Application for RAISE Transportation Discretionary Grants

FY 2021 RAISE

Marine Service Center

Sheetpile Wall and Crane

City and Borough of Sitka

Type: Maritime – New Capacity – Port Infrastructure

Location: City and Borough of Sitka, Alaska
Alaska's at-large Congressional District
Alaska Rural Area

Amount Requested: $7,344,720

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Project Description

The Marine Service Center (MSC) seawall, one of several harbor elements making up the Sitka Port system, is approximately 45 years old and has surpassed the end of its useful design life. A 2011 report estimated that the existing structure had a remaining life of 5 years. That, of course, was 10 years ago. If the seawall fails, the upland seafood cold storage facility which sits partially on the seawall will need to be condemned. The proposed project is to construct a new, similar bulkhead design located slightly seaward of the existing bulkhead, utilizing grouted anchor rods drilled through the existing fill material and into the underlying bedrock.

Figure 1 – Segment of Sheetpile Bulkhead Face – July 2011

Figure 2 – Splash Zone Corrosion of Sheetpile – July 2011

Transportation Challenges Addressed

The Marine Service Center at Sitka serves a variety of customers. Cruise ships, fishing vessels, trampers, sailing vessels, government vessels, and barges are all users.

There are no docks downtown for large cruise ships so they either must go to a private dock outside of town and be bused in or anchor downtown and lighter people in on small vessels. The City and Borough of Sitka (CBS) subsidizes the busing of passengers from the private dock outside of town. The cruise ships calling at the MSC are in the 176 – 240-foot range. Cruise ships have averaged 12 visits annually to the MSC dock and bring up to 1,200 visitors to Sitka each year. If the dock were unavailable, they too would have to anchor offshore and lighter customers or seek alternate ports of call. While cruise ship activity was light in 2020 due to COVID-19, large cruise activity is returning in July 2021 and will return to more normal levels by 2022. The MSC dock serves smaller cruise vessels.

Fishing vessels currently deliver harvest for cold storage or processing, pick up bait and ice, and collect crew and equipment from this seawall. There are other docks in town where fishing vessels could conduct their business but there are a variety of issues with using these alternatives. Vessels will generally deliver their product to the dock that can most efficiently get the product either to the processing plant or into cold storage in the shortest amount of time. Other docks in Sitka are busy with vessels who have those established relationships. The Seafood Producers Cooperative processing plant is located adjacent to the cold storage facility at MSC. Seafood product from the plant can travel from the dock to the processing plant and then another 100 yards back to the cold storage facility in a short amount of time. "The Seafood Producers Cooperative is owned by over 500 members who fish the waters of the North Pacific. Each member is a small boat hook and line fisherman and owner of the cooperative, and therefore receives the benefits of ownership."[1]

Sitka Sound Seafoods is located .2 miles from the cold storage facility or a 4 minute drive. "The Sitka Sound Seafoods plant started processing in the late 1960s, with North Pacific Seafoods and its sister companies purchasing a majority interest in 1990. A full merger of Sitka Sound and North Pacific was completed in 1997. This plant location has access to northern harvesting areas of Southeast Alaska, from Yakutat to the south end of Baranof Island. The plant processes all species of salmon from all gear types, halibut, sablefish, rockfish, herring, sea cucumbers, lingcod, Pacific cod, shrimp and Dungeness crab."[2]

If the seawall fails, and the cold storage facility is condemned, there is insufficient cold storage space in Sitka to capture the overflow. Cold storage users suggest they would need to get 25 to 40 freezer vans to accommodate their needs.

Trampers offload about 160 tons of product per visit. Trampers have averaged 6 visits per year over the last three years with 11 visits in 2019. This is northbound freight consisting of fiber, salt, machinery, and bait. Their southbound freight consists of frozen fish. Trampers can also offload at alternate ports in Sitka though the vessel owners would need to wait for available

[1] https://www.spcsales.com/co-op
[2] https://www.northpacificseafoods.com/sitka-sound-seafoods.html

space to do so. In addition, inbound freight would need to be transported to alternate ports for vessel retrieval. Outbound frozen fish would need to be stored in freezer vans until transport. All of which adds additional costs for the tramper industry.

Storing frozen fish in freezer vans for transport adds a new dimension of difficulty to the fish processing industry. Cold storage at MSC currently allows users to accumulate enough product to ship fish that have been consolidated. Each lot is defined by fish type, quality, and size, meaning a load of chum salmon could have up to 16 different lots based on size and quality. There are five different kinds of salmon harvested in the Sitka region along with halibut, sablefish, rockfish, herring, crab, and shrimp. Storing fish in freezer vans would not allow this option for the accumulation and consolidation, so fish would have to be shipped en masse to Seattle/Bellingham where it would then be sorted. If there is insufficient fish product to fill a particular container with the same species, quality, and size of fish, the shipper would still need to pay the same fee for that partially filled container. Storage costs could be as much as five times higher in Seattle due to minimum lot expense and the pounds of fish.

Much of the harvested fish in Sitka have value added with smoking and packaging and again this product would have to compete for limited cold storage space in town.

Support for the fishing industry is not the only use of the MSC dock. The Eyak is a fishing vessel making at least weekly visits to the MSC dock to pick up mail, fuel, and groceries for outlying villages. The Eyak serves the City of Port Alexander, Armstrong Keta Hatchery, Little Port Walter NOAA Research Station, and the City of Sitka (bringing goods that would otherwise be sourced elsewhere). In the past three years, the Eyak has averaged 80 visits to the MSC annually. If the seawall were unavailable, it would be a challenging hardship for their program and would limit these outlying communities' ability to access Sitka vendors. There could also be longer periods of time between mail deliveries.

Figure 3 – F/V Eyak

Repair to the seawall will make the MSC safer, more efficient, and more reliable.

History of Completed Projects

The Marine Service Center sheet pile bulkhead dock was originally constructed in 1976. The tie-back wall structure is approximately 36-ft high (from mudline) by 356-ft long along the face, with approximately 10-ft long end/return walls at each end of the bulkhead. The PZ27 sheet piles are driven approximately 10-ft to underlying bedrock, and are laterally restrained by exterior, MC8x22.8 walers located at elevations 0.0 ft (MLLW) and -10.0 ft. Each waler is connected via tie-rods to a sheet pile anchor wall approximately 70-ft behind the bulkhead face.

The steel, round bar tie-rods are 2 ½-inch diameter, with ends upset to 3 ¼-inch diameter. They are spaced at 6-ft on-center, with the upper tie-rods being offset from the lower tie-rods by 3 feet. The walers and tie-rods are of ASTM A36 chemistry while the sheet piles are of ASTM A690 material. Creosote-treated timber fender piles protect the face of the bulkhead and a 12x12 timber bullrail caps the top of the wall. Steel pipe bollards and access ladders are positioned at varied spacing along the dock face.

In 1990, the CBS contracted for the design and construction of a 140-ft wide by 150-ft long cold storage building that is positioned approximately 30-ft behind the face of the bulkhead. In 1993, the CBS contracted with WS Construction Inc. to install 22 anodes along the face of the bulkhead and perform associated electrical bonding work. In November of 1999, the CBS engaged Tryck Nyman Hayes, Inc. (TNH) to perform an inspection and condition assessment of the facility which did not include an underwater inspection.

Shortly thereafter, in April of 2000, Foreshore Technologies, Inc. (FTI) performed a dive inspection. Potential readings were taken during the underwater inspection which indicated that the structure was actively corroding. Both the TNH and FTI reports noted significant corrosion existed throughout the bulkhead face sheet piles as well as at the walers and tie-rod ends. In 2002, in response to the TNH and FTI inspections, the CBS again contracted with WS Construction Inc. to install an additional 36 anodes along the face of the bulkhead, and in 2003, the CBS retained the local engineering company, Structural Solutions, to design a complete cathodic protection system for the facility.

The designed cathodic protection system was installed in 2004. Included in the construction documents were the requirements to provide electrical bonding and continuity between all steel bulkhead face elements. All tie-rod locations were required to be videotaped, and continuity was to be verified at each tie-rod location using a reference electrode. See Sitka Marine Service Center Bulkhead Replacement - Report Update October 2011 Final.pdf

Other Transportation Infrastructure Investments

The Marine Service Center is located on Katlian Street which is a city-maintained road in downtown Sitka. An alternate facility for the seawall at the MSC is the Gary Paxton Industrial Park approximately 7.7 miles from downtown.

Detailed Statement of Work

Replacement options considered depend on the long-range CBS plans for the site. Due to the proximity of the existing CBS Cold Storage Building, demolition and in-kind replacement of the existing bulkhead is not feasible. One option was to remove the bulkhead wall entirely, but this was quickly ruled out due to the importance of the seawall to the community.

This project proposes to construct a new, similar bulkhead design located slightly seaward of the existing bulkhead, utilizing grouted anchor rods drilled through the existing fill material and into the underlying bedrock (See Figure 4). Though relatively small, the revised pier head alignment would require coordination with adjacent property owners to resolve any potential navigational issues. The rough order of magnitude estimate provides for an upgraded facility with superior materials and improved cathodic protection systems.

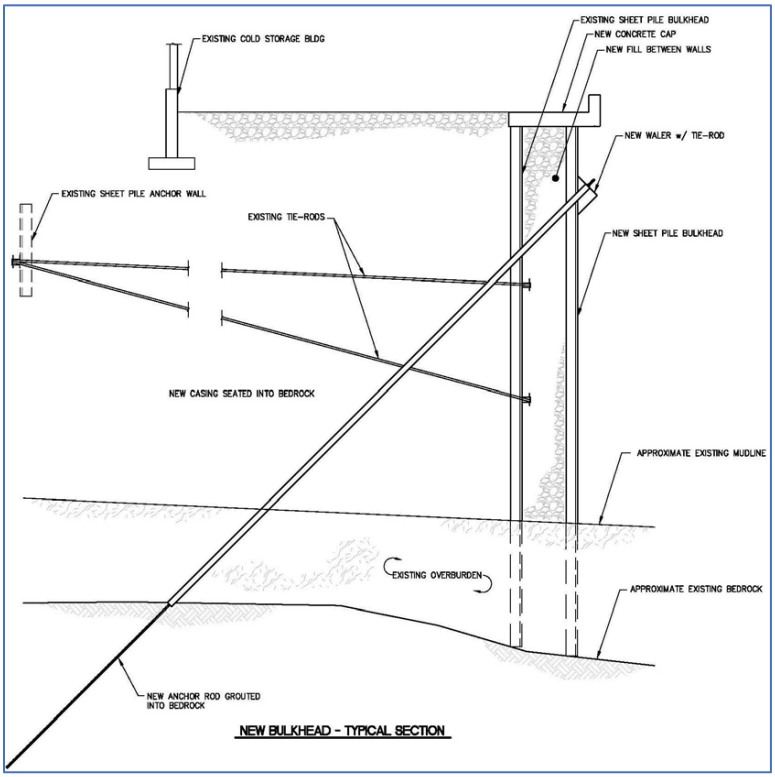

Figure 4 – Typical Replacement Bulkhead Wall Section

Project Location

The cold storage facility is located at 600 Katlian Street in Sitka, Alaska adjacent to the Seafood Producers Cooperative facility. The waterfront land parcel contains about 71,014 square feet. The legal description is Tract A Port Development, a portion of ATS 15.

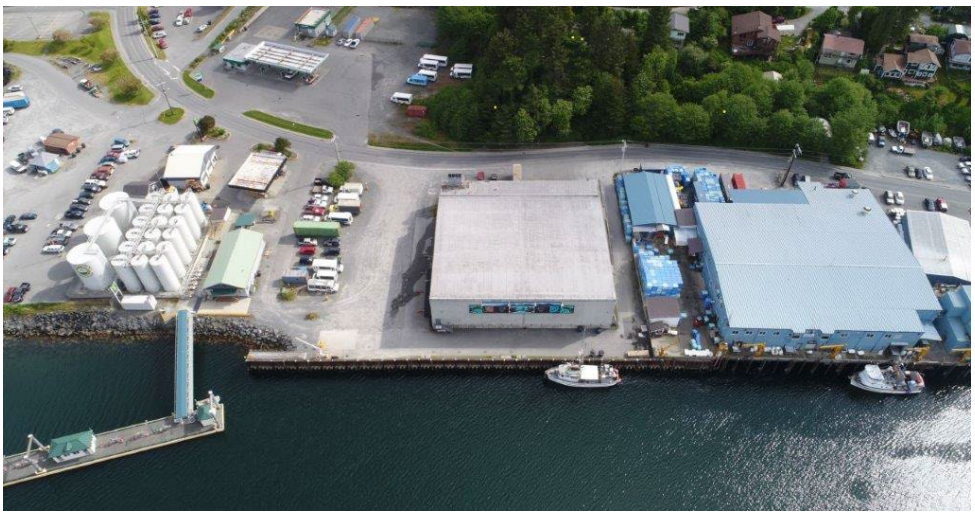

Figure 5 – Marine Service Center Cold Storage Facility and Adjacent Seafood Processing Plant

The building contains about 21,000 square feet of which about 16,500 square feet is presently operated as cold storage. The waterfront side of the cold storage property is supported by a sheet pile retaining wall. The wall is utilized as a berth for vessels. Marine vessels including small cruise ships, freighters, and fishing boats utilize the retaining wall to transfer goods, cargo, and passengers to/from vessels. Adjacent to the Northwest end of the retaining wall is a small hydraulic hoist that is available for public use.

NOAA Chart 17327 (August 2010) shows at a mean lower low water or 0.0 tide it is 22 feet at the MSC dock face while the PND drawings show the toe of the bulkhead at minus 20 feet.

Geographical Description

Sitka is located on the west coast of Baranof Island fronting the Pacific Ocean, on Sitka Sound. An extinct volcano, Mount Edgecumbe, rises 3,200 feet above the community. It is 95 air miles southwest of Juneau and 185 miles northwest of Ketchikan. Seattle, Washington, lies 862 air miles to the south. The CBS is located at Latitude, Longitude: 57.0583, -135.3448.

Sitka falls within the southeast maritime climate zone, characterized by cool summers, mild winters, and heavy rain throughout the year. This zone lacks prolonged periods of freezing weather at low altitudes and is characterized by cloudiness and frequent fog. The combination of heavy precipitation and low temperatures at high altitudes in the coastal mountains of southern Alaska accounts for the numerous mountain glaciers. The CBS encompasses 2,874 square miles of land and 1,937.5 square miles of water.[3]

While many communities in Alaska are listed, the City and Borough of Sitka is not on the list of Qualified Opportunity Zones as per the IRS Notice 2018-48 or 2019-42, 2018–28 Internal Revenue Bulletin 9, July 9, 2018. This is a coastal port project at tidal water and forms one of the elements of the Sitka Port system. The City and Borough of Sitka is not in an Area of Persistent Poverty nor is it close to any of those areas in the State of Alaska.

Figure 6 – Project Location in Relation to Other Sitka Infrastructure

3 State of Alaska Department of Commerce Community and Economic Development. https://dcced.maps.arcgis.com/apps/MapJournal/index.html?appid=2ded44ad6dd4456fbe353f1292e285c2#

Map of Project Location

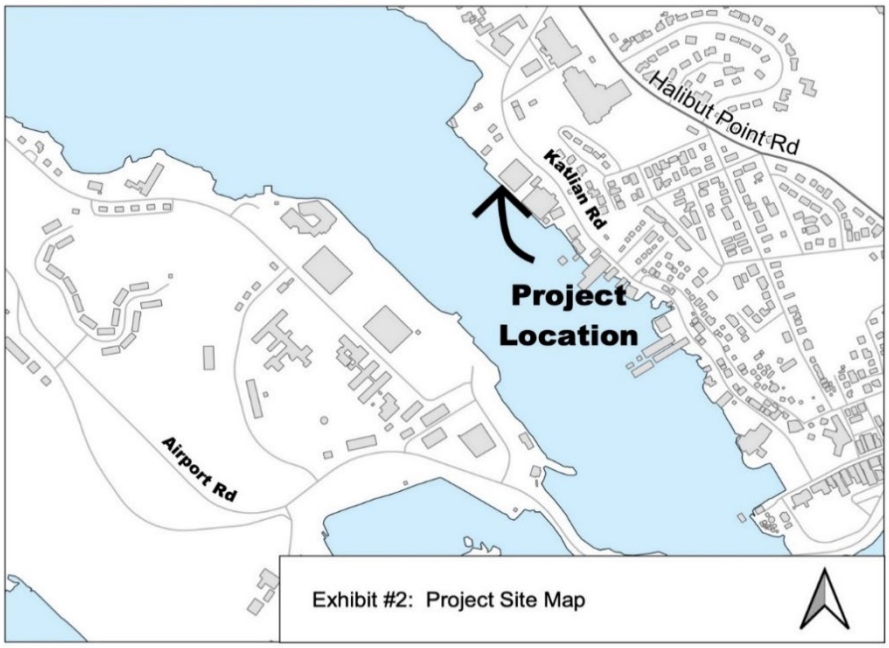

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Figure 7 – Project Location in Relation to Downtown Infrastructure and Airport

Connections to Existing Infrastructure

The Marine Service Center is in downtown Sitka. It is linked by road to several other harbors owned and operated by the CBS. The CBS operates five small boat harbors with 1,350 stalls and a seaplane base on Sitka Sound. Large cruise ships anchor in the harbor and lighter visitors to shore. The Sitka Sound Cruise Terminal, privately owned, is the only deep-water moorage facility in Sitka capable of accommodating large vessels. It is 7.7 miles to the Gary Paxton Industrial Park which could be an alternative for the fishers when the downtown harbors are busy. The community also has a state-owned public-use airport, the Rocky Gutierrez Airport, serving the community with daily jet service and located just west of the central business district.[4] In addition to daily jet service, several scheduled air taxis and air charters are available. There is no road access to outside communities from Sitka, but vehicles can be transported to town using the Alaska Marine Highway ferry system located six miles north of town or through barge operators.

Grant Funds, Sources, and Uses of all Project Funding

Estimated Costs

Cost estimates for this project were obtained from the Marine Service Center Bulkhead Conditions Assessment prepared by PND Engineers in October 2011. In addition, see North Pacific Crane Company.pdf and SS-21549_MCT-2230 Sales Sheet.pdf for crane replacement

4 https://en.wikipedia.org/wiki/Sitka_Rocky_Gutierrez_Airport

estimate. Total project costs have been updated to today's dollars using the Anchorage Consumer Price Index and are estimated at $9,180,900.

Source of Funds

The CBS has the 20 percent match on hand and has various options to fund the match. One option is that MSC Port Wall could be funded in large part by the MSC Enterprise Fund Working Capital. In addition, as revenue generated from the Port Wall is paid to the Harbor Fund, there is justification to use Harbor Fund working capital to fund part or all of the required match for the MSC Port Wall. There are no restrictions on these funds and the City's Assembly meeting of June 22, 2021 notes that these funds may be used for this purpose.

Table 1 – Project Cost Allocation

Total Project Costs:	**$ 9,180,900**	**100%**
Funding Sources (Non-Federal):	**Amount:**	**Percent:**
City of Sitka (resolution attached)	$ 1,836,180	20 %
Federal RAISE Funds Requested	**$ 7,344,720**	**80%**

Documentation of Funding Commitment

See City and Borough of Sitka signed resolution number 2021-15 as of June 22, 2021 committing the funding for this project. (See Signed Res 2021-15.pdf) There are no previously incurred expenses included in the budget and no other Federal funds authorized for this project.

Budget

The following budget is based on engineering design estimates from PND in 2011 which have been updated to today's dollars using the Anchorage Consumer Price Index. Total project cost for the sheetpile wall and crane replacement is $9.2 million, approximately $7.3 million in Federal funds and $1.8 million in non-Federal funds. See Table 2.

Table 2 -Budget Cost-Share for Sheetpile Wall and Crane Replacement

Description	Amount	BUILD funds (80%)	Non-Federal Funds (20%)
Budget as to Sheetpile wall repair:			
Mobilization	$ 579,000	$ 463,200	$ 115,800
Demolition & Disposal	225,000	180,000	45,000
Sheet Pile Face Wall Galvanized	1,334,000	1,067,200	266,800
Sheet Pile End Walls Galvanized	157,000	125,600	31,400
Drilled and Grouted Tie-Rod Anchors	2,021,000	1,616,800	404,200
Steel Waler Assembly	269,000	215,200	53,800
Shot Rock Fill, Vibrocompacted	337,000	269,600	67,400
Drainage Improvements	84,000	67,200	16,800
C.I.P. Concrete Bulkhead Cap	449,000	359,200	89,800
Cathodic Protection System (Anodes)	112,000	89,600	22,400
Energy Absorbing Timber Fender System	687,000	549,600	137,400
Area Lighting	112,000	89,600	22,400
Subtotal	**$6,366,000**	**$5,092,800**	**$1,273,200**
Contingency @ 20%	1,273,200	1,018,560	254,640
Env permitting, final design, contract admin, inspection @ 20%	1,273,200	1,018,560	254,640
Subtotal Sheetpile Wall Repair	***$8,912,400***	***$7,129,920***	***$1,782,480***
Budget as to Crane replacement:			
Electro Hydraulic Telescope Boom Crane Model MCT 2230	168,500	134,800	33,700
Installation Estimate	100,000	80,000	20,000
Subtotal Crane Replacement	***$ 268,500***	***$ 214,800***	***$ 53,700***
Total Budget Sheetpile Wall and Crane	**9,180,900**	**7,344,720**	**1,836,180**

Note: No other Federal funds are authorized for this project.

Selection Criteria

Primary Selection Criteria includes Safety, Environmental Sustainability, Quality of Life, Economic Competitiveness, and State of Good Repair. Each of those are discussed in turn.

Safety

This project will contribute to a reduction in crashes, fatalities, and injuries as vessel owners will be able to continue functioning as they have in the past. The need to travel to alternate ports for product delivery introduces new risks as vessels compete for limited space to conduct their business. The addition of several hundred vehicles on Sitka roads traveling between harbors,

seafood processing plants, and competing with the summer tourist traffic will undoubtedly lead to more congestion and the potential for unwanted interactions between vehicles and pedestrians.

Repairing the sheetpile wall at the MSC is an important solution to ensuring the safety of people and equipment working in the fish harvesting business and the many tourists that visit Sitka annually. Failure of this wall could be catastrophic and will certainly lead to inefficiencies for the varied users of the facility. Failure could also lead to unintended releases of hazardous materials into Sitka's waterfront.

Environmental Sustainability

The existing seawall is more than 45 years old and in imminent danger of failure. Replacing the seawall prior to failure will protect the environment from the damage that will result from this old structure falling in the water. The construction plan calls for constructing a new bulkhead to the seaward side of the existing structure. This approach will allow for visual inspection of the deteriorated seawall and removal of environmentally damaging material prior to filling in the open spaces.

This project addresses environmental sustainability in the following ways:

1. The EJSCREEN report for the City and Borough of Sitka shows higher than State and Nation Environmental Justice readings for all categories. The EJ Index highlights which block groups contribute the most toward low-income/minority residents nationwide having a higher environmental indicator score on average than the rest of the US population.[5] See appendix for EJSCREEN Standard report.
2. The project supports reduced emissions and marine travel demands.
3. The project supports reduced truck travel demand on roads in Sitka.
4. There are no wetlands affected by this construction project.
5. The project avoids adverse environmental impacts to air and water quality and wetlands.
6. The project promotes energy efficiency because once the seawall fails, the cold storage facility will no longer be usable, and the only alternative at this point is for freezer vans with much higher rates of electric utility consumption.
7. This project repairs existing dilapidated infrastructure.

Quality of Life

The MSC and associated uplands infrastructure are important components to the Sitka fishing industry. Maintaining this infrastructure allows Sitkans to continue to work where they live and maintain active community ties. The need to travel to other harbors to conduct business will negatively affect fishing, tourism, and commodity movements within the community.

There are no fiber or broadband deployments envisioned for this project.

This project addresses quality of life with the following examples:

5 https://www.epa.gov/ejscreen/glossary-ejscreen-terms#category-primary

1. Contracts with the CBS may not "discriminate against any employee or applicant for employment because of race, religion, color, national origin, age, disability, sex, marital status, changes in marital status, pregnancy, or parenthood." (actual contract language)
2. This project will improve freight transportation with its close proximity to the seafood processing plant and the cold storage facility.
3. This project will improve freight movements to shore with an increased capacity stationary crane.
4. The project will allow the community to avoid the costly deterioration of their working seawall.
5. This project will protect the Sitka workers from unnecessary travel and added expenses.

Economic Competitiveness

Replacement of the sheetpile wall and crane at the MSC will allow users to continue benefitting from this important community infrastructure. The cost of cold storage in Sitka can be a full $0.05 a pound less than cold storage in the Pacific Northwest. The ability for seafood processors to consolidate product at Sitka prior to shipment to customers is also of extreme value as processors would need to lease additional cold storage space to fill containers for shipping.

In addition, the MSC is centrally located in Sitka so that vessels like the F/V Eyak can stop at one location to receive multiple shipping orders going to neighboring villages.

The CBS currently employs some union workers through the Alaska State Employees Association. Depending on who gets the contract for the construction of this project, there could be additional union employees.

State of Good Repair

This development is consistent with the Sitka Comprehensive Plan 2030 adopted May 2018. See FinalCompPlanreducedsize.pdf. Improving Sitka's marine infrastructure and providing employment and economic development are key components of this documents. Avoiding the risk of failure of this seawall will allow Sitkans to enjoy the benefits of the economic activity already occurring in the area. The primary purpose of this grant application is to keep the MSC dock and crane in a state of good repair as the aged infrastructure is at risk.

Secondary merit criteria include partnership and innovation including innovative technologies, project delivery and financing.

Partnership

A project partnership is not envisioned at this time. However, this project will benefit the seafood processing facilities in Sitka, the fishing industry harvesters, the cruise ships and their passengers (when they return), and barge operations in the area. The CBS discusses this project

with users of the seawall and crane regularly to provide updates on the project during public meetings and at the request of users. The CBS will continue to operate the seawall and crane facility under the Harbormaster's purview and the cold storage users will continue to function with the lease agreement with the City. The CBS owns the cold storage facility but relies on the partnership with the two main leaseholders to manage the facility.

Innovative Technologies

The technologies recommended here are similar to the previous design of the seawall. Building a wall on the seaward side of the existing wall may be innovative in other places but is common in Alaska for these type projects. There are no innovative approaches being discussed at this time. However, once a Request for Proposal is issued, the CBS would entertain innovative ideas to enhance usability and project component longevity improvements.

Border patrol officials routinely walk the harbors in Sitka looking for foreign flag vessels. Cruise ships with over 100 passengers have to check in with customs and shore-side security though most of the cruise ships coming to the MSC dock have less than 100 passengers at a time.

Innovative Project Delivery

The CBS will invite respondents to the request for proposals to suggest innovative project delivery for consideration. In addition, Alaska is currently one of the states engaged in the program with FHWA on responsibilities assigned through a Memorandum of Understanding for NEPA compliance.

Innovative Financing

The CBS has the 20 percent match on hand and has various options to fund the match. One option is that MSC Port Wall could be funded in large part by the MSC Enterprise Fund Working Capital. In addition, as revenue generated from the Port Wall is paid to the Harbor Fund, there is justification to use Harbor Fund working capital to fund part or all of the required match for the MSC Port Wall.

Environmental Risk Review

Project Schedule

The construction calls for an 18-month schedule. This will allow completion of the project in advance of the next fishing season. See Table 3.

Table 3 – Sheetpile Wall and Crane Replacement Schedule

Overall Task	Date
Grant award	Nov-21
Final Design & Permitting	Dec-21
Mobilization	Feb-22
Demolition/Disposal	Apr-22
Sheetpile installation	May-22
Rock fill	Sep-22
Lighting & Crane installation	Jan-23
Final inspection	Mar-23
Grant closeout	Apr-23

Approvals and Permits

The CBS plans to engage agencies for approvals and permits quickly once grant funds have been authorized. A listing of environmental and operational permits required include:

1. USACE – Section 10 and Section 404 Authorizations
2. ADFG Fish Habitat Permit
3. ADEC Stormwater Treatment & Runoff Design Review
4. ADEC Water & Sewer Utilities
5. ADEC MSGP Operational SWPPP for Boatyards
6. Local Building Permits

NEPA Compliance

The CBS fully intends to meet the requirements of NEPA for this project including public meetings once they are allowed. Other forms of gathering public input may be required depending on timing and conditions of the COVID-19 environment. Construction scheduling will include windows of time when construction will be interrupted to account for fish migration and other marine interactions.

Risk and Mitigation Strategies

Risks to this project include site specific conditions, scheduling, funding, and project management. It is anticipated that construction of a new sheetpile wall seaward of the existing structure will limit any unforeseen site-specific conditions that warrant special treatment. The COVID-19 environment is on ongoing risk that will be managed in accordance with CDC and State recommendations and may impact schedule.

Other risks and mitigation strategies follow:

1. The greatest risk for this project is the catastrophic failure of the seawall during operations. The CBS cannot afford the repairs on its own so has been actively pursuing grant funds to accommodate the repairs.

2. While the CBS does not have previous experience with BUILD or INFRA grants, the City does have an active Public Works Department with experience in projects of similar size and nature.

3. The footprint of this project is owned by the City so real estate acquisitions will not be required.
4. Environmental concerns are always an unknown but since this property was constructed by the City in 1976, the soil composition is expected to be similar and the construction of the seawall to the seaward side of the existing wall will mitigate any unforeseen changes to the substrate.
5. The windows of fish migration in Sitka are well known and will be incorporated into construction contracts to limit adverse impacts.
6. The timeline for construction could have an adverse effect on current users but the CBS would mitigate this impact with frequent updates to the community on the project status and alternative ports for use.
7. CBS does not anticipate a waiver for domestic preference on the equipment or supplies needed for this project.
8. CBS reached out to USDOT headquarters to confirm the proposed schedule was reasonable.

CBS has a very successful track record of finishing large scale projects on time and on budget. Risks are managed on projects through incorporation of high-level experienced staff and consultant teams to ensure best practices are following in planning, organizing, and executing projects. CBS has extensive experience in marine projects and has recently completed four major marine projects in excess of $5 million including an award-winning harbor project. The harbor project award was based on superb project delivery methods that saved the project time and money.

CBS has been recognized with several awards for their projects and delivery methods over the last 10-years. CBS regularly manages projects with grant funds including Federal funding and understands well how to manage such projects to success including all the necessary procurements. CBS is staffed with professional engineers, contract managers, procurement specialists, construction inspectors, and project managers skilled in risk management of contracts and projects of this nature.

The CBS team is continually and successfully executing over $20 million in projects per year including projects up to $150 million. The Public Works Director was certified in managing Federally funded projects under the State of Washington's Department of Transportation program for managing Federal Highway funds and his work has been referenced in training manuals for local government. The best practices used in managing Federal Highway funds has been carried over to CBS policy and staffing efforts to mitigate risk on projects and has served CBS well over the last 12 years executing over $240 million in projects without incident or contractor claims.

Benefit Cost Analysis

The following assumptions form the basis of the benefit/cost analysis. These assumptions have been vetted with the CBS harbormaster, users of the cold storage facility, the director of the Sitka Economic Development Association, and vessel owners operating in the area.

Assumptions

- The seawall at the Marine Service Center is in danger of imminent failure.
- Once the seawall fails, the cold storage facility will be condemned and unusable as the building partially sits on the seawall.
- The crane used at the MSC is more than 20 years old. The hoist can lift full loads, but a larger (knuckle boom) crane would better serve the fishing fleet.
- Vessels delivering seafood product at this location will need to find alternate drop-off points for unloading their catch.
- Vessels with disembarking passengers may need to lighter passengers to shore on smaller vessels.
- The cold storage facility receives between 11 million (low case) and 18 million (high case) pounds of fish product annually.
- There is insufficient cold storage available in Sitka to replace the Marine Service Center 21,000 square foot facility.
- Refrigerated freezer vans can help fill that gap but at a much higher cost.
- Of the two main tenants at the cold storage facility, one would continue to operate out of Sitka with the freezer vans and the other would flash freeze product and immediately ship from town.
- The ability to consolidate product is an important component for keeping costs down in the export of frozen fish. Freezer vans will not allow for this activity.
- The loss of one of the cold storage users will result in the loss of 10-20 jobs for 4 months of the year as consolidation will need to place in the PNW rather than Sitka.

Users of the MSC seawall engage in the following primary activity:

Table 4 -MSC Seawall Users

Users	Cold Storage	Commodity over wall	Crane/hoist
North Pacific Seafoods (previously, Sitka Sound Seafoods)	yes	Bait	yes
Seafood Producers Cooperative (SPC)	yes	Fiber, salt, machinery, bait, ice, and inbound/outbound fish	yes
F/V Eyak (supplies to outlying villages)	no	Fuel, groceries, mail, outbound fishfood for hatchery	yes
Cruise Ships	no	Passengers	no
Coast Guard	no	Crew changes, supplies	no
Fishing Vessels	yes	Fish, bait, ice, and supplies	yes

There are two primary tenants of the cold storage facility, both seafood processors, each renting half of the space. One seafood processor reveals they move between 5 and 8 million pounds of product annually and that they rent 20 percent of their space to the public or private entities. Using these same percentages for the second processor, they would move between 6.25 and 10 million pounds of product annually as all their space is utilized. The cold storage facility allows seafood processors to consolidate product by species, size, and quality. Without the cold storage facility, product must be shipped to Pacific Northwest facilities and sorting/consolidation would take place there.

We examine two future scenarios for this evaluation, a low case of 10 million pounds of product and a high case of 16 million pounds of product. See the economics appendix for further detail on the changed conditions when the seawall fails.

Present Value Costs

Initial cost estimates are $9.2 million spread over a 2-year construction season. Periodic maintenance for the facility is assumed at 1 percent of initial construction cost every five years over the 20-year period of analysis. Cathodic protection is needed in year 15 of the analysis. See Table 5.

Table 5 – Sheetpile Wall and Crane Replacement Cost Estimate – Select Years

Year	Construction	Periodic Maintenance	Total Cost	NPV Factor	Net Present Value
2021	$ 4,456,200		$4,456,200	0.93458	$ 4,164,673
2022	$ 4,724,700		$4,724,700	0.87344	$ 4,126,736
2027		$ 91,809	$ 91,809	0.62275	$ 57,174
2032		$ 91,809	$ 91,809	0.44401	$ 40,764
2037		$ 203,809	$ 203,809	0.31657	$ 64,521
Totals	**$ 9,180,900**	**$ 387,427**	**$9,568,327**		**$ 8,453,868**
Total Construction Cost and Maintenance					**$ 8,453,868**
Less Residual Value after 20 years					$ 662,978
Present Value of Sheetpile Wall and Crane Replacement					**$ 7,790,890**

Present Value Benefits

Benefit calculations for this evaluation include avoided travel costs, avoided product transportation costs, opportunity costs of time, and emissions avoided. The economics appendix describes these in more detail. The present value of benefits for the low case scenario are $11.6 million over the 20-year period of analysis. See Table 6.

Table 6 – Low Case Scenario Benefit Calculations – Select Years

Year	Avoided Travel	Add'l Transport Costs	Cold Storage Alt	OCT	Emissions Avoided	Total	NPV Factor	Net Present Value
2023	$64,080	$593,753	$475,108	$11,670	$12,175	$1,156,785	0.87344	$1,011,223
2027	$64,080	$593,753	$486,000	$11,670	$12,194	$1,167,696	0.66634	$780,172
2032	$64,080	$593,753	$486,000	$11,670	$12,217	$1,167,720	0.47509	$557,797
2037	$64,080	$593,753	$486,000	$11,670	$12,245	$1,167,747	0.33873	$399,039
2042	$64,080	$593,753	$486,000	$11,670	$12,272	$1,167,775	0.24151	$285,666
Totals	**$1,281,598**	**$11,875,050**	**$9,709,108**	**$233,406**	**$244,429**	**$23,343,590**		**$11,607,515**

The present value of benefits for the high case scenario are $19.5 million over the 20-year period of analysis. See Table 7.

Table 7 – High Case Scenario Benefit Calculations – Select Years

Year	Avoided Travel	Add'l Transport Costs	Cold Storage Alt	OCT	Emissions Avoided	Total	NPV Factor	Net Present Value
2023	$64,080	$950,004	$1,212,172	$11,670	$12,175	$2,250,101	0.87344	$1,966,168
2027	$64,080	$950,004	$900,000	$11,670	$12,194	$1,937,948	0.66634	$1,293,423
2032	$64,080	$950,004	$900,000	$11,670	$12,217	$1,937,971	0.47509	$923,738
2037	$64,080	$950,004	$900,000	$11,670	$12,245	$1,937,999	0.33873	$659,950
2042	$64,080	$950,004	$900,000	$11,670	$12,272	$1,938,027	0.24151	$471,692
Totals	**$1,281,598**	**$19,000,080**	**$18,312,172**	**$233,406**	**$244,429**	**$39,071,685**		**$19,515,912**

BCR

Replacement of the MSC seawall and installation of a new crane has positive benefit to cost ratios of 1.57 and 2.59 for the low and high case scenarios, respectively. Net benefits are $3.8 million for the low case scenario and $11.7 million for the high case scenario. See Table 8.

Table 8 – Benefit to Cost Ratios for the Low and High Case Scenarios

Summary of Calculations	Low Case	High Case
Benefit calculations - 2021 $$		
Vessel avoided travel	$634,452	$634,452
Additional Transport Cost	$5,878,713	$9,405,940
Opportunity Cost of time	$115,547	$115,547
Emissions reduced	$176,457	$176,457
Cold Storage Alternatives	$4,802,347	$9,183,516
PV Benefits summary	**$11,607,515**	**$19,515,912**
Cost Calculations - 2021 $$		
PV Cost of Project	$8,453,868	
Less residual value	$662,978	
Effective cost (PV)	$7,790,890	
PV Net benefits (benefits - costs)	**$3,816,625**	**$11,725,022**
Benefit/cost ratio (benefits/costs)	**1.57**	**2.59**

Additional Considerations

The rural community of Sitka, Alaska is heavily dependent on a working waterfront for the fishing and cruise industries. Sitka has the largest fleet of vessels and harbor system in the state

and is 8th in the state and 19th in the nation in value of fish landings.[6] The loss of the Marine Service Center seawall and crane will affect cruise ships, fishing vessels, barges, and government vessels. The ability to retain this important asset for the community cannot be understated.

[6] Fisheries of the United States 2019 prepared by the National Marine Fisheries Service Office of Science and Technology published in May 2021.

Appendix

EJSCREEN Tool Report

MSC Interview Summary

Benefit/Cost Analysis

EJSCREEN Report (Version 2020)

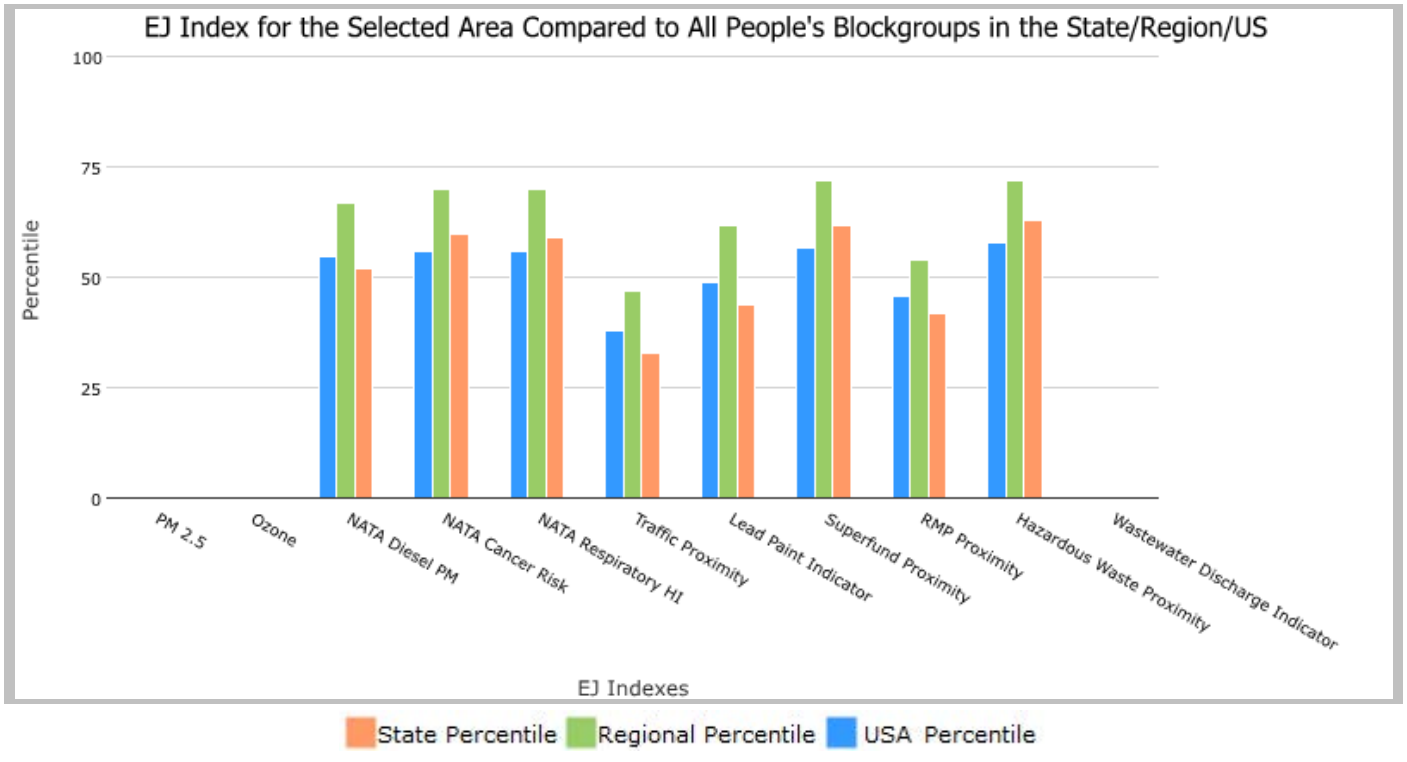
20 miles Ring Centered at 57.052682,-135.335083, ALASKA, EPA Region 10

Approximate Population: 8,732

Input Area (sq. miles): 1256.38

CBS

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	52	67	55
EJ Index for NATA* Air Toxics Cancer Risk	60	70	56
EJ Index for NATA* Respiratory Hazard Index	59	70	56
EJ Index for Traffic Proximity and Volume	33	47	38
EJ Index for Lead Paint Indicator	44	62	49
EJ Index for Superfund Proximity	62	72	57
EJ Index for RMP Proximity	42	54	46
EJ Index for Hazardous Waste Proximity	63	72	58
EJ Index for Wastewater Discharge Indicator	N/A	N/A	N/A



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

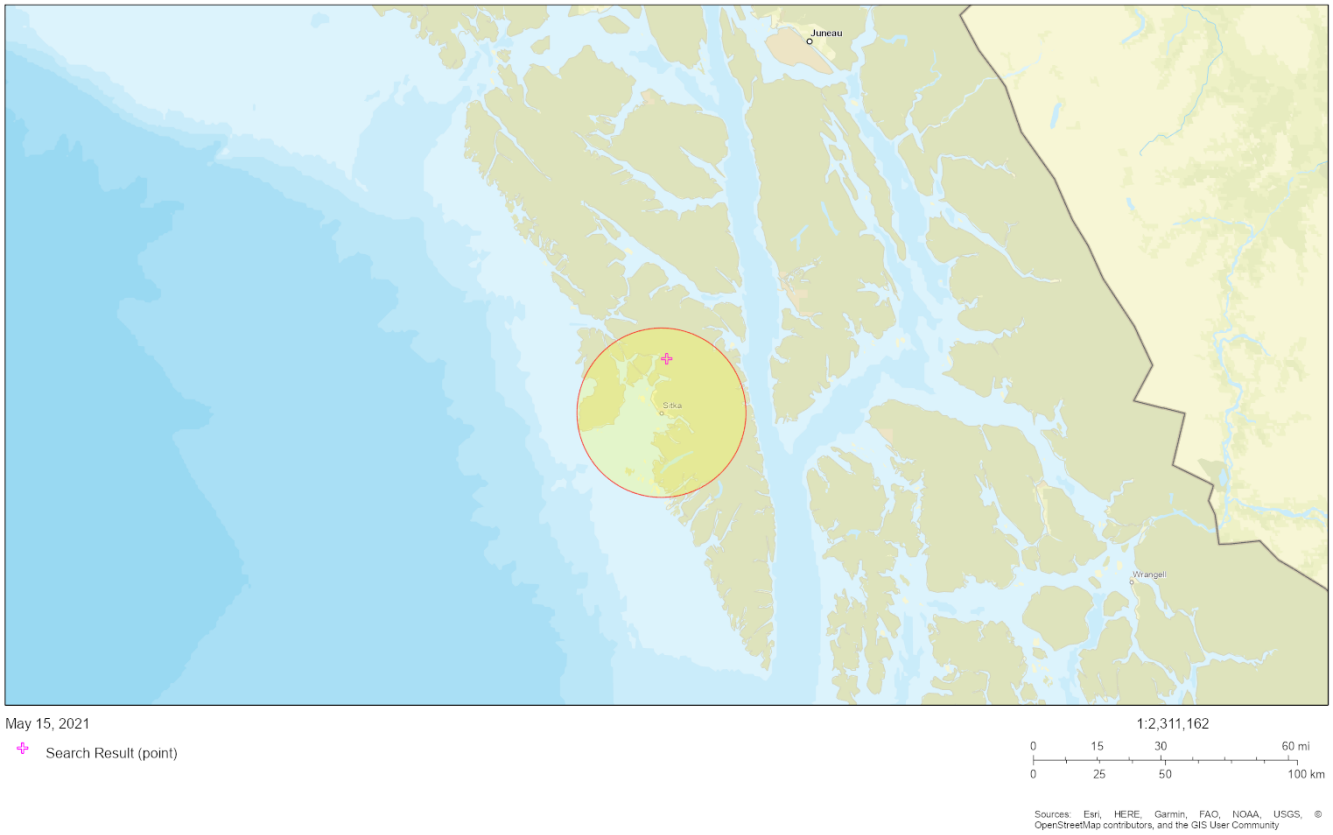
EJSCREEN Report (Version 2020)

20 miles Ring Centered at 57.052682,-135.335083, ALASKA, EPA Region 10

Approximate Population: 8,732

Input Area (sq. miles): 1256.38

CBS



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2020)

20 miles Ring Centered at 57.052682,-135.335083, ALASKA, EPA Region 10

Approximate Population: 8,732

Input Area (sq. miles): 1256.38

CBS

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	N/A	N/A	N/A	8.52	N/A	8.55	N/A
Ozone (ppb)	N/A	N/A	N/A	39.1	N/A	42.9	N/A
NATA* Diesel PM (µg/m^3)	0.134	0.361	41	0.481	<50th	0.478	<50th
NATA* Cancer Risk (lifetime risk per million)	8.3	15	24	31	<50th	32	<50th
NATA* Respiratory Hazard Index	0.12	0.2	37	0.46	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	180	260	66	510	49	750	46
Lead Paint Indicator (% Pre-1960 Housing)	0.14	0.079	86	0.22	51	0.28	44
Superfund Proximity (site count/km distance)	0.0043	0.092	17	0.13	0	0.13	0
RMP Proximity (facility count/km distance)	0.97	0.5	81	0.65	78	0.74	75
Hazardous Waste Proximity (facility count/km distance)	0.0065	0.56	9	1.5	0	5	0
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	N/A	N/A	N/A	3.1	N/A	9.4	N/A
Demographic Indicators							
Demographic Index	29%	32%	55	29%	60	36%	49
People of Color Population	38%	39%	58	28%	74	39%	57
Low Income Population	21%	25%	44	30%	36	33%	35
Linguistically Isolated Population	2%	2%	67	3%	58	4%	55
Population With Less Than High School Education	6%	7%	49	9%	44	13%	35
Population Under 5 years of age	5%	7%	24	6%	37	6%	38
Population over 64 years of age	15%	11%	77	15%	54	15%	53

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

Interview Protocol for Marine Service Center Wall and Crane - Summary

For the following, questions that need to be asked are in this font. *Background information for you to have handy as to why you are asking a question will be in italics. It might be handy to number these responses either on a hard copy of the questions or using the spreadsheet I've provided.* Responses from interviewees follow the questions in this orange font. There were 20 respondents in total.

Hello, my name is _____ and I'm assisting the City and Borough of Sitka in a Federal grant application for improvements at the Marine Service Center. The grant application is asking for funds to repair the seawall and purchase a new crane. My questions will take about 10 minutes of your time. Is this a good time to talk? *(If the answer is no, ask for a better time for you to connect with them.)*

1. Do you currently use the Marine Service Center facilities? __20____ yes __0____ no
    a. If no, why not? _____*(If no, thank them for their time.)*
2. What services do you use at the MSC? *(Choose all that apply.)*
    a. __15___Moorage *(answer Q3)*
    b. __6___Offloading seafood product *(answer Q4)*
    c. __5___Offloading equipment *(answer Q5)*
    d. __2___Offloading passengers *(answer Q6)*
    e. __1___Crane *(answer Q7)*
    f. __2___Mail delivery *(answer Q8)*
    g. __2___Grocery delivery *(answer Q9)*
    h. __1___Fish food *(answer Q10)*
    i. __2___Construction materials *(answer Q11)*
    j. __4___Other *(please describe)* Gear_____*(answer Q12)*
    k. __6___Other *(please describe)* Fuel_____*(answer Q13)*
    l. __1___Other *(please describe)* Offload Cargo_____*(answer Q12)*
    m. __1___Other *(please describe)* Wood_____*(answer Q13)*
    n. __2___Other *(please describe)* Laundry_____*(answer Q12)*
    o. __2___Other *(please describe)* Supplies_____*(answer Q13)*
    p. __2___Other *(please describe)* Groceries_____*(answer Q13)*

3. If **moorage** is selected as a service being used, how often to you moor at the MSC? __1 to 52 times annually from 19 respondents_____ *(need a number here so if they are having trouble ask for a range.)*
    a. How long would you typically stay moored? __1 to 120 hours at a time from 17 respondents_____ (hours)

Summary of responses concerning moorage:

Q3 - Moorage	Low	High	Totals
Annual Moorage	1	52	339
Annual Hours	1	120	483

4. If **offloading seafood product** is selected as a service being used, what would you say is the average annual pounds of product offloaded? Some respondents provided a range. There was a low of 642,000 pounds and a high of 710,000 pounds from 5 respondents. All product was going to the seafood processing plant._____ (pounds)
    a. Of these pounds, what portion is salmon? ___80 to 100%_____ (percentage)
        i. Is this product headed to cold storage or seafood processing? __Processing_____
    b. What portion is Halibut? _____no responses_____ (percentage)
        i. Is this product headed to cold storage or seafood processing? _____
    c. What portion is crab? ____no responses_____(percentage)
        i. Is this product headed to cold storage or seafood processing? _____
    d. What portion is herring? ___no responses_____(percentage)
        i. Is this product headed to cold storage or seafood processing? _____
    e. What portion is other groundfish? __no responses_____(percentage)
        i. Is this product headed to cold storage or seafood processing? _____
    f. What portion is other shellfish? ___no responses_____(percentage)
        i. Is this product headed to cold storage or seafood processing? _____
    g. What portion is sablefish? _____5 to 20%_____ (percentage)
        i. Is this product headed to cold storage or seafood processing? __Processing_____
5. If **offloading equipment** is selected as the service being used, how often on average would you say that you do this annually? ___63 to 64 times annually from 4 respondents_____ times a year *(need a number here so if they are having trouble ask for a range.)*
6. If **offloading passengers** is selected as the service being used, how often would you say that you do this annually? __21 to 52 times annually from 2 respondents_____ times a year *(need a number here so if they are having trouble ask for a range.)*
    a. How many passengers would you say embark/disembark from this location annually? ___no answer provided_____*(this will probably be a range.)*
7. On average, how many times a year does your activity require the use of the **crane** at the MSC? __once every other year from one respondent____*(this might also be a range.)*
8. How often does **mail delivery** occur at the MSC dock? __4 to 5 times a week from 2 respondents_____ times a week

9. How often does **grocery delivery** occur at the MSC dock? __4 to 5 times a week from 2 respondents_____ times a week
10. How often does **fish food delivery** occur at the MSC dock? ___once a week from 1 respondent_____times a week
11. How often are **construction materials** delivered at the MSC dock? __54 times annually from 2 respondents_____times annually
12. How often does the **other** activity occur at the MSC dock? __Other gear was 18 to 20 times annually, Other laundry was 10 times annually_____
13. How often does the **other** activity occur at the MSC dock? __Other groceries was 6 to 8 times annually, and Other cargo/supplies was twice a year._____
14. What are the dimensions of your vessel?
    a. Length _____ (feet) Average length was 65.53 feet from 19 respondents
    b. Draft _____(feet) Average draft was 9.16 feet from 16 respondents
    c. Beam _____(feet) Average beam was 19.51 feet from 16 respondents.
15. The MSC dock is aged and in need of repair. If the MSC dock were no longer available for use, how would you conduct the business you just described in the previous questions? _____
    Responses that follow have not been edited.

Not sure. Need vehicle access. Tried the dock out the road but it didn't work well
Poorly, slowly, more cost. Possibly use a processor
Use Eliason harbor but it gets quite busy. There isn't much space
Anchor out which is very inconvenient.
Would use transient, but not much space
Has a slip in Eliason would use that, but not as convenient
Don't know. It would be a struggle to conduct business in Sitka.
May be able to use the walk down ramp at the end of the road. Possibly run freight across the processor's dock. But couldn't do it easily and would probably not be able to get the stuff off the semi-trailers.
Would have to use the drive down at Silver Bay
Possibly use SSS dock
It would be challenging. He is contracted with SPC to tender so would use SPC however, that creates a problem while they also try to service their fleet
Would use the processing plant but would be harder to schedule
It would suck. It would put more pressure on the harbor scene.
Transient float and at birth 9 or 10 but it's difficult to tie and untie when it's windy.
Would use Silver Bay or New Thompsen
Anchor out and have to do goofy stuff to get the gear to shore.
Would tie up to the fuel dock until they were kicked off
ANB or stall/transient at Eliason
Would have to deliver to tenders

(I think we need to leave this open-ended depending on how many activities were selected above. If multiple activities selected, you might need to ask about each one separately.)

16. Do you use the cold storage facility on the MSC dock? ___4___ yes __8____ no and 9 did not respond to this question.
    (If no, skip to Q19.)
17. As we just mentioned, the MSC dock is aged and needs repairs which may impact the cold storage facility. If cold storage were not available at the MSC dock, where would you store your product?
    a. __2___ another facility in Sitka *(skip to Q19.)*
    b. _____ would get a freezer van *(skip to Q19.)*
    c. _____ would ship to PNW storage facility
    d. _____ other _____

18. If you had to ship your frozen product to another area for storage, how would this impact your operations? There were no responses to this question.
    a. _____ would have to pay additional transportation fees.
        i. Cost estimate $_____
    b. _____ would have to pay for sorting of product at the new location.
        i. Cost estimate $_____
    c. _____ would have to pay higher storage fees.
        i. Cost estimate $ _____
    d. _____ would not be able to continue selling frozen seafood.
    e. _____ Other consequence
    _____

19. A portion of this grant application pertains to social equity and environmental justice. For that reason, we are asking respondents if they identify as a minority group. Do you identify as:
    a. __2___ White/Caucasian
    b. _____ Alaska Native
    c. _____ Black/African American
    d. _____ Asian or Pacific Islander
    e. _____ Other _____
20. Do you have other comments or suggestions that you would like to share with the City and Borough of Sitka as it pertains to the MSC dock and crane and the cold storage facility? _____
    The following responses have not been edited.

The facility is extremely important. It is always busy.
Preparing the sheet pile bulkhead is not a good answer. Build a pier, its less costly.
It is highly convenient. Larger vessels need it.
The CBS needs to come up with a better plan for transient moorage for the summer. It changed a few years ago.
Before the facility was available, he shipped his product to Bellingham and used freezer vans. Without the cold storage it would drastically change the way he does things. Spend the money wisely.
It is a great location.

It is a very important facility.
He really likes the facility. It is useful for his business.
It is a valuable asset for the public.
Would hate to see it become a non-public usage.
There is metal between the pilings that makes it difficult to tie up and not scratch the boat and the ladder is dangerous.
All for upgrading. Any harbor upgrades especially with federal dollars.
It's nice to have a separate place because New Thompsen gets crowded.
It is a great addition to the port facilities in Sitka especially when it gets crowded. Boats can stack up, it's a nice spot when there are no other places for boats to be.
Suggested having the pilings further away from the wall, right now they are so close it pinches the line and a better ladder is needed.
Appreciates the public use of the facility

Thank you for your time today.
We appreciate your assistance with the data for this grant application.

Benefit-Cost Analysis for the Marine Service Center Sheetpile Wall and Crane Replacement

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July 2021

Introduction

The Marine Service Center bulkhead wall is in danger of imminent failure. A 2011 PND report states that the wall had perhaps another five years of useful life. The City and Borough of Sitka wishes to replace this more than 45-year-old seawall because if the seawall fails the upland cold storage facility which sits partially on the wall will need to be condemned. The tie-backs used for the seawall sit under the cold storage facility.

The Marine Service Center at Sitka serves a variety of customers. Cruise ships, fishing vessels, trampers, sailing vessels, government vessels, and barges can all use it. Many of these vessels can find workarounds using other harbors in Sitka though overcrowding conditions will get worse as a result. Table 9 describes some of the seawall users, whether they need cold storage or the crane, and the commodity typically coming over the seawall.

Table 9 -MSC Seawall Users

Users	Cold Storage	Commodity over wall	Crane/hoist
North Pacific Seafoods (previous Sitka Sound Seafoods)	yes	Bait	yes
Seafood Producers Cooperative (SPC)	yes	Fiber, salt, machinery, bait, ice, and inbound/outbound fish	yes
Eyak (supplies to outlying villages)	no	Fuel, groceries, mail, outbound fishfood for hatchery	yes
Cruise Ships	no	Passengers	no
Coast Guard	no	Crew changes, supplies	no
Fishing Vessels	yes	Fish, bait, ice, and supplies	yes

"The Seafood Producers Cooperative is owned by over 500 members who fish the waters of the North Pacific. Each member is a small boat hook and line fisherman and owner of the cooperative, and therefore receives the benefits of ownership."[7]

Sitka Sound Seafoods is located .2 miles from the cold storage facility or a 4-minute drive. "The Sitka Sound Seafoods plant started processing in the late 1960s, with North Pacific Seafoods and its sister companies purchasing a majority interest in 1990. A full merger of Sitka Sound and North Pacific was completed in 1997. This plant location has access to northern harvesting areas of Southeast Alaska, from Yakutat to the south end of Baranof Island. The plant processes all species of salmon from all gear types, halibut, sablefish, rockfish, herring, sea cucumbers, lingcod, Pacific cod, shrimp and Dungeness crab."[8]

Assumptions Used for this Analysis

- The seawall at the Marine Service Center is in danger of imminent failure.

[7] https://www.spcsales.com/co-op
[8] https://www.northpacificseafoods.com/sitka-sound-seafoods.html

- Once the seawall fails, the cold storage facility will be condemned and unusable as the building partially sits on the seawall.
- The crane used at the MSC is more than 20 years old. The hoist can lift full loads, but a larger (knuckle boom) crane would better serve the fishing fleet.
- Vessels delivering seafood product at this location will need to find alternate drop-off points for unloading their catch.
- Vessels with disembarking passengers may need to lighter passengers to shore on smaller vessels.
- The cold storage facility receives between 11 million (low case) and 18 million (high case) pounds of fish product annually.
- There is insufficient cold storage available in Sitka to replace the Marine Service Center 21,000 square foot facility.
- Refrigerated freezer vans can help fill that gap but at a much higher cost.
- Of the two main tenants at the cold storage facility, one would continue to operate out of Sitka with the freezer vans and the other would flash freeze product and immediately ship from town.
- The ability to consolidate product is an important component for keeping costs down in the export of frozen fish. Freezer vans will not allow for this activity.
- The loss of one of the cold storage users will result in the loss of 10-20 jobs for 4 months of the year as consolidation will need to place in the PNW rather than Sitka.

Transportation Cost Differential

Fish harvest arrives at the cold storage facility from the various seafood processing plants in Sitka. It is estimated that freezer vans can be used to supplement the loss of the cold storage facility once it is condemned. The cost of using freezer vans will be much higher and will put additional strain on the City's electrical system. Estimates of that additional cost to the electric utility company are not included in this assessment but could be substantial.

Additional costs to the seafood processers estimated in this analysis derive from the lack of storage space and capability to consolidate product using the cold storage facility. If product is put into freezer vans for transport, there will not be the capability to consolidate in advance of transport. Consolidation is a necessary function of the fish harvest as lots of fish are purchased by fish type, quality, and size. So, a load of chum salmon, for instance, could have 16 different lots based on the fish's quality and size. The inability to consolidate product at Sitka means that all product is shipped to the Pacific Northwest, either Seattle or Bellingham, and consolidation

must take place there. The challenge then becomes one of filling each cold storage container with the same lots of fish. Partial lots mean that the shipper must pay for the entire container, even if only partially full.

Interviews conducted with users of the MSC dock asked what they would do when the seawall fails and the cold storage facility is condemned. All responses indicated that conducting their business in Sitka would get much harder. There are other docks in town where they might be able to deliver their catch, but the harbors are busy and there would undoubtedly be delays. Some said they would deliver to tenders who would then attempt to find dock space to offload the product. Some said they would lighter their catch by small vessel to other port locations. Those finding other port locations would then have to truck their catch to the processing plant.

Once the seafood product is in its finished state at the processing plant, the product would then need transport to another location for cold storage. The cost of cold storage in Sitka is about $0.043 per pound and the electric utility bill for the cold storage facility is shared by the two main tenants. One option is to store the product in freezer vans until transport can be arranged to a cold storage facility where consolidation and packaging can be completed. The cost of cold storage space on a per pound basis is higher in the Pacific Northwest by about $0.05 per pound.

Cold storage users reveal that 72.22 percent of their product gets shipped directly to customers once they have been able to consolidate. Shippers give a discount to their customers for these through rates of about $0.01 per pound of product. So, the product can be consolidated in Sitka, put in a van for the customer, and then shipped directly to places like Japan without having to stopover in Pacific Northwest. The inability to consolidate in Sitka adds this additional cost of product transport from the PNW to the processor to bear.

The inability to consolidate in Sitka also puts strain on the processor's financial cash flow as a bill of lading issued in Sitka can be 4 to 6 weeks ahead of a bill of lading issued in Seattle. Both seafood processors said that loss of cold storage capability would put financial strain on their organizations and would require a rethinking of their business model. Some product may no longer be viable. One processor who has cold storage space in PNW said it would add about $250,000 in annual costs to their bottom line. The other processor who does not currently have cold storge space in PNW said it would add between $400,000 and $800,000 in costs to their bottom line. Some of this cost has been captured with the additional storage fees and the loss of discount to their customers. Another portion of this cost is the additional labor requirements in the PNW. We have not estimated these costs as it is a transfer from one region to another.

The amount of product moving through the cold storage facility fluctuates from year to year given harvest success, regulatory environment, and sometimes weather and abilities of the fishing fleet. For this reason, this benefit analysis uses a low and high calculation to account for those fluctuations over time.

Equation 1 demonstrates the calculation for these additional transportation costs.

	Equation 1: $TCD_{(year)} = [FP_{(year)} \times P \times CD] + [(1-P) \times (CD + TR)]$

Where:

$TCD_{(year)}$ is the value of the transportation cost differential for cold storage in a particular year

$FP_{(year)}$ is the pounds of frozen product for the given year

P is the percent of product shipped straight through to customer

CD is the cost differential between Sitka and Pacific Northwest cold storage facilities

TR is the through rate differential for product which must now travel to PNW prior to shipping on to customer

Table 10 -Additional Transportation Costs Associated with Frozen Fish Product – Low and High Case

	Low Case	High Case
Year	**Add'l Transport Costs**	**Add'l Transport Costs**
2023	$ 593,753	$ 950,004
2024	$ 593,753	$ 950,004
2025	$ 593,753	$ 950,004
2026	$ 593,753	$ 950,004
2027	$ 593,753	$ 950,004
2028	$ 593,753	$ 950,004
2029	$ 593,753	$ 950,004
2030	$ 593,753	$ 950,004
2031	$ 593,753	$ 950,004
2032	$ 593,753	$ 950,004
2033	$ 593,753	$ 950,004
2034	$ 593,753	$ 950,004
2035	$ 593,753	$ 950,004
2036	$ 593,753	$ 950,004
2037	$ 593,753	$ 950,004
2038	$ 593,753	$ 950,004
2039	$ 593,753	$ 950,004
2040	$ 593,753	$ 950,004
2041	$ 593,753	$ 950,004
2042	$ 593,753	$ 950,004
Totals	**$ 11,875,050**	**$ 19,000,080**

Avoided Travel

The F/V Eyak provides a special service to Sitka and the surrounding villages as it delivers mail, groceries, building supplies, fuel, and other necessities. F/V Eyak made 80 trips to the MSC seawall in 2019 to complete these activities. If the MSC seawall were unavailable, deliveries would have to be made to the Gary Paxton Industrial Park dock, 7.7 miles away, and F/V Eyak would have to travel 5.3 nautical miles to reach that destination and pick up delivery items.

This benefit category estimates the number of vehicle trips and vessel trips that would have to be made as a result of the seawall failure. Mail and groceries would be delivered to the GPIP location when it is known that the Eyak will be arriving as there is no place to store product at the site. It is estimated that at least two vehicles would need to travel to GPIP for this purpose, one for the mail and one for groceries. It is further estimated that half of the annual trips would require a third vehicle to deliver fish food or construction materials for delivery to neighboring villages.

Vessel/Vehicle Avoided Travel

The F/V Eyak made 80 trips to the MSC seawall in 2019 in order to pick up groceries, mail, fuel, fish food, and construction supplies for the outlying villages. Fish food is delivered to the Port Armstrong Fish Hatchery. Once the seawall fails, all of these deliveries will need to go to the Gary Paxton Industrial Park dock as this dock can support these activities. It is 7.7 miles from the MSC seawall to the GPIP dock. The USPS and the grocery stores are each expected to meet the Eyak when it arrives for transport of mail and other purchases. Using the RAISE guidance for mileage at $0.93 per mile, both the mail delivery and the grocery deliveries add $1,145.76 in additional travel costs to the Eyak's business. It is estimated that about half of Eyak's trips include fish food for the fish hatchery and building materials for the outlying villages. Each of these trips add $572.88 annually in additional travel costs.

The F/V Eyak must travel from the MSC seawall to the GPIP dock to pick up these supplies. It is a distance of 5.3 nautical miles. Assuming a travel rate of 8.3 nautical miles per hour and a vessel hourly operating cost of $443, the round-trip cost of this additional travel is $45,304 annually. It could be expected that population growth would increase these trips over time. However, the population of Sitka and the surrounding villages has been mostly stable in recent years (in some cases declining) so the avoided travel is at a consistent rate over the 20-year period of analysis. There is no difference between the low and high case scenarios as it pertains to avoided travel for the Eyak and the supply vehicles.

Total avoided travel for both the Eyak and the vehicles supplying it is valued at $48,741 annually. See Table 11.

Table 11 -Avoided travel benefit calculation for F/V Eyak

Avoided Travel					
Eyak Transportation Calculations	**NM**	**# of annual trips**	**Hourly Operating Costs**	**Time for round trip (hrs)**	**Added Transport Cost**
		(a)	**(b)**	**(c)**	**(a * b * c)**
Vessel mileage reason					
Difference in travel from MSC to GPIP	5.3	80	$443	1.28	$45,303.84

Vehicle mileage reason	**Miles**	**# of annual trips**	**Mileage Rate (per mile)**	**Round Trip Miles**	**Added Transport Cost**
	(a)	**(b)**	**(c)**	**(a * b * 2 = d)**	**(c * d)**
MSC to GPIP for mail delivery	7.7	80	$0.93	1,232	$1,145.76
MSC to GPIP for grocery delivery	7.7	80	$0.93	1,232	$1,145.76
Travel from seafood processing plant to GPIP with fish food	7.7	40	$0.93	616	$572.88
Travel from downtown to GPIP with construction materials	7.7	40	$0.93	616	$572.88

Value of Additional Travel for Eyak pick-ups and deliveries	**$48,741.12**

In addition to the Eyak, fishing vessels currently delivering to the MSC for fish processing will need to modify their behavior once the MSC seawall fails. Telephone interviews with vessels currently using the MSC dock for seafood transport reveals that 65 percent of the vessels would travel to Silver Bay, the Gary Paxton Industrial Park, to offload their vessel and then transport their catch by vehicle to their respective fish processing plants, either Sitka Producers Cooperative (SPC) or the North Pacific Seafoods (previously Sitka Salmon Shares) locations. Other respondents thought they might deliver to a floating processor, one of the other docks in town, anchor out and lighter their catch to shore, and all said it would be harder to schedule and will put additional pressure on already crowded docks in town. This additional travel by vessels and vehicles can be avoided with improvements to the MSC seawall.

Avoided vessel traffic for the fishing vessels is valued at $13,930 and the avoided vehicle traffic is valued at $1,409 for a total avoided travel of fishing vessels of $15,339 annually. See Table 12.

Table 12 -Avoided travel benefit calculation for fishing vessels

Avoided Travel					
Fishing Vessel Transportation Calculations	**NM**	**Number of annual trips**	**Hourly Operating Costs**	**Time for round trip (hrs)**	**Added Transport Cost**
		(a)	**(b)**	**(c)**	**(a * b * c)**
Vessel mileage reason					
MSC to Silver Bay (GPIP)	5.3	43.55	$250	1.28	$13,880.93
MSC to NPS dock	0.17	4.69	$250	0.04	$49.02

Vehicle mileage reason	**Miles**	**Number of annual trips**	**Mileage Rate (per mile)**	**Round Trip Miles**	**Added Transport Cost**
	(a)	**(b)**	**(c)**	**(a * b * 2 = d)**	**(c * d)**
Travel from Silver Bay (GPIP) to NPS	6.3	108.88	$0.93	1,372	$1,275.80
Travel from Silver Bay (GPIP) to SPC	6.1	11.73	$0.93	143	$133.03

Value of Additional Travel for Fishing Vessel pick-ups and deliveries	**$15,338.78**

This additional time for fish product to get from fishing vessel to processing plant can lead to degradation of the fish product and a reduced price to the fishermen. There is no attempt made here to quantify this reduction in fish value. In addition, the local fishing fleet and the processing plants have learned that value-added seafood product has higher returns on the investment than the raw product. Fisheries throughout the State of Alaska have improved these value-added activities in recent years that have allowed fishermen to weather the ups and downs of the fishing industry.

Vessel and Vehicle Emissions Avoided

"Transportation activities contribute significantly to localized air pollution, and some transportation projects offer the potential to reduce the transportation system's impact on the environment by lowering emissions of air pollutants that result from production and combustion of transportation fuels. The economic damages caused by exposure to air pollution represent externalities because their impacts are borne by society as a whole, rather than by the travelers and operators whose activities generate these. By lowering these costs, transportation projects that reduce emissions may produce environmental benefits."[9]

[9] Benefit-Cost Analysis Guidance for TIGER and INFRA Applications – July 2017

Once the MSC seawall fails, the F/V Eyak will need to drop off and receive product at the GPIP dock and vehicles will need to travel the additional distance to get products to the dock when the Eyak is scheduled to arrive. Mileage, nautical miles, and number of trips are the same as the avoided travel calculations.

This analysis takes a conservative approach for vessel emissions and uses the 2010 total cost per cylinder for Stoichiometric Gasoline Direct Injections[10] and assumes at least one 8-cylinder engine for the Eyak. The 2010 cost per cylinder from the National Highway Transportation Safety Administration Final Regulatory Impact Analysis was $67.00. Updating this to 2021 dollars using deflator indexes from the Bureau of Economic Analysis results in $75.48 per cylinder in emissions reduction. (Calculation: $67 * 115.514(2021$) / 102.532(2010$) = $75.48)

The value of vessel emissions due to additional travel when the MSC dock is no longer useable is $11,925 annually. The avoided travel is comprised of activity for the F/V Eyak and the fishing vessels currently delivering product at the MSC dock. This amount rises slightly throughout the 20-year period of analysis as the damage costs of emissions per metric ton rise. See Table 13 for emissions calculations for the Eyak and Table 14 for emissions calculations for fishing vessels currently using the MSC dock.

Equation 2: $E_{(year)} = T_{(year)} \times H \times VE + M_{(year)} \times MT$

Where:

$E_{(year)}$ is the value of the emissions during a particular year

$T_{(year)}$ is the number of trips per year

H is hours of traveling for the given year for vessels

VE is the vessel emissions per hour

M is the miles of travel for vehicles in a given year

MT is the value of metric tons of emissions per mile traveled

The benefit/cost analysis guidance for the FY2021 RAISE grant applications provides an estimate of 0.00887 metric tons of CO_2 emissions for gas light-duty trucks which we use here for the emissions calculations. We also assume that these vehicles are getting about 10 miles to the gallon and that the speed for vehicles will average about 45 miles per hour. The value of a metric ton of CO_2 emissions is $54.00 for the 2023 and then rises to $75.00 by 2042. There is no difference between the low and high case for the Eyak and fishing vessels transportation benefit category.

[10] https://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/FRIA_2017-2025.pdf

Table 13 -Avoided Emissions for F/V Eyak

Emissions

Eyak Transportation Calculations	NM	# of annual trips	Time for round trip (hrs)	Vessel Emissions per Hour	Vessel Emissions
		(a)	(b)	(c)	(a * b * c)
Vessel mileage reason					
Difference in travel from MSC to GPIP	5.3	80	1.28	$75.48	$7,712.01

Vehicle mileage reason	Miles	# of annual trips	Total Miles Round Trip	Metric Tons of CO2 [1]	Vehicle Emissions
	(a)	(b)	(a * b * 2 = c)	(c /10 * .008887 = d)	(d * 1) thru 2030 then (d * 2)
GPIP with construction materials	7.7	80	1,232	1.09	$59.12
MSC to GPIP for grocery delivery	7.7	80	1,232	1.09	$59.12
MSC to GPIP for mail delivery	7.7	40	616	0.55	$29.56
Travel from seafood processing plant to GPIP with fish food	7.7	40	616	0.55	$29.56

Emissions Calculations for Eyak pickups and deliveries	**$7,889.38**

Notes: 1. Metric tons of CO2 assumes 10 miles to the gallon for gas and .008887 MT to the gallon per BUILD monetized values

In addition to the avoided travel for Eyak deliveries, fishing vessels will also have added transportation costs for their operations. Telephone interviews with fishermen delivering product at the MSC dock reveal that 65 percent of them would deliver their catch to Silver Bay, the Gary Paxton Industrial Park, and then truck the harvest to the Sitka Producers Cooperative where they have processing agreements. In addition, 7 percent of respondents said they would deliver to the Sitka Salmon Shares dock rather than the MSC dock. Both of these calculations form the avoided emissions calculations for the MSC seawall.

Table 14 -Avoided Emissions for fishing vessels

Emissions					
Fishing Vessel Transportation Calculations	**NM**	**Number of annual trips**	**Time for round trip (hrs)**	**Vessel Emissions per Hour**	**Vessel Emissions**
		(a)	**(b)**	**(c)**	**(a * b * c)**
Vessel mileage reason					
MSC to Silver Bay (GPIP)	5.3	43.55	1.28	$75.48	$4,198.23
MSC to NPS dock	0.17	4.69	0.04	$75.48	$14.83

Vehicle mileage reason	**Miles**	**Number of annual trips**	**Total Miles Round Trip**	**Metric Tons of CO2 [1]**	**Vehicle Emissions**
	(a)	**(b)**	**(a * b * 2 = c)**	**(c /10 * .008887 = d)**	**2023 values**
Travel from Silver Bay (GPIP) to NPS	6.3	108.88	1,372	1.22	$65.83
Travel from Silver Bay (GPIP) to SPC	6.1	11.73	143	0.13	$6.86

Emissions Calculations for fishing vessel pickups and deliveries	**$4,285.75**

Notes: 1. Metric tons of CO_2 assumes 10 miles to the gallon for gas and .008887 MT to the gallon per RAISE monetized values

Total emissions avoided for the Eyak and the fishing vessels is $12,175 in the first year of the benefit calculations. These emissions avoided rise slightly in accordance with the RAISE damage costs per emissions for CO_2.

Opportunity Cost of Time

The opportunity cost of time measures the choice of the next best alternative to the thing chosen. In this case, vessel operators must stay on their vessel during travel to alternate harbors. Vessel operators would generally elect to continue with fishing activity, but they could elect to do something else with their time. For instance, being with family, visiting with friends, and enjoying all that Alaska has to offer. Given the absence of data supporting additional fishing effort, we assume that the leisure rate of 1/3 the hourly rate is the opportunity cost of time.

The vessel operator's opportunity cost of time is based on the leisure rate for captain, deckhand, and two mates operating the vessel and those hourly rates were obtained from the Alaska Department of Labor and Workforce Development.[11] Total value of the opportunity cost of time for the vessels – both Eyak and fishing vessels - is $8,709 annually.

[11] http://live.laborstats.alaska.gov/wage/index.cfm?at=01&a=000000#g53

The vehicle operator's opportunity cost of time uses the same numbers of trips and mileage as the avoided travel calculation. The hourly rate for the truck drivers is based on the values from the FY 2021 Benefit Cost Analysis Guidance from the US DOT site.[12] The hourly rate is $30.80, and we use the same time estimate as the avoided travel benefit. See Table 15 for OCT of Eyak crew and Table 16 for OCT for fishing vessel crews. We do not increase this benefit over time as the future is unknown for the demand for additional travel to the neighboring communities. Nor do we have data to support additional harvests of fishing vessels. Total opportunity cost of time for the vehicle operators is $2,962 annually.

Equation 3: $OCT_{(year)} = C_{(year)} \times H \times W \times R_{vessel} + C_{(year)} \times T \times R_{vehicle}$

Where: $OCT_{(year)}$ is the value of cost of time for workers on transported vessels and vehicles in a given year

$C_{(year)}$ is the number of trips for the year

H is the hours associated with travel to alternate ports

W is the number of workers in that particular position on the vessel

R_{vessel} is the wage rate from the State of Alaska Dept. of Labor and Workforce Development for May 2018 divided by 3 to determine the leisure rate

T is the travel time from MSC to GPIP dock

$R_{vehicle}$ is the wage rate for the truck driver

Total OCT for the added travel for the F/V Eyak as a result of loss of the MSC seawall is $5,632 annually. The OCT for vehicle drivers is $1,971 annually based on $30.80 hourly rate for light truck drivers. The opportunity cost of time for fishing vessel crew is $3,076 and the OCT for vehicle drivers associated with fishing vessels is $991. Total fOCT or both the Eyak and fishing vessels is $11,670 annually. This amount remains consistent over the 20-year period of analysis as the change in vessel deliveries are not known at this time. The opportunity cost of time calculation is the same for the low and high case scenarios.

[12] https://www.transportation.gov/sites/dot.gov/files/2021-01/benefit-cost-analysis-guidance-2021.pdf

Table 15 -Opportunity Cost of Time for F/V Eyak

Opportunity Cost of Time						
Eyak Transportation Calculations	**Leisure Rate Captain**	**Leisure Rate Deckhand**	**Leisure Rate Mate (2)**	**Number of annual trips**	**Time for round trip (hrs)**	**Added Transport Cost**
	(a)	**(b)**	**(c)**	**(d)**	**(e)**	**[(a + b + c) * d *e]**
Vessel mileage reason						
MSC to GPIP	$17.94	$14.05	$23.13	80	1.28	$5,631.88

Vehicle mileage reason		**Truck Driver Hourly Value**	**Number of annual trips**	**Time for round trip (hrs)**	**Added Transport Cost**
		(a)	**(b)**	**(c)**	**(a * b * c)**
MSC to GPIP for mail delivery		$30.80	80	0.27	$657.07
MSC to GPIP for grocery delivery		$30.80	80	0.27	$657.07
Seafood processing plant to GPIP with fish food		$30.80	40	0.27	$328.53
Downtown to GPIP with construction materials		$30.80	40	0.27	$328.53

Opportunity Cost of Time for Eyak pickups and deliveries	**$7,603.08**

Similar to the F/V Eyak, fishing vessels must also engage in additional travel, both for their vessels and for vehicles that must now get product from one dock to another or to the processing plant. The Opportunity Cost of time for the fishing vessel operators is $3,076 annually and the vehicle drivers have an OCT of $991 annually.

Table 16 -Opportunity Cost of Time for fishing vessels

Opportunity Cost of Time						
Fishing Transportation Calculations	**Leisure Rate Captain**	**Leisure Rate Deckhand**	**Leisure Rate Mate (2)**	**Number of annual trips**	**Time for round trip (hrs)**	**Added Transport Cost**
	(a)	**(b)**	**(c)**	**(d)**	**(e)**	**[(a + b + c) * d *e]**
Vessel mileage reason						
MSC to Silver Bay (GPIP)	$ 17.94	$14.05	$23.13	43.55	1.28	$3,065.85
MSC to NPS dock	$ 17.94	$14.05	$23.13	4.69	0.04	$10.83

Vehicle mileage reason		**Truck Driver Hourly Value**	**Number of annual trips**	**Time for round trip (hrs)**	**Added Transport Cost**
		(a)	**(b)**	**(c)**	**(a * b * c)**
Silver Bay (GPIP) to NPS		$30.80	108.88	0.27	$894.23
Silver Bay (GPIP) to SPC		$30.80	11.73	0.27	$96.30

Opportunity Cost of Time for fishing vessels pickups and deliveries	**$4,067.21**

Table 17 summarizes the Avoided Travel benefits for vessels. vehicles, and workers described so far.

Table 17 – Avoided Travel Benefits Summary

Benefit Category	**First year of benefits**
Avoided vessel travel Eyak	$45,304
Avoided vessel travel fishing vessels	$13,930
Avoided vehicle travel Eyak	$3,437
Avoided vehicle travel fishing vessels	$1,409
Additional transport costs (low case)	$593,753
Opportunity Cost of Time vessel operators -Eyak	$5,632
Opportunity Cost of Time fishing vessel operators	$3,077
Opportunity cost of time vehicle operators - Eyak	$1,971
Opportunity cost of time vehicle operators - fishing vessels	$991
Emissions reduced vessel operators - Eyak	$7,712
Emissions reduced fishing vessel operators	$4,213
Emissions reduced vehicle operators for Eyak	$177
Emissions reduced vehicle operator for fishing vessels	$73
Total	**$681,678**

Note: This table is showing the 2023 benefits prior to evaluating the net present value.

Avoided Cold Storage Replacement

Additional costs for cold storage in the PNW are not the only cold storage expenditure. Once the seawall fails and the cold storage facility is condemned, seafood processors must find temporary freezer space until they can ship the product. There will not be sufficient space to conduct consolidation of product in the freezer vans so that would still occur in the PNW and is estimated in the Additional Transportation Costs previously described. Seafood processors have suggested they would need refrigerated vans to keep product frozen. One seafood processor said they would just flash freeze product and ship it south on trampers or freighters to their facility in the PNW. It is estimated that the remaining cold storage user would need 25 to 40 vans to hold the product they currently process on an annual basis.

The cost to purchase these vans, if they were to find that many available, is $7,750 per van for new insulated container. Container vans throughout the country are in short supply. We assume that there will be a need for both used and new equipment as empty vans are in high demand for other reasons. Both the used vans and the new vans will need new refrigeration units as the vans do not generally come equipped with that capability and used vans would no doubt need an upgrade. Costs for new reefer units is $9,900 to $20,500 depending on the age of the unit.[13]

The City has sufficient land space to accommodate the freezer vans needed to replace the cold storage facility.

Refrigerated vans needed from the low case to the high case is assumed to be mostly new vans shipped from Seattle and delivered to Sitka. Estimates from Container Specialists of Alaska reveals they do not currently have containers in Seattle, but they have some coming in from overseas and expect to see them in around 30 days. Container Specialists of Alaska also revealed that they have had only a handful of used vans in the past two months.[14] New vans cost $7,750 each and shipping is $1,829.30 per container.[15]

In addition to the cost of establishing a system of refrigerated vans to accommodate the frozen seafood product, there would be additional demands on the City's electric utilities to supply power to these storage units. The City's electric grid is fed primarily by the hydroelectric plant. It is estimated that the City would be able to accommodate this additional usage with current power generation. However, the charge to the customer would be significantly higher as each of the refrigerated vans would need to be tied to the grid. This would allow vans not in use to be shut down, but it would put additional expense on the power operators to service these units. The cold storage unit currently has a monthly electric bill of about $17,0000. Customers in Sitka using refrigerated vans have an average monthly bill of about $2,300 per van according to the City's utility engineer.

[13] Quote from https://www.marketbook.ca/listings/trailers/for-sale/list/category/804/semi-trailers-reefer-unit-only

[14] https://containerspecialtiesak.com/containers/index.htm

[15] Per Samson Tug and Barge which serves Sitka.

The cost to supply alternate cold storage with the use of refrigerated vans is estimated between $454,375 and $1.2 million depending on the number of vans. The existing seawall is in danger of imminent failure and has been for years, so the cost of replacement freezer capacity begins in the benefit begin year of 2023. The cost differential of electric utilities between the cold storage facility and the freezer vans is between $486,000 and $900,000 annually. See Table 18 and Table 19.

Table 18 -Cold Storage Refrigerated Container Cost estimates

	Low Case 25 Vans			High Case - 40 Vans		
	Number Vans	Cost Each	Total	Number Vans	Cost Each	Total
Refrigerator Vans - Used	2.5	$3,000	$7,500	4	$10,000	$40,000
Reefer units - Used	25	$9,900	$247,500	40	$20,500	$820,000
Refrigerator Vans - New	22.5	$7,750	$174,375	36	$7,750	$279,000
Shipping Seattle to Sitka	25	$1,829	$45,733	40	$1,829	$73,172
Total Cost			**$475,108**			**$1,212,172**

Note: Cost estimates for vans from Alaska Container Specialists of Alaska, cost estimates for reefer units from Marketbook CA, and shipping costs from Samson Tug and Barge.

Table 19 -Cost Differential in Electric Utilities using Freezer Vans

Electric Utility Expense	Existing Cold Storage [1]	Reefer Vans low case [2]	Reefer vans high case [2]
Annual cost to consumer	$204,000	$690,000	$1,104,000
Total	$204,000	$690,000	$1,104,000
Differential (i.e. increased cost)		**$486,000**	**$900,000**

1. Existing cold storage electric utility bills run about $17,000 per month.
2. Reefer vans in Sitka at another location runs about $2,300 per month for 40-ft van.

Note: Electric utility engineer at City provided cost estimates.

Summary Benefits Calculations

The low case scenario has a net present value of for benefits of $11.6 million over the 20-year period of analysis using a 3 percent discount rate for emissions and 7 percent discount rate for all other categories. The high case scenario has a net present value for benefits of $19.5 million for the same period. See Table 20 and Table 21.

Table 20 -Low Case Scenario Net Present Value Benefit Summary

	Low Case								
Year	**Avoided Travel**	**Add'l Transport Costs**	**Cold Storage Alternative**	**OCT**	**Emissions Avoided**	**Total**	**NPV Factor (3%)**	**NPV Factor (7%)**	**Net Present Value**
2023	$64,080	$593,753	$475,108	$11,670	$12,175	$1,156,785	0.94260	0.87344	$1,011,223
2024	$64,080	$593,753	$486,000	$11,670	$12,180	$1,167,682	0.91514	0.81630	$954,381
2025	$64,080	$593,753	$486,000	$11,670	$12,184	$1,167,687	0.88849	0.76290	$892,353
2026	$64,080	$593,753	$486,000	$11,670	$12,189	$1,167,692	0.86261	0.71299	$834,372
2027	$64,080	$593,753	$486,000	$11,670	$12,194	$1,167,696	0.83748	0.66634	$780,172
2028	$64,080	$593,753	$486,000	$11,670	$12,198	$1,167,701	0.81309	0.62275	$729,507
2029	$64,080	$593,753	$486,000	$11,670	$12,203	$1,167,706	0.78941	0.58201	$682,146
2030	$64,080	$593,753	$486,000	$11,670	$12,208	$1,167,710	0.76642	0.54393	$637,873
2031	$64,080	$593,753	$486,000	$11,670	$12,212	$1,167,715	0.74409	0.50835	$596,486
2032	$64,080	$593,753	$486,000	$11,670	$12,217	$1,167,720	0.72242	0.47509	$557,797
2033	$64,080	$593,753	$486,000	$11,670	$12,221	$1,167,724	0.70138	0.44401	$521,629
2034	$64,080	$593,753	$486,000	$11,670	$12,231	$1,167,733	0.68095	0.41496	$487,821
2035	$64,080	$593,753	$486,000	$11,670	$12,235	$1,167,738	0.66112	0.38782	$456,213
2036	$64,080	$593,753	$486,000	$11,670	$12,240	$1,167,743	0.64186	0.36245	$426,664
2037	$64,080	$593,753	$486,000	$11,670	$12,245	$1,167,747	0.62317	0.33873	$399,039
2038	$64,080	$593,753	$486,000	$11,670	$12,249	$1,167,752	0.60502	0.31657	$373,214
2039	$64,080	$593,753	$486,000	$11,670	$12,254	$1,167,757	0.58739	0.29586	$349,069
2040	$64,080	$593,753	$486,000	$11,670	$12,258	$1,167,761	0.57029	0.27651	$326,497
2041	$64,080	$593,753	$486,000	$11,670	$12,263	$1,167,766	0.55368	0.25842	$305,394
2042	$64,080	$593,753	$486,000	$11,670	$12,272	$1,167,775	0.53755	0.24151	$285,666
Total	**$1,281,598**	**$11,875,050**	**$9,709,108**	**$233,406**	**$244,429**	**$23,362,858**			**$11,607,515**

Note: Emissions avoided are discounted at 3% per RAISE guidance while all other benefit categories are discounted at 7%.

Table 21 -High Case Scenario Net Present Value Benefit Summary

	High Case								
Year	**Avoided Travel**	**Add'l Transport Costs**	**Cold Storage Alternative**	**OCT**	**Emissions Avoided**	**Total**	**NPV Factor (3%)**	**NPV Factor (7%)**	**Net Present Value**
2023	$64,080	$950,004	$1,212,172	$11,670	$12,175	$2,250,101	0.94260	0.87344	$1,966,168
2024	$64,080	$950,004	$900,000	$11,670	$12,180	$1,937,934	0.91514	0.81630	$1,583,135
2025	$64,080	$950,004	$900,000	$11,670	$12,184	$1,937,939	0.88849	0.76290	$1,479,974
2026	$64,080	$950,004	$900,000	$11,670	$12,189	$1,937,943	0.86261	0.71299	$1,383,550
2027	$64,080	$950,004	$900,000	$11,670	$12,194	$1,937,948	0.83748	0.66634	$1,293,423
2028	$64,080	$950,004	$900,000	$11,670	$12,198	$1,937,952	0.81309	0.62275	$1,209,181
2029	$64,080	$950,004	$900,000	$11,670	$12,203	$1,937,957	0.78941	0.58201	$1,130,440
2030	$64,080	$950,004	$900,000	$11,670	$12,208	$1,937,962	0.76642	0.54393	$1,056,839
2031	$64,080	$950,004	$900,000	$11,670	$12,212	$1,937,966	0.74409	0.50835	$988,043
2032	$64,080	$950,004	$900,000	$11,670	$12,217	$1,937,971	0.72242	0.47509	$923,738
2033	$64,080	$950,004	$900,000	$11,670	$12,221	$1,937,976	0.70138	0.44401	$863,630
2034	$64,080	$950,004	$900,000	$11,670	$12,231	$1,937,985	0.68095	0.41496	$807,448
2035	$64,080	$950,004	$900,000	$11,670	$12,235	$1,937,990	0.66112	0.38782	$754,930
2036	$64,080	$950,004	$900,000	$11,670	$12,240	$1,937,994	0.64186	0.36245	$705,838
2037	$64,080	$950,004	$900,000	$11,670	$12,245	$1,937,999	0.62317	0.33873	$659,950
2038	$64,080	$950,004	$900,000	$11,670	$12,249	$1,938,003	0.60502	0.31657	$617,055
2039	$64,080	$950,004	$900,000	$11,670	$12,254	$1,938,008	0.58739	0.29586	$576,959
2040	$64,080	$950,004	$900,000	$11,670	$12,258	$1,938,013	0.57029	0.27651	$539,478
2041	$64,080	$950,004	$900,000	$11,670	$12,263	$1,938,017	0.55368	0.25842	$504,441
2042	$64,080	$950,004	$900,000	$11,670	$12,272	$1,938,027	0.53755	0.24151	$471,692
Totals	**$1,281,598**	**$19,000,080**	**$18,312,172**	**$233,406**	**$244,429**	**$39,098,513**			**$19,515,912**

Note: Emissions avoided are discounted at 3% per RAISE guidance while all other benefit categories are discounted at 7%.

Qualitative Considerations

Safety

This project will contribute to a reduction in crashes, fatalities, and injuries as vessel owners will be able to continue functioning as they have in the past. The need to travel to alternate ports for product delivery introduces new risks as vessels compete for limited space to conduct their business. The addition of several hundred vehicles on Sitka roads traveling between harbors, seafood processing plants, and competing with the summer tourist traffic will undoubtedly lead to more congestion and the potential for unwanted interactions between vehicles and pedestrians. Telephone interviews with fishermen using the MSC wall to conduct their business reveals that there would be serious inefficiencies to losing this access. Repairing the sheetpile wall at the MSC is an important solution to ensuring the safety of people and equipment working in the fish harvesting business and the many tourists that visit Sitka annually.

Quality of Life

The MSC and associated uplands infrastructure are important components to the Sitka fishing industry. Maintaining this infrastructure allows Sitkans to continue to work where they live and maintain active community ties. Telephone interviews with fishermen using the MSC dock reveals that their ability to continue living and working in this community without the seawall would be strained at the least when the seawall fails.

Community Cohesiveness

The MSC provides an important stopping point for vessels needing to offload product and onload supplies and cargo. It also is an active point of disembarkation for cruise ship passengers, with almost 1,000 passengers disembarking annually. This location allows for easy access to many downtown activities for tourists.

Vessel and Infrastructure Damage

Vessel and infrastructure damage have not been qualified for this evaluation. The MSC seawall is already beyond its useful life and could fail at any time. Hopefully, that failure would not be catastrophic or involve ships moored at the location or passenger disembarking. There is the potential for vessel damages as vessels such as the Eyak must now traverse longer distances in order to complete their business.

Employment

There are three employees currently working at the MSC cold storage facility. The loss of the facility would result in the loss of these jobs. One seafood processor reveals that there would be a loss of 10 to 20 seasonal employees if they can no longer conduct consolidation activity in Sitka.

Cost Estimates

Initial cost estimates are $9.2 million spread over an 18-month construction season. Periodic maintenance for the facility is assumed at 1 percent of initial construction cost every five years over the 20-year period of analysis. See Table 22.

Table 22 – Sheetpile Wall and Crane Replacement Cost Estimate

Description	Amount
Budget as to Sheetpile wall repair:	
Mobilization	$ 579,000
Demolition & Disposal	225,000
Sheet Pile Face Wall Galvanized	1,334,000
Sheet Pile End Walls Galvanized	157,000
Drilled and Grouted Tie-Rod Anchors	2,021,000
Steel Waler Assembly	269,000
Shot Rock Fill, Vibrocompacted	337,000
Drainage Improvements	84,000
C.I.P. Concrete Bulkhead Cap	449,000
Cathodic Protection System (Anodes)	112,000
Energy Absorbing Timber Fender System	687,000
Area Lighting	112,000
Subtotal	**$ 6,366,000**
Contingency @ 20%	1,273,200
Env permitting, final design, contract admin, inspection @ 20%	1,273,200
Subtotal Sheetpile Wall Repair	***$ 8,912,400***
Budget as to Crane replacement:	
Electro Hydraulic Telescope Boom Crane Model MCT 2230	168,500
Installation Estimate	100,000
Subtotal Crane Replacement	***$ 268,500***
Total Budget Sheetpile Wall and Crane Replacement	**$ 9,180,900**

At the end of the 20-year period of analysis, there is still value to the project components. See Table 23 for residual value calculations. Total discounted residual value at the end of the 20-year period of analysis is $662,978. The expected useful life of the cathodic protection is estimated at 15 years so additional cathodic protection is incorporated to the total project cost at year 15.

The net present value of the sheetpile wall and crane replacement is $7.8 million over the 20-year period of analysis. See Table 24.

Table 23 – Sheetpile Wall and Crane Replacement Residual Value

Improvement Component	Expected useful life (years)	Residual value after 20 years
Sheetpile Wall	40	$ 1,890,500
Fill	40	$ 435,000
Timber Fenders	40	$ 343,500
Area Lighting	25	$ 22,400
Crane	25	$ 53,700
Total Residual Value of improved infrastructure		**$ 2,745,100**
Net Present value of Residual		**$ 662,978**

Table 24 – Net Present Value Sheetpile Wall and Crane Replacement

Year	Construction	Periodic Maintenance	Total Cost	NPV Factor	Net Present Value
2022	$ 4,456,200		$ 4,456,200	0.93458	$4,164,673
2023	$ 4,724,700		$ 4,724,700	0.87344	$4,126,736
2024			$ -	0.81630	$ -
2025			$ -	0.76290	$ -
2026			$ -	0.71299	$ -
2027			$ -	0.66634	$ -
2028		$ 91,809	$ 91,809	0.62275	$ 57,174
2029			$ -	0.58201	$ -
2030			$ -	0.54393	$ -
2031			$ -	0.50835	$ -
2032			$ -	0.47509	$ -
2033		$ 91,809	$ 91,809	0.44401	$ 40,764
2034			$ -	0.41496	$ -
2035			$ -	0.38782	$ -
2036			$ -	0.36245	$ -
2037			$ -	0.33873	$ -
2038		$ 203,809	$ 203,809	0.31657	$ 64,521
2039			$ -	0.29586	$ -
2040			$ -	0.27651	$ -
2041			$ -	0.25842	$ -
2042			$ -	0.24151	$ -
Totals	**$ 9,180,900**	**$ 387,427**	**$ 9,568,327**		**$8,453,868**
Total Construction Cost and Maintenance					**$8,453,868**
Less Residual Value after 20 years					$ 662,978
Present Value of Sheetpile Wall and Crane Replacement					**$7,790,890**

Note: One percent of total construction cost is assumed at 5-year intervals for maintenance. Additional cathodic protection assumed in year 15 of project.

Benefit-Cost Summary

The low case scenario for the seawall and crane replacement has $3.8 million in net benefits with a benefit to cost ratio of 1.57. The high case scenario has net benefits of $11.7 million with a benefit to cost ratio of 2.59. Benefit calculations are determined using a 7 percent discount rate and a project period of analysis of 20 years.

Table 25 -Seawall and Crane Replacement Benefit to Cost Summary

Summary of Calculations	Low Case	High Case
Benefit calculations - 2021 $$		
Vessel avoided travel	$634,452	$634,452
Additional Transport Cost	$5,878,713	$9,405,940
Opportunity Cost of time	$115,547	$115,547
Emissions reduced	$176,457	$176,457
Cold Storage replacement	$4,802,347	$9,183,516
PV Benefits summary	**$11,607,515**	**$19,515,912**
Cost Calculations - 2021 $$		
PV Cost of Project	$8,453,868	
Less residual value	$662,978	
Effective cost (PV)	$7,790,890	
PV Net benefits (benefits - costs)	**$3,816,625**	**$11,725,022**
Benefit/cost ratio (benefits/costs)	**1.57**	**2.59**