operational throughout the entire construction period of this project, but the face of Lutak Dock is expected to be nonoperational for approximately three months. During the period in which the dock face is closed, some regularly scheduled port calls (Delta Western, AML, and AMHS) may need to be redirected or postponed.

There are currently three design alternatives for the Lutak Dock replacement project that have capital costs ranging from roughly $24.1 million to $37.3 million (not discounted). The project costs used in the benefit- cost analysis vary by scenario; Scenario A assumes project costs associated with Alternative 3, Scenario B assumes project costs associated with Alternative 2, and Scenario C assumes project costs associated with Alternative 1. For each scenario the analysis assumes annual maintenance costs will be approximately one percent of the alternative's capital cost and major maintenance to be five percent of the capital cost and occur every 10 years. These assumptions were developed based on input from the engineering and design team.

3.2 Transportation Costs

The largest monetizable benefit of replacing Lutak Dock is the transportation cost savings realized through the continuation of AML barge service into Haines. The majority of consumer and industrial goods that come into Haines are currently transported by barge, which is the most cost-efficient mode of transportation in the region. If Lutak Dock were to become nonoperational, freight would most likely be transported via truck directly from Seattle, or barged to Valdez or Anchorage and then trucked to Haines. The increased use of truck transport, which costs more per mile and increases the total mileage traveled, would increase transportation costs relative to the current system.

To calculate the transportation cost benefits associated with the proposed replacement of Lutak Dock, the analysis uses the average freight revenue per ton-mile for barge and truck as a proxy for the difference in cost between the two modes (BTS, 2016). Based on national transportation statistics, the average freight revenue per ton-mile for freight moved by truck is over seven times as much as the average freight revenue per ton-mile for freight moved by barge. It is likely that the difference in modal transportation costs is even higher for the routes that would be used to transport freight into Haines due to a number of border crossings, road conditions, and terrain along the alternative routes.

Table 4. Transportation Cost Benefits (millions $2015)

Baseline Scenario	Discounted at 3 Percent	Discounted at 7 Percent
Scenario A	30.7	13.7
Scenario B	40.3	20.5
Scenario C	46.8	25.9

Source: Northern Economics, Inc. 2016.

Table 4 shows the transportation cost benefits under each of the baseline scenarios. The NPV of transportation cost benefits resulting from the replacement of Lutak Dock range from $13.7 million to $46.8 million depending on which baseline assumptions and discount rates are applied.

3.3 Maintenance Costs

The replacement of Lutak Dock, allowing for the continuation of AML's weekly barge service to Haines, would reduce pavement maintenance costs that would otherwise occur if freight is transported via road instead of passing over the dock.

If Lutak Dock were to become nonoperational, the most logistically feasible freight transportation routes would be to truck freight directly from Seattle to Haines, or transport freight via barge to AML's facilities in either Valdez or Anchorage, and then transfer the freight to be trucked to Haines. All three freight transportation alternatives would increase truck traffic and pavement maintenance cost along the specified routes. The reduction in pavement maintenance cost resulting from the replacement of Lutak Dock is monetized based on the recommended average maintenance costs by vehicle and highway class, and vehicle miles traveled (VMT). The analysis of pavement maintenance costs is limited to road segments in the United States and excludes those segments in Canada. Table 5 shows the NPV of pavement maintenance benefits under each of the baseline scenarios.

Table 5. Pavement Maintenance Benefits ($2015)

Baseline Scenario	Discounted at 3 Percent	Discounted at 7 Percent
Scenario A	154,461	68,792
Scenario B	202,844	103,254
Scenario C	235,484	130,254

Source: Northern Economics, Inc., 2016.

The NPV of the pavement maintenance benefits resulting from the replacement of Lutak Dock range from just under $69,000 to over $235,000 under the three baseline scenarios and two discount rates considered in this analysis.

3.4 Safety

In addition to the increased maintenance cost, there is also an increased risk of accidents and injuries associated with increased truck traffic. The proposed replacement of Lutak Dock supports the continuation of AML's weekly barge service, and reduces the amount of freight being transported over the road system.

The road distances of the three alternative routes (see baseline assumptions for detailed description of alternative routes) in conjunction with freight volume forecasts are used to estimate the increase in road traffic, presented in VMT. The most recent crash statistics for Alaska were then applied to calculate the incremental increase in VMT and monetize the value of vehicle related injuries according to the maximum Abbreviated Injury Scale (AIS) (ADOT&PF, 2015). The data recorded by ADOT&PF are not presented in the AIS format, so the analysis uses a conversion from more general injury categories to the preferred AIS format per the BCA Resource Guide (USDOT, 2016). Table 6 shows the monetized value (in 2015 dollars) of the accident cost reduction benefits associated with the replacement of Lutak Dock. Unlike the calculations used to monetize the pavement maintenance benefit, the safety benefit calculations use the entire road distance of each alternative route, even for the segments that pass through Canada.

Table 6. Value of Safety Benefits (millions $2015)

	Discounted at 3 Percent	Discounted at 7 Percent
Scenario A	1.9	0.8
Scenario B	2.5	1.3
Scenario C	2.9	1.6

Source: Northern Economics, Inc., 2016.

Lutak Dock also plays a significant role in the fuel distribution network in Haines and the surrounding region. Delta Western is one of the primary users of Lutak Dock and owns a tank farm with a capacity of 3.25 million gallons adjacent to Lutak Dock. Fuel shipped through Haines is used locally and sold to Canadian wholesalers in the surrounding area. It is unclear whether this tank farm would be operationally feasible without Lutak Dock, as trucking fuel from other locations would be costly and time consuming. If this tank farm were to remain operational and fuel were to be transferred via the road system, this would significantly increase truck traffic on the alternative routes and the value of safety benefits would increase accordingly.

Explosives and other hazardous cargo also make up a significant portion of the total freight moved over Lutak Dock, supporting various mining operations in the area. If Lutak Dock were to cease operations, these cargo types would be rerouted, but it is unclear what mode or route would be used at this time. While important, these benefits are difficult to quantify and therefore were not monetized in the BCA. For these reasons, the monetized value of road safety presented in this analysis should be seen as a conservative estimate.

3.5 State of Repair

Lutak Dock was originally designed and constructed in 1953. In a 2014 structural assessment, PND concluded that “the structure has reached the end of a credible 60-year service life” and that further utilization of Lutak Dock is effectively on “borrowed time” (PND, 2015). A conditions assessment revealed that the dock has experienced significant corrosion loss of the base metal in the sheet piles over the last 63 years and the bulkhead does not meet the Industry standard safety requirements. Dock inspections completed in 1976, 1988, 2003, and 2014 document the substantial growth of corrosion over the life of the dock. PND does not believe repairing the existing facility is a viable option due to the dock’s current level of deterioration and recommends planning for a full replacement of Lutak Dock as soon as feasibly possible.

The replacement of Lutak Dock would reduce the likelihood of unplanned facility closures resulting from structural failures. In 2004, there was a partial collapse of one of the cells on the portion of the dock operated by the State of Alaska. This led to temporary interruptions in regularly scheduled AMHS service and costly repairs (approximately $14 million). The partial collapse of the cell was considered to be a localized failure, but the presence of sink holes in other areas of the working surface is consistent with the loss of fill and a localized or complete failure of other portions of the dock is considered likely in the near future.

While these costs are not monetized in the BCA, an improvement to the state of repair of Lutak Dock is seen as a valuable benefit that further demonstrates the public benefits of the proposed dock replacement.

4 References

Alaska Department of Commerce, Community, and Economic Development (DCCED). Community Database Online. Available at https://www.commerce.alaska.gov/dcra/DCRAExternal. December, 2016.

Alaska Department of Transportation and Public Facilities (ADOT&PF). 2011 Alaska Traffic Crashes. Available at http://www.dot.alaska.gov/stwdplng/transdata/pub/accidents/2011_AK_CrashData.pdf. July, 2015.

Bureau of Transportation Statistics (BTS). National Transportation Statistics. Available at http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/index.html. January, 2016.

Haines Borough. Haines Borough 2025 Comprehensive Plan. September, 2012.

Haines Borough. Port revenue and expense data prepared at request of Northern Economics, Inc. December, 2016.

Northern Economics, Inc. *Benefit-Cost Analysis of the Lutak Dock* Replacement. Prepared for Haines Borough. December 2016.

Office of Management and Budget (OMB). Circulars A-4. Available at https://www.whitehouse.gov/omb/circulars_a004_a-4. February, 2016.

PND Engineers, Inc. *Haines Maine Facilities Condition Assessment*. Prepared for Haines Borough. June, 2010.

PND Engineers, Inc. *Lutak Dock Structural Assessment*. Prepared for Haines Borough. November, 2014.

United States Department of Transportation (USDOT). Benefit-Cost Analysis Resource Guide. Available at https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-bca-resource-guide. November, 2016.