MARITIME ADMINISTRATION/PORT OF ANCHORAGE
FINDING OF NO SIGNIFICANT IMPACT
FOR THE
MARINE TERMINAL REDEVELOPMENT, PORT
INTERMODAL EXPANSION PROJECT

1.0 NAME OF THE PROPOSED ACTION

Marine Terminal Redevelopment, Port Intermodal Expansion Project

The Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) were prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) and its implementing regulations (Council on Environmental Quality, 40 CFR 1500-1508).

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The U.S. Department of Transportation, Maritime Administration (MARAD) in cooperation with the Port of Anchorage (POA) proposes to expand, reorganize, and improve the POA over a seven-year period anticipated to begin in 2005. This Marine Terminal Redevelopment Project (Project) would add 135 acres of land, doubling the size of the POA, and provide approximately 8,880 linear feet of waterfront structures west, northwest and southwest of the existing POA.

The POA is the largest of Alaska's ports and harbors and accommodates cruise vessels and a full range of maritime commodities, including container, trailer, break-bulk, dry-bulk, and liquid-bulk cargos. It is a designated strategic location for supporting the rapid deployment of the Stryker Brigade Combat Team and other U.S. Army Alaska combat forces due to its proximity to Elmendorf Air Force Base (AFB) and Fort Richardson. The POA currently is operating at or near critical capacity ranges for various types of cargo. Usage is limited by its facilities and the conditions at the POA, resulting in congestion at all of its five terminals. POA facilities, including the terminals and docking berths, are substantially past their design life. In addition, the POA lacks land and infrastructure to support Stryker Brigade Combat Team military deployments. The purpose of the Project is to meet the identified needs of the citizens of Alaska and the POA through 2025 by replacing functionally obsolete structures; increasing POA capacity, efficiency, and security; and accommodating the newly introduced needs of the U.S. military for rapid deployment.

MARAD and the POA undertook a hierarchical screening process involving three major criteria derived from the purpose and need for the project. These criteria were: 1) location; 2) size; and 3) orientation and design. They established that expansion would be limited to property under control of the POA to the west, northwest and southwest of the existing POA because of land ownership conflicts and conflicts in management and use in other areas. MARAD and the POA also examined the orientation of the dock and the various design methods given engineering and

environmental constraints of constructing and maintaining a facility in the area. Alternatives with orientations perpendicular to the currents or using trestles or 100 percent pile-supported dock structures could not adequately meet engineering constraints. These and similar alternatives were rejected because of icing, material stability and lateral support during seismic events, hydrologic impacts, and increased construction schedules and constructability.

Three alternative designs for the Project were deemed appropriate for further evaluation for the expanded terminal facilities—100 percent sheet pile construction, pile-supported dock with a sheet pile fill, and a combination of the two designs. The alternatives are described in detail in the March, 2005 EA (Chapter 2.0, "Description of Proposed Action and Alternatives" and Chapter 3.0, "Affected Environment and Environmental Consequences"). MARAD and the POA identified the 100 percent sheet pile design to be the preferred alternative.

Marine Terminal Redevelopment Project

Elements of the proposed action include design and construction methods, dredging activities, filling, equipment and systems replacement, and operations. Construction is anticipated to take approximately seven years, primarily occurring in summer field seasons, beginning in 2005 to support Stryker Brigade Combat Team deployment needs. After anticipated completion of the construction in 2011, the POA would proceed with operations of the expanded facility for the foreseeable future.

Construction Activities. The Project has been divided into six construction areas, ranging in size from 17 acres to 34 acres each. Construction would consist of dredging of the construction area, where required; filling; construction of pile supports for the crane; installation of pile supports for the pile-supported dock alternative or sheet pile cells for the sheet pile alternative; completion of dock construction; movement of operations to new areas; demolition of current facilities; placement of new cranes; dredging of berth areas; and completion of final operational layouts, utilities, road systems, and security systems. Construction activities would likely occur in multiple areas at the same time. A typical construction season in Anchorage lasts approximately 180 days and takes place from mid-April through October, depending upon weather conditions. Construction activities that generate high noise levels would typically occur from 6:00 a.m. to 10:00 p.m. seven days a week. Some backland construction and material deliveries may occur year-round.

Dredging. Dredging to a depth of -45 feet MLLW (approximately 10 feet below the current dredging depth of -35 feet MLLW) would be conducted in conjunction with the development of tidelands. Dredge material not suitable for use as fill would be disposed of at an approved site. Methods similar to those employed by the U.S. Army Corps of Engineers (USACE) in the Knik Arm for maintenance dredging would be used for the Project. For the construction phase of the proposed action, approximately 6.7 million cubic yards (286 acres) of material would be removed

by dredging. Approximately 16 percent of total dredging would occur in the intertidal zone, with the remainder occurring in the subtidal zone.

Fill material. All design alternatives would require a large amount of suitable engineered and common fill material (12.3 million cubic yards or 16 million tons). Dredge materials would be used to the extent feasible for common fill. Multiple sources could supply the remaining fill through various delivery methods.

Equipment Replacement. The proposed action includes installation and operation of three 100-gage container cranes, an upgraded cathodic protection and protective coating system, a new fendering and mooring system, an upgraded drainage system, and a new utilities system.

Operations. The Project would accommodate military vessels, multi-purpose vessels, barges, and railroad traffic associated with cargos at the POA. Expansion would include accommodations for cement, two Petroleum, Oils, and Lubricants (POL) berths, two container berths, a military RO-RO cargo berth (with access to 100-gage cranes), and two barge berths. The new POA would also have increased lighting facilities, improved stormwater drainage, and improved access within the POA and secure access to the POA from the outside. The expanded area is projected to be sufficient to accommodate projected increases in commodities and traffic through 2025 and beyond.

Management Actions. The proposed action would include the implementation of various management actions, including mitigation, monitoring, and the implementation of environmentally beneficial programs to limit potential impacts to the environment. Mitigation measures include, but are not necessarily limited to, implementation of Best Management Practices and compensation for loss of Essential Fish Habitat (EFH) and tidelands. The specific proposals for mitigation of EFH and tidelands will be identified through the Section 404 permitting process with the USACE and appropriate resource agencies. Monitoring and ongoing studies would be conducted before, during, and in some cases, after construction, for fish and beluga whales. The POA also is proposing projects that would enhance the local environment, including improvements to the Sea Services Veterans Memorial and Ship Creek area and the area around a Comprehensive Environmental Response, Compensation, and Liability Act-site on Elmendorf AFB.

Design Alternatives. The POA extensively examined three design alternatives for the expanded terminal facilities: Alternative A, sheet pile construction with fill design; Alternative B, steel pile-supported dock with sheet pile fill design; and Alternative C, a combination of the two. Both sheet piling and pipe pile designs have been used throughout Alaska. MARAD and the POA assessed a combination of these two design alternatives (Alternative C) based on differences in soil stability in the affected area. Any one of the alternative design methods would meet the stated purpose and need. The POA and MARAD have identified Alternative A as the preferred alternative. Based on the analysis presented in this EA, the POA and MARAD deemed

Alternative A to be preferable to Alternatives B and C. Alternative A meets all of the operational requirements with the least potential for environmental impacts.

No-Action Alternative

Under the no-action alternative, the POA would not implement the Project. However, because the POA is at or exceeding present operational capacities for various types of cargo and many of the facilities are at the end of or have surpassed their design life and are in critical need of replacement, MARAD and the POA conclude that the no-action alternative would require:

- a long-term program to repair and/or replace corroded steel piles, deteriorating concrete structural elements, and other facility elements that are past their design life;
- replacement of the obsolete and poorly-functioning cathodic protection system to help slow future corrosion; and
- increased maintenance requirements and costs in the future as other existing facility features further exceed their design lifespan.

3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

According to the analysis in the EA, and based upon best available data, implementation of the preferred alternative (including management actions) would not result in significant adverse impacts in any resource category. The EA presents the existing environmental conditions and potential consequences that could result from the proposed action. An examination of the possible impacts focused the analysis on 16 resource categories: air quality; noise and vibration; hazardous materials and waste; safety; geology and soils; hydrodynamics and sedimentation; water quality; biological resources; essential fish habitat, land use and coastal zone consistency; recreation and visual resources; transportation; 4(f)/106 resources; public services and utilities; socioeconomics and environmental justice; and cultural resources.

Construction associated with the Project would result in an increase in air emissions and noise levels. Although these increases are expected, criteria pollutant emissions would not exceed *de minimis* levels and noise in nearby residential areas would not exceed Federal or municipality regulated levels.

Filling of Essential Fish Habitat and noise associated with pile driving would have an adverse impact; however, the use of mitigation measures included within the proposed action would ensure that the effects are less than significant. The POA, in conjunction with MARAD, will implement mitigation and management measures to monitor for unanticipated impacts and ensure that impacts are less than significant. Best available data indicate that impacts to beluga whales in the construction area would not be significant. Nevertheless, the POA, in conjunction with MARAD, will also implement a beluga monitoring plan and appropriate management practices for whenever belugas approach construction activities to address unanticipated impacts.

No significant adverse impacts would occur to hazardous materials and waste, safety, geology and soils, hydrodynamics and sedimentation, water quality, land use, transportation, public utilities, and cultural resources.

Beneficial economic impacts from construction would consist of an additional 6,600 jobs and an additional Gross State Product (GSP) of $352 million. Beneficial economic impacts to the region in 2025 would include more than $515 million in GSP, accounting for more than 8,400 jobs and more than $272 million in income in 2025 alone. Other benefits include enhancement to parks and 4(f) resources, enhancement and improvements to LF04, and creation of an Alaska Native interpretive area.

4.0 CONCLUSIONS

On the basis of the findings of the EA, no significant impact to human health or the natural environment would result from implementation of the preferred alternative. Therefore, a Finding of No Significant Impact is warranted, and preparation of an Environmental Impact Statement, pursuant to the National Environmental Policy Act of 1969 (Public Law 91-190) is not required.

This Finding of No Significant Impact (FONSI) is based on the attached contractor prepared EA The EA has been independently evaluated by the MARAD/POA and determined to adequately and accurately discuss the need for the project, the alternatives considered, a list of agencies and persons consulted, proposed mitigation, and impacts of the proposed project and provides sufficient evidence and analysis for determining that an Environmental Impact Statement is not required. MARAD and the POA take full responsibility for the accuracy, scope, and content of the attached EA.

3/9/2005	Carolyn E. Juremann	Environmental Protection Specialist
Date	Environmental Reviewer	Title/Position

I have considered the information contained in the EA, which is the basis for this FONSI. Based on the information in the EA and this FONSI document, I agree that the Proposed Action as described above and in the EA, will have no significant impact on the environment.

Margaret D. Blum — 3/09/2005

MARGARET D. BLUM — Date

Associate Administrator for Port, Intermodal, and Environmental Activities

U.S. Department of Transportation, Maritime Administration

Final

PORT INTERMODAL EXPANSION PROJECT

Marine Terminal Redevelopment Environmental Assessment

ANCHORAGE

ALASKA'S REGIONAL PORT

March 2005

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

Organization of This Environmental Assessment

This document comprises the Environmental Assessment for the Marine Terminal Redevelopment Project (Project) for the Port of Anchorage in Anchorage, Alaska. This project, which entails development of 135 acres of tidelands and construction of an 8,880 foot water front, is critical to:

- Replace obsolete infrastructure that is at or past its design life and, in many cases, has deteriorated to or below minimal design standards.
- Provide required operational area and dock frontage for safe and efficient port operations for existing and projected future capacity requirements. The port currently operates at or above sustainable capacity for many types of cargo received, and must expand to continue to provide goods to Alaska.
- Provide required support to the Department of Defense for the deployment of military units housed in Alaska. This role is highlighted by the designation of the Port of Anchorage as the 15th Strategic Commercial Seaport in the nation.
- Support the economic well-being of Anchorage and Alaska as the key node in the state-wide distribution of goods.

Based on the analysis and findings of this Final Environmental Assessment, it is the intent of the U.S. Department of Transportation, Maritime Administration to issue a Finding of No Significant Impact (FONSI) or mitigated FONSI no sooner than 30 days after the publication of this document.

The goal of this document is to provide a reader-friendly presentation of the in-depth analysis of the various alternatives considered for the Project, as well as their environmental impacts. Therefore, the content is structured to provide concise overviews of issues, supported by more detailed discussions and analyses, either in the body of the text or as appendices. The appendices also include administrative documentation, scoping comments, a summary of comments provided to the draft EA, and responses to those comments.

Based upon the comments received both during scoping and in response to the draft Environmental Assessment, it is obvious that individual readers may have different interests in the information presented in this document. To aid readers in locating specific key sections related to issues of greatest apparent interest, the following informational summary is provided:

Item of Interest	Document Section	
Overview of the project, a description of the proposed action, and a detailed summary of the assessed impacts.		Executive Summary
Detailed description of the need for the project.	Chapter 1	Purpose and Need for the Proposed Action
Detailed description of the 25 alternatives considered for the proposed project, and the process used to select three alternatives for detailed consideration.	Chapter 2	Description of the Proposed Action and Alternatives
Discussion of the preferred alternative	Section 2.1.4	Identification of the Preferred Alternative

Item of Interest	Document Section	
Detailed description of the resources that would be potentially affected by the proposed project, and a discussion of the effects to those resources for each of the three alternatives considered in detail.	Chapter 3	Affected Environment and Environmental Consequences
• Summary and Overview	Section 3.5	Summary of Environmental Consequences
• Air	Section 3.2.1	Air Quality
• Noise	Section 3.2.2	Noise
• Geology and Soils	Section 3.3.1	Geology and Soils
• Currents and Sedimentation in Upper Cook Inlet	Section 3.3.2	Hydrodynamics and Sedimentation
• Water	Section 3.3.3	Water Quality
• Biological Resources	Section 3.3.4	Biological Resources
o Birds	Section 3.3.4	Biological Resources
o Beluga Whales	Section 3.3.4	Biological Resources
o Fish	Section 3.3.4	Biological Resources
o Essential Fish Habitat	Section 3.3.5	Essential Fish Habitat Assessment
• Land	Section 3.4.1	Land Use and Coastal Zone Consistency
• Traffic	Section 3.4.3	Transportation/Traffic
• Cultural Resources	Section 3.4.4	4(f)/106 Programmatic Evaluation
	Section 3.4.7	Cultural Resources
Detailed listing of other past, present, and reasonably foreseeable future projects in the area, and a discussion of the cumulative impacts of those projects that are non-speculative with the proposed Marine Terminal Redevelopment Project.	Chapter 4	Cumulative Effects, Irreversible and Irretrievable Commitment of Resources

Also to aid in reading this complex technical document that includes a number of acronyms, an acronym definition list is included at the last page. This page can be "folded out" to lay adjacent to the body of the document during reading. In this manner, the reader can easily determine any definition while retaining their place in the text.

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This Environmental Assessment (EA) analyzes the potential environmental impacts associated with the proposed Marine Terminal Redevelopment Project (Project) at the POA of Anchorage (POA). This EA is being prepared to support the proposed expansion of the POA, which is currently operating above its Sustainable Practicable Capacity (SPC). The Project, which includes numerous activities to enhance the transportation of goods and services within the State of Alaska, would expand, reorganize, and improve the POA over a seven-year period anticipated to begin in 2005. The Project would add 135 acres of land, doubling the size of the POA, and provide approximately 8,880 linear feet of waterfront structures west, northwest and southwest of the existing POA. Operations at the POA would improve and increase with the expansion, construction, and reorganization. The Project would influence both the physical and economic aspects of the Municipality of Anchorage (MOA) and the State of Alaska. In addition, the Project is critical to national defense by providing the additional land and facilities necessary to support military deployments.

The EA has been prepared under direction of the U.S. Department of Transportation, Maritime Administration (MARAD) and in cooperation with the POA. The EA complies with the requirements of the National Environmental Policy Act (NEPA), its implementing regulations (Council on Environmental Quality [CEQ], 40 Code of Federal Regulations [CFR] 1500 – 1508), and U.S. Department of Transportation regulations implementing NEPA, and other applicable federal and state-delegated environmental regulations. This documentation adheres to the goals and requirements of streamlining processes as embodied in Executive Order (EO) 13274, *Environmental Stewardship and Transportation Infrastructure Project Reviews*, its associated Memorandum of Understanding, and Section 1309 of the *Transportation Equity Act for the 21st Century.*

A draft EA was published on August 11, 2004. The publication of the document was announced in the *Federal Register* and in local newspapers (MARAD 2004a). The document was made available to the public and agencies through a public website, at the Loussac Library, and by providing individual copies on request. A public comment period was originally held from August 11 to September 10, 2004. At the request of the National Oceanic and Atmospheric Administration (NOAA), the comment period was extended until September 17, 2004 (MARAD 2004b). The goal during this process was to solicit comments concerning the analysis presented in the draft EA. MARAD and the POA received comments from the public as well as federal, state, and municipal agencies. Following the public comment period, a final EA was prepared. The final EA considered all comments, and provides the MARAD decision-maker with a comprehensive review of the proposed action and alternatives and their potential environmental consequences. Changes in the final EA that reflect public and agency comments include an expanded discussion of the alternatives selection process (section 2.1), addition of environmental management actions to be included in the proposed action (section 2.2), and an expanded discussion of

direct, indirect, and cumulative impacts concerning biological and other resources (sections 3.4 and 4.1). A summary of the comments received during the public comment period is also included in Appendix H.

In accordance with NEPA and CEQ guidelines, the POA and MARAD identified a preferred alternative. Section 2.1.4 of this final EA incorporates a summary of the process and results of identifying the preferred alternative.

BACKGROUND

Located in and managed by the MOA, the POA occupies approximately 129 acres surrounded by commercial and military properties to the north, south, east, and by the Knik Arm of Upper Cook Inlet to the west. The POA contains three major functional areas: the dock structure and berthing areas; storage areas; and the transportation network (roads, rails, and pipelines). At an elevation of 38 feet above Mean Lower Low Water (MLLW), the dock stands on steel pipe pilings surrounded by rip-rap. The berthing area provides three container ship terminals (Terminals 1, 2, 3) and two Petroleum, Oils and Lubricants (POL) terminals (POL 1, POL 2); surface facilities for the POA offices and maintenance shop; three 38-gage cranes; and other facilities for loading and unloading dry-bulk and liquid-bulk cargo. Storage and transportation facilities cover most of the POA property, extending eastward from the dock to the eastern boundary. Container storage dominates these facilities, although they also accommodate liquid-bulk, dry-bulk, and auto/vehicle storage and transshipment. Commercial shipping lines, Totem Ocean Trailer Express (TOTE) and Horizon Lines, are the dominant operators of these facilities, although Homeland Security, the military, and cruise ships constitute fast-growing users. A fuel tank farm occupies the southeastern corner of the POA lands. The tidelands in front of and to the north of the dock are owned by the POA and consist of 1,400 acres of undeveloped mudflats. These tidelands stretch from the southern end of the dock northward for more than a mile to beyond Cairn Point. In addition to areas it owns, the POA leases about 70 acres of tidelands south of the POA from the Alaska Railroad Corporation (ARRC) through 2023.

The POA's mission is to provide a modern, safe, and efficient facility capable of effectively handling the quantity (4.4 million tons in 2003) and variety of cargo entering and leaving the POA, and to stimulate economic development while meeting future growth demands. As an economic leader, it generates more than $750 million annually for the state's economy. In addition, the POA and Kodiak offer the only active Foreign Trade Zone services currently in Alaska. The POA is self-supporting, receives no tax support from the MOA, and funds facility improvements through its revenues and grants. It is the largest of the state's 95 public ports and harbors and accommodates cruise vessels and a full range of maritime commodities, including container, trailer, break-bulk, dry-bulk, and liquid-bulk cargos. The POA is a designated strategic location for supporting the rapid deployment of the Stryker Brigade Combat Team and other U.S. Army Alaska (USARAK) combat forces due to its proximity to Elmendorf Air Force Base (AFB) and Fort Richardson. Direct and indirect employment opportunities for stevedores, truckers,

railroaders, warehousemen, the oil and construction industries, the finance-insurance-real estate sector, and a growing number of export-related jobs in petroleum products, forest products, mining, and manufacturing are generated by POA activities.

The POA stages 100 percent of the exports of refined petroleum products from the state's largest refinery (in Fairbanks) and facilitates petroleum deliveries from smaller refiners on the Kenai Peninsula and in Valdez. Approximately 60 percent of inbound freight is destined for the Anchorage Bowl, with the remainder destined for delivery throughout the state (VZM 1999). The POA handles:

- all of the jet fuel for Ted Stevens Anchorage International Airport, JP-8 fuel for Elmendorf AFB, and petroleum products for Alaska's bush area;
- goods for all major military installations; and
- wholesale goods for all retail distributors and grocery stores north of Cordova.

The POA provides "just-in-time" service to businesses—the goods that arrive on Tuesday generally are available in stores to customers on Wednesdays. Thus, the POA fulfills a vital role for Anchorage, the State of Alaska, and the nation.

Primarily a receiving POA, the POA typically handles twice the tonnage of inbound cargo as outbound cargo. Of the 4.4 million tons of cargo handled by the POA in 2003, 58 percent was POL, 38 percent was containerized cargo, and 3 percent was dry-bulk/cement. In addition, the POA is a critical national POA that has been designated as the 15th "Strategic Commercial Seaport" in the nation by the Department of Defense (DoD) and is considered to be a critical link in the rapid deployment of U.S. troops throughout the world.

The POA is operating at or near critical capacity ranges for various types of cargo. A key component of the proposed action is to provide for the increased capacity necessary to support the growing demands of Anchorage and Alaska. For example, liquid-bulk, primarily in the form of POL, is the largest category of POA cargo, accounting for approximately 2.6 million tons of the 4.4 million tons received by the POA in 2003. The capacity for POL products at the POA was estimated to be about 2.8 million tons in the POA Master Plan (VZM 1999). Thus, handling of liquid-bulk products reached 93 percent of the SPC in 2003. Similarly, inbound vans, flats, and containers representing major cargo handled by the POA, and accounting for 1.7 million tons of the 4.4 million total tons handled by the POA in 2003, exceeded the SPC estimated in the POA Master Plan. Cement, another vital inbound commodity, uses a POL berth to off-load because a dedicated dry-bulk facility does not exist. Approximately 145,000 tons were offloaded in 2003, well exceeding the Maximum Practicable Capacity (MPC) of 107,000 tons estimated in the POA Master Plan.

Currently, most of the military shipments into the POA arrive by commercial carriers (TOTE). Military ships used the POA three times in 2003 and four times in 2004. These visits were for deployment of

equipment for combat missions and to support training in the region. The military used both Terminals 2 and 3, with cargo loaded through a roll on-roll off (RO-RO) operation. Backland storage requirements for these loadings used a nine-acre area, and superseded all other POA operations in those areas until the deployments were complete. As part of requirements for military deployment, and specifically for the Stryker Brigade Combat Team, the DoD recommends 40 acres of staging area be available. As noted, only nine acres are currently available for use. Thus, a key component of the Project is the creation of additional staging areas for Stryker activities in conjunction with the 2005 deployment date.

The POA is in the process of undertaking a multi-phased Road and Rail Extension Project to improve current transport of goods within the POA and to the nearby ARRC intermodal yard. Additionally, the Road and Rail Extension will support future military deployments. Construction for this project began in 2004 (POA 2004a) and involves the relocation and extension of Terminal Road along the eastern and southern boundaries of the POA, coupled with construction of three tracks and an intermodal yard. An EA evaluated this Road and Rail Extension, and a Finding of No Significant Impact (FONSI) was issued on February 4, 2004 (POA 2004a).

POA usage is currently limited by its facilities and the conditions at the POA, resulting in congestion at all of its five terminals. For example, in 1998, 84 occurrences of congestion at the POA were identified (VZM 1999). Because the extremes that expose deep draft vessels to hazards at low tide, conventional bulk carriers with a laden draft of over 40 feet are required to schedule arrivals and departures in order to avoid being delayed by low tide. In addition, terminal POL 1 is not considered to be sufficiently stable to support the pneumatic off-loader needed for moving dry-bulk cargo, and neither terminals POL 1 nor POL 2 have the capability of supporting the heavy lift equipment required for containerized cargo. Cruise ships are sometimes required to use Terminal 3 during times of congestion, such as when a cement vessel is stationed at POL 2. However, new security requirements cause issues with the transportation of passengers within the secured POA area. A cement vessel can require over three weeks to unload, resulting in further shipping traffic congestion.

POA facilities, including the terminals and docking berths, are substantially past their design life. Corrosion and other impacts have reduced the structural integrity of many of the areas to critical levels, and inspecting engineers have determined that the facilities are at substantial risk, especially during a significant seismic event. Therefore, for operational safety purposes and to ensure the flow of goods into most of Alaska, it is crucial that the obsolete infrastructure be replaced as soon as feasible.

PURPOSE AND NEED

In 1999, the POA Master Plan (VZM 1999) identified the following key findings about the growth of POA operations at the POA through 2025:

- containerized cargo throughputs at the POA are expected to grow at a compound annual rate of 2.5 percent according to moderate forecasts; and
- market opportunities included growth in domestic and international container traffic, automobile and bulk cargos, and cruise activities.

Demand for POA services has grown even faster than these forecasts, and, due to its limited infrastructure and increased throughput, the POA is currently operating at an average of 18 percent above the SPC. In addition, the increasing role of the POA in military deployments has created additional demands on POA facilities and resources not anticipated in the Master Plan. Therefore, the need for the proposed action, and specifically the Marine Terminal Redevelopment phase of expansion, is urgent.

The purpose of the Project is to meet the identified needs of the citizens of Alaska and the MOA through 2025 by replacing functionally obsolete structures; increasing POA capacity, efficiency, and security; and accommodating the newly introduced needs of the U.S. military for rapid deployment. The POA provides critical goods to Anchorage and the State of Alaska. However, it lacks critical features to meet current and predicted additional needs and to maintain its level of service over the next 20 years given forecasted growth in demand for POA services. These needs include:

- ***Necessary replacement of obsolete infrastructure*** – certain elements of the POA's existing infrastructure are functionally obsolete and near or below design safety standards for seismic events.
- ***Ability to withstand harsh environmental conditions*** – the Upper Cook Inlet provides challenges in the form of strong currents, the second most widely fluctuating tides in the world, ice buildup, scour from ice and silt, and earthquakes that any POA expansion proposal must consider.
- ***Additional capacity to accommodate growth in current customers*** – current and near-future cargo-handling capacity will continue to exceed maintainable, safe, and efficient levels.
- ***Additional berths to provide service to new customers*** – expected growth of operations coupled with existing customer demand will result in at least 40 percent growth in ship calls, causing berthing conflicts, increased waiting times for berths, and increased transportation costs to the public.
- ***Deeper drafts, longer berths, larger cranes for offloading, and more streamlined intermodal transportation to efficiently handle new ships and to move the increasing amount of cargo out to the public*** – current trends in maritime transportation have produced larger, longer ships that cannot currently be supported by the POA. With deeper drafts and wider beams, these large ships require longer berths and cranes with a wider capacity for unloading. Failure to expand would

result in increasing inefficiencies and costs for shipping goods to Alaska's customers. Loading procedures at ports of origin are currently restricted by the POA crane reach.

- ***Lighting, gates, and other features to meet new security requirements under the new Maritime Security mandates*** – the POA, like all U.S. ports, must construct facilities and implement measures to comply with the Maritime Transportation Security Act of 2002 and associated U.S. Coast Guard maritime security regulations designed to protect the nation's ports and waterways from terrorist attack.
- ***Additional space and an improved berth to support military rapid deployments without conflicting with commercial customers*** – as a critical conduit for military deployment, the POA will need to maintain a sustained commitment that embodies a long-term plan, integrating intermodal efficiency with that of heightened security and positive cargo control. Current berthing facilities at the POA are insufficient to accommodate both military and commercial ships supporting the USARAK's Alaska-based Stryker Brigade Combat Team. The expansion in facilities and increase in efficiencies are also critical to the POA supporting its designation as the 15th Strategic Commercial Seaport in the nation for military deployments.

PROPOSED ACTION AND ALTERNATIVES

Alternatives Screening Process. To define reasonable alternatives and to identify those alternatives not appropriate to carry forward for further analysis in the EA, MARAD and the POA conducted a hierarchical screening process involving three major criteria: 1) location; 2) size; and 3) orientation and design. These criteria and their subcriteria tie directly to the purpose and need defined in Chapter 1. MARAD and the POA then decided on a single proposed location for construction and operation of expanded vessel berthing and cargo storage facilities. The POA established that expansion would be limited to property under control of the POA to the west, northwest and southwest of the existing POA. Expanding onto the tidelands to the west would not create land ownership conflicts similar to those for backlands to the south, east or north; or conflicts in management and use similar to lands to the north and east.

With immediate and longer-term growth in POA use expected, location and orientation of the expansion needs to promote the efficient movement and flow of cargo to and from the waterfront as well as maximize cargo storage space. The expansion west, northwest, and southwest of the POA into the existing tidelands would meet these needs. In order to expand to the west, northwest, and southwest of the present docks, the POA is proposing to create 135 acres of usable area.

This expansion meets all of the defined criteria and requirements and would fulfill the purpose and need for the action. The footprint of this option lies wholly within or directly adjacent to the POA, providing for efficient and secure off-loading, on-loading, and storage of commercial and military cargo. Because

of its location adjacent to Elmendorf AFB and the POA, this location provides secure access without inhibiting the flow to or from the cargo area or docks during mobilization operations of the military.

Other alternatives for design oriented toward creating or maintaining a shallow water intertidal zone through the use of trestles or 100 percent pile-supported dock structures could not adequately meet engineering constraints. The use of extensive steel pile supports (i.e., 50 percent or greater of the structure) with associated icing issues, material stability and lateral support issues during seismic events, hydrologic impacts, and increased construction schedules and constructability issues all act to render such an approach infeasible.

Three alternative designs were deemed appropriate for further evaluation for the expanded terminal facilities—100 percent sheet pile construction, pile-supported dock with a sheet pile fill, and a combination of the two designs. The sheet pile design has been used at a number of POA and dock facilities world-wide, including Seward, POA Mackenzie, Flint Hills Petroleum (adjacent to the POA), Dutch Harbor, on the North Slope of Alaska, and at other Alaskan locations, most recently Dillingham. MARAD and the POA also decided to assess a combination of these two designs given differences in soil stability from Cairn Point south to the former Summit Barge and Transfer facility. Any one of these three alternative design methods would meet the stated purpose and need.

MARAD and the POA identified no other reasonable alternatives capable of fulfilling the purpose, need and engineering feasibility requirements, given the criteria for alternatives selection. Although the no-action alternative would not meet the purpose and need for the Project, it is carried forward for analysis in compliance with CEQ guidelines.

Marine Terminal Redevelopment. The completed Marine Terminal would include:

- Seven modern dedicated ship berths;
- Two dedicated barge berths;
- Rail access;
- Modern shore-side facilities and equipment to accommodate cruise passengers, cement bulk, POL, RO-RO cargo, containers, general cargo, Stryker Brigade Combat Team, and general cargo on barges; and
- Additional land area to support expanding military and commercial operations.

These facilities would provide for the critical replacement of existing facilities that are past their design-life, that have deteriorated structurally to unacceptable levels, and that do not have the capacity to service increasing demand.

Implementing the Project would involve two major components and one related activity:

- Continuous expansion onto tidelands and construction of marine structures for berths to accommodate barges and additional RO-RO vessels, a floating dock; a cement berth, two improved POL terminals, three longer berths to accommodate larger container ships, a staging area for Stryker Brigade Combat Team and industrial fabrication, and land for other new or expanded operations.
- Reorganization of the POA system and support structure for loading, unloading, and storage of cargo, and more efficient intermodal freight transfer facilities for commercial and military use. As part of the reorganization, the POA would provide enhanced security measures and improved equipment for loading and unloading containers.
- In a related activity, direct dredging in the harbor area during construction would provide necessary deeper draft for the larger commercial and military ships that must call at the POA in the future.

Construction is anticipated to take approximately seven years, primarily occurring in summer field seasons, beginning in 2005 to support Stryker Brigade Combat Team deployment needs. After anticipated completion of the construction in 2011, the POA would proceed with operations of the expanded facility for the foreseeable future. However, to continue to supply critical goods to Alaska, operations at the POA must continue unabated during construction. This assessment examines environmental impacts from POA operations through 2025.

Elements of the proposed action include construction methods, dredging activities, filling, equipment and systems replacement, and operations. Phasing of construction areas and operations of the POA at completion are also described below.

Construction Activities. Given the size of the expanded surface area envisioned for the Project, the need to segregate the work undertaken in each year for project control purposes, and the need to temporarily relocate existing operations during construction to maintain POA operations, the Project has been divided into six construction areas, ranging in size from 17 acres to 34 acres each. The sequence of construction required for successful implementation of the POA expansion, must occur so that:

- Additional lands are available to meet the requirements for Stryker Brigade Combat Team deployment in 2005;
- The present and future supplies of critical goods to Anchorage and Alaska continue unabated; and
- Crane operations are relocated off the existing structure as soon as is feasible to allow necessary demolition of decaying structures.

This sequencing requires the creation of backlands as the first step in construction. As part of the EA process, MARAD and the POA evaluated the feasibility of initiating construction south of the existing dock area. However, the requirements for Stryker Brigade Combat Team deployment in 2005 and the

direct access from DoD property to the northern portion of the proposed expansion area, dictated that initial expansion activities begin in that area.

Other steps in the sequence would include dredging of the construction area, where required; filling; construction of pile supports for the crane; installation of pile supports for the pile-supported dock alternative or sheet pile cells for the sheet pile alternative; completion of dock construction; movement of operations to new areas; demolition of current facilities; placement of new cranes; dredging of berth areas; and completion of final operational layouts, utilities, road systems, and security systems. Construction activities would likely occur in multiple areas at the same time. A typical construction season in Anchorage lasts approximately 180 days and takes place from mid-April through October, depending upon weather conditions. Construction activities that generate high noise levels would typically occur from 6:00 a.m. to 10:00 p.m. seven days a week. Some backland construction and material deliveries may occur year-round.

Dredging. Based on available information, dredging in front of and behind the new dock to a depth of -45 feet MLLW (approximately 10 feet below the current dredging depth of -35 feet MLLW) would be conducted in conjunction with the development of tidelands. To the extent feasible, dredge material would be used for common fill material in the proposed backlands. Dredge material not suitable for use as fill would be disposed of at an approved site. Methods similar to those employed by the U.S. Army Corps of Engineers (USACE) in the Knik Arm for maintenance dredging would be used for the Project. For the construction phase of the proposed action, approximately 6.7 million cubic yards (286 acres) of material would be removed by dredging. Approximately 16 percent of total dredging would occur in the intertidal zone, with the remainder occurring in the subtidal zone.

USACE performs annual operations and maintenance dredging of 206 acres within the POA vicinity. Approximately 70 percent of the 206 acres currently dredged by USACE overlap with the POA expansion dredge areas. Approximately 68 acres currently within the USACE project limits would no longer require dredging to support POA operations after completion of the Project.

Fill material. All design alternatives would require a large amount of suitable engineered and common fill material (9.1 to 12.3 million cubic yards or 11.8 to 16 million tons). Dredge materials would be used to the extent feasible for common fill. Multiple sources could supply the remaining fill through various delivery methods.

Equipment Replacement. The proposed action includes installation and operation of three 100-gage container cranes, an upgraded cathodic protection and protective coating system, a new fendering system and mooring system, upgraded drainage system, and a new utilities system.

Operations. The Project would accommodate military vessels, multi-purpose vessels, barges, and railroad traffic associated with cargos at the POA. Expansion would include accommodations for cement, two POL berths, two container berths, a military RO-RO cargo berth (with access to 100-gage cranes), and two barge berths. The new POA would also have increased lighting facilities, improved stormwater drainage, and improved access within the POA and secure access to the POA from the outside. The expanded area is projected to be sufficient to accommodate projected increases in commodities and traffic through 2025 and beyond.

Management Actions. The proposed action would include the implementation of various management actions, including mitigation, monitoring, and the implementation of environmentally beneficial programs to limit potential impacts to the environment. Mitigation measures include, but are not necessarily limited to, implementation of Best Management Practices and compensation for loss of Essential Fish Habitat (EFH) and tidelands. The specific proposals for mitigation of EFH and tidelands will be identified through the Section 404 permitting process with the USACE and appropriate resource agencies. Monitoring and ongoing studies would be conducted before, during, and in some cases, after construction, for fish and beluga whales. The POA also is proposing projects that would enhance the local environment, including improvements to the Sea Services Veterans Memorial and Ship Creek Point area and the area around a Comprehensive Environmental Response, Compensation, and Liability Act-regulated landfill on Elmendorf AFB (LF04).

Design Alternatives. The POA would use one of three design alternatives for the expanded terminal facilities: Alternative A, sheet pile construction with fill design; Alternative B, steel pile-supported dock with sheet pile fill design; or Alternative C, a combination of the two. Both sheet piling and pipe pile designs have been used throughout Alaska. MARAD and the POA assessed a combination of these two design alternatives (Alternative C) based on differences in soil stability in the affected area. Any one of the alternative design methods would meet the stated purpose and need. The POA and MARAD have identified Alternative A as the preferred alternative. Based on the analysis presented in this EA, the POA and MARAD deemed Alternative A to be preferable to Alternatives B and C. Alternative A meets all of the operational requirements with the least potential for environmental impacts.

No-Action Alternative

Under the no-action alternative, the POA would not implement the Project. The POA is at, or is exceeding, present operational capacities for various types of cargo. In addition, many of the facilities are at the end of, or have surpassed their design life, and are in critical need of replacement. The POA has been operating for 25 years beyond its original design life, and the structural integrity of the supporting steel infrastructure has been greatly reduced by corrosion and deterioration. Consequently, in order to reduce the risks of structural instability and continue to operate the POA in a safe and responsible manner,

a true no-action alternative is not possible. Thus, MARAD and the POA conclude that the no-action alternative would require:

- a long-term program to repair and/or replace corroded steel piles, deteriorating concrete structural elements, and other facility elements that are past their design life;
- replacement of the obsolete and poorly-functioning cathodic protection system to help slow future corrosion; and
- increased maintenance requirements and costs in the future as other existing facility features further exceed their design lifespan. This would include rapid implementation of deferred repair or replacement projects identified in previous inspection reports, as well as more responsive or proactive maintenance efforts in response to future inspections.

These actions would require extended periods of restricted access to existing terminals and, in some cases, closure of specific berths during periods of replacement or repair, resulting in long delays and temporary but lengthy disruptions in cargo loading and unloading operations. Such closures would be implemented at the same time that the POA was trying to balance the rising demand for consumer goods and the need to support military deployment during national emergencies. Such closures would violate the purpose and need requiring that throughput of goods and services be maintained in order to supply required consumer goods to Alaskans.

Thus, even if the POA expansion does not occur, critical facilities will require replacement to allow continued operation of the POA at its existing capacities. Therefore, MARAD and the POA evaluated the impacts from critical maintenance and replacement activities as part of the assessment on not implementing the Project.

Summary of Environmental Consequences

This EA presents the existing environmental conditions and potential consequences that could result from the proposed action. An examination of the possible impacts focused the analysis on 16 resource categories: air quality; noise and vibration; hazardous materials and waste; safety; geology and soils; hydrodynamics and sedimentation; water quality; biological resources; essential fish habitat, land use and coastal zone consistency; recreation and visual resources; transportation; 4(f)/106 resources; public services and utilities; socioeconomics and environmental justice; and cultural resources.

According to the analysis in this EA, and based upon best available data, implementation of the proposed action's three design alternatives (including management actions) would not result in significant adverse impacts in any resource category. A summary of the potential impacts by resource category for the proposed action's three design alternatives and the no-action alternative is presented in Table 3-38. Although emissions and noise levels would increase, carbon monoxide (CO) emissions levels would not exceed *de minimis* levels and therefore would not have a significant adverse impact. Noise levels in

nearby residential areas would not exceed MOA levels or levels established as significant by MARAD and other transportation agencies.

Construction of the Project would not have a significant adverse impact on biological resources. Filling of EFH and noise associated with impact pile driving could have an adverse impact, although based upon best available data, the impact would not be significant. The POA, in conjunction with MARAD, will implement management measures (e.g., fish studies and habitat restoration on Ship Creek) to monitor for impacts and address unanticipated impacts to less than significant levels. Potential adverse impacts to beluga whales from construction may also occur. Best available data indicate that those impacts would not be significant. Nevertheless, the POA, in conjunction with MARAD, will also implement measures, such as a beluga monitoring plan and appropriate management practices for whenever belugas approach construction activities, to address unanticipated impacts.

No significant adverse impacts would occur to hazardous materials and waste, safety, geology and soils, hydrodynamics and sedimentation, water quality, land use, transportation, public utilities, and cultural resources.

Beneficial economic impacts from construction would range from an additional 6,600 to 8,000 jobs and an additional Gross State Product (GSP) of between $352 million to $445 million. Beneficial economic impacts to the region in 2025 would include more than $515 million in GSP, accounting for more than 8,400 jobs and more than $272 million in income in 2025 alone. Other beneficial impacts under the proposed action include enhancement to parks and 4(f) resources, enhancement and improvements to LF04, and creation of an Alaska Native interpretive area.

Implementation of the no-action alternative would result in adverse impacts, including increasing noise levels at nearby residential areas, lack of critical commercial goods in the future because of congestion and delay during major military deployments, and significant potential loss of jobs and income. It is projected that in 2025, a lack of implementing the Project at the POA would result in almost 4,700 fewer jobs, more than $522 million less in output, $154 million less in income, and $294 million less in GSP. Enhancements and improvements to Ship Creek, additions to parks, inclusion of a Native Alaskan interpretive center, and improvements to LF04 would not occur. No significant adverse impacts due to the no-action alternative would occur to air quality, hazardous materials and waste (although the potential for spills could increase with congestion), safety, geology and soils (although the POA would be more susceptible to damage from an earthquake), hydrodynamics and sedimentation, water quality, biological resources, land use, recreation and visual, 4(f) resources, public services and utilities, and cultural resources.

CHAPTER 1

PURPOSE AND NEED FOR THE PROPOSED ACTION

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

This Environmental Assessment (EA) analyzes the potential environmental impacts associated with the proposed Marine Terminal Redevelopment Project (Project). It is being prepared to support the proposed expansion of the Port of Anchorage (POA), which is currently operating above Sustainable Practicable Capacity (SPC). The Project includes a variety of activities to enhance the transportation of goods and people within the State of Alaska. Potential expansion activities are scheduled to occur over approximately the next seven years (2005 to 2011), using federal funding administered by the U.S. Department of Transportation, Maritime Administration (MARAD). The Project would expand, reorganize, and improve the POA by:

- *Demolishing and replacing structures that are degraded, decayed, or functionally obsolete;*
- *Providing barge dock capacity;*
- *Expanding commercial dock space to meet unfilled present and future demands;*
- *Upgrading functionally obsolete cranes to enable a full reach across ship beams;*
- *Providing the additional land and facilities necessary to support military rapid deployment from Alaska's bases, including the U.S. Army's Stryker Brigade Combat Team and Airborne Brigade Combat Team (BCT) Sealift Operations;*
- *Improving landside traffic circulation and intermodal surface freight operations;*
- *Replacing and relocating code-compliant POA support structures and buildings and developing warehouse storage;*
- *Developing a secured cruise ship terminal to accommodate passengers and baggage screening in accordance with new Homeland Security mandates;*
- *Providing rail connection to the waterfront for commercial and military intermodal transfers; and*
- *Installing state-of-the-art security and lighting controls in accordance with the new Maritime Security mandates.*

The Project will influence the physical and economic aspects of the Municipality of Anchorage (MOA) and the State of Alaska, expanding both cargo and, to a lesser extent, passenger use of the POA with ensuing benefits and effects on the remainder of the state. In addition, the Project is critical to national defense by providing the additional land and facilities necessary to support military deployments. Because of this, MARAD and the POA have included extensive public involvement and community outreach efforts during the course of the Project. Such efforts have included two public and three agency meetings, numerous direct mailings, four newsletters, a public website, and public review of the draft EA.

This EA has been prepared under direction of MARAD in cooperation with the POA, and in accordance with the requirements of the National Environmental Policy Act (NEPA) and its implementing regulations (Council on Environmental Quality [CEQ], 40 Code of Federal Regulations [CFR] 1500 –

1508). This documentation has also been prepared in accordance with U.S. Department of Transportation (USDOT) regulations implementing NEPA and other applicable federal and state-delegated environmental regulations. The conduct of this NEPA project adheres to the goals and requirements of streamlining processes as embodied in Executive Order (EO) 13274, *Environmental Stewardship and Transportation Infrastructure Project Reviews*, its associated Memorandum of Understanding, and Section 1309 of the *Transportation Equity Act for the 21st Century*.

1.1 LOCATION AND DESCRIPTION

The POA, located in the Upper Cook Inlet and managed by the MOA (Figure 1-1), occupies approximately 129 acres. It is surrounded by commercial or military properties to the north, south, and east, and by the Knik Arm of Cook Inlet to the west (Figure 1-2). Immediately south of the POA are other port-related commercial activities covering about 111 acres predominantly owned by the Alaska Railroad Corporation (ARRC). Commercial activities operated by tenants on ARRC land include petroleum storage and transfer, dry-bulk transshipment, and container cargo storage. To the north and east, Elmendorf Air Force Base (AFB), adjacent to the POA, lies on a terrace roughly 100 feet above the property. To the southeast, the lands formerly supporting the U.S. Army Anchorage Fuel Terminal delimits the POA. The POA extends into the Knik Arm of Cook Inlet on the west. The closest residential areas include Cherry Hill, a military housing tract located within Elmendorf AFB, approximately 1,500 feet to the east, and the Government Hill community, located approximately 1,500 feet to the southeast. Given current land use and ownership, expansion of facilities cannot extend landward to the north, south, or east.

Development of the current POA area began early in the twentieth century (Table 1-1). Population and economic growth since this time, including production levels of Alaska's natural resources, have been primary drivers on the demand for maritime shipping.

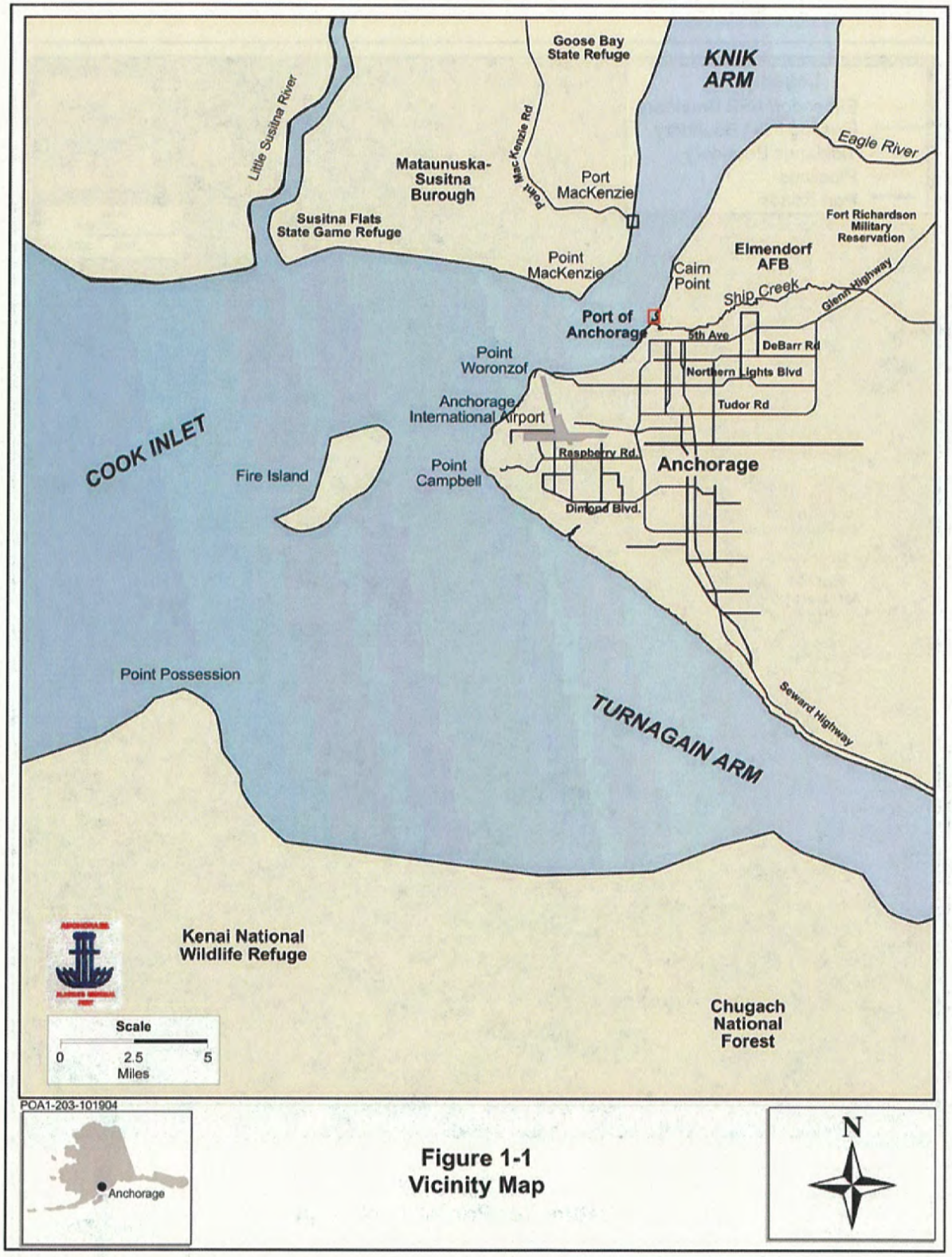

Figure 1-1
Vicinity Map

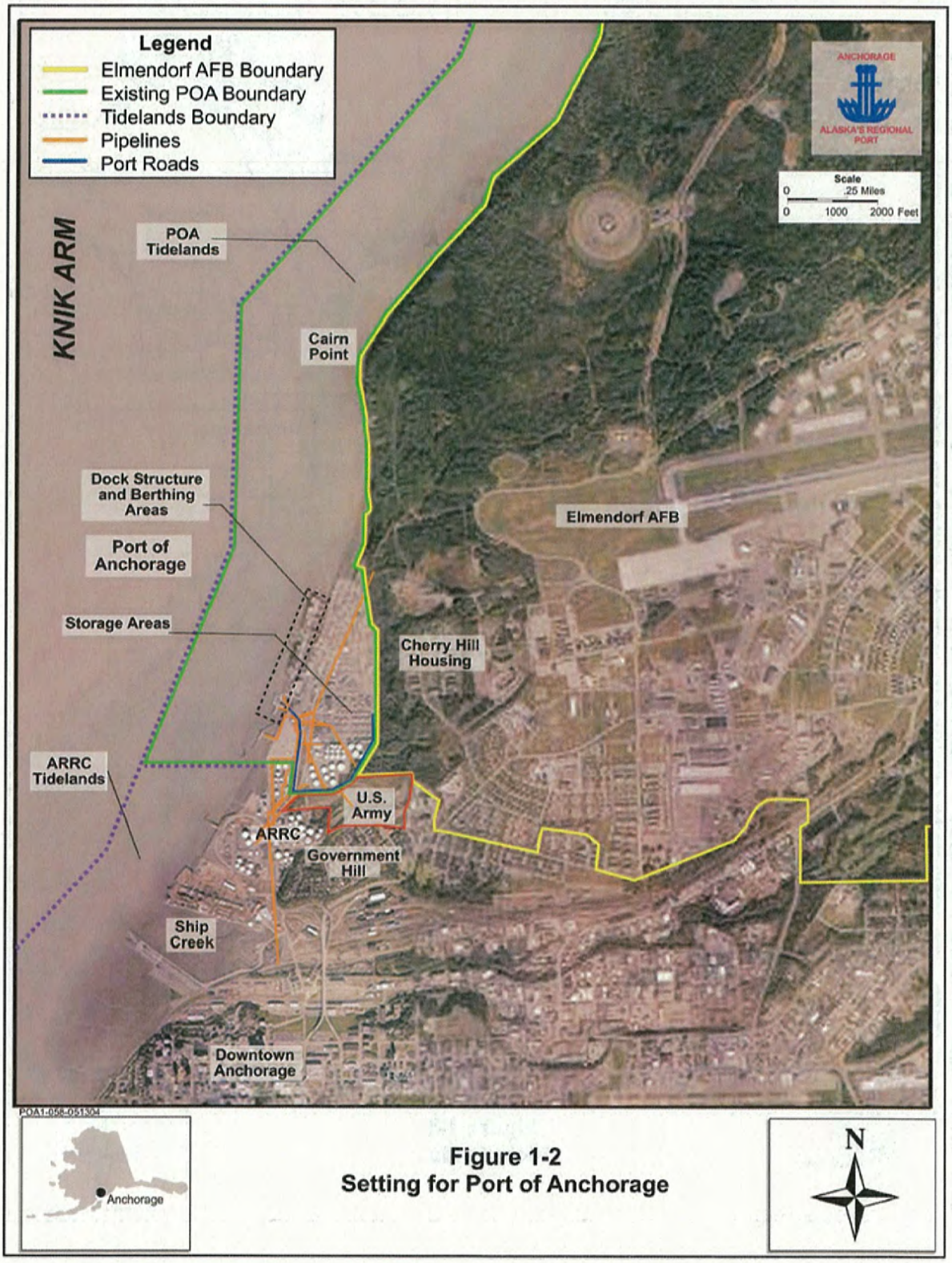

Figure 1-2
Setting for Port of Anchorage

Table 1-1 Development of the POA	
Year	***Description***
1910	First cabins constructed on Ship Creek
1914	Congress authorizes the construction of the Alaska Railroad; City of Anchorage born as a construction campsite
1918	Ocean Dock built
1920	Incorporation of City of Anchorage
1940	Construction of military dock, Fort Richardson and Elmendorf AFB
1942	Alaska Canadian Highway built; Dam built on Ship Creek on Elmendorf AFB
1946	Creation of the Port Commission
1946-1949	Construction of a dock and approach in Knik Arm
1950	Anchorage-Seward Highway completed
1950-1955	Construction of a dock and dredging of a slip
1951	Anchorage Airport opens
1952	Two additional dams built on Ship Creek, the old Chugach Electric Dam and the Fort Richardson Dam
1958	Construction of transit shed and Terminal 1
1959	Alaska gains statehood
1961	POA established terminal (38,000 tons of goods)
1961-1964	Construction of a bulkhead
1964	Good Friday Earthquake; military dock destroyed; Terminal 1 and Petroleum, Oil, and Lubricants (POL) 1 damaged; Terminal 1 and POL 1 repaired
1965	North docking berth extension constructed
1967	Building/rebuilding of Tidewater, Terminal, and Gull roads
1968	Oil discovered in Prudhoe Bay; Terminal 2 construction
1970	Terminal 2 complete; Growth of oil industry in Alaska; Cranes 1 and 2 acquired; Lots 1D, 1E, 2B, 3A, 4A, 5D, 5E, 5F, 6C, 6D, 7B, 8, 8B, 8C are paved and developed
1971	Stevedor Building 1 is built
1972-1975	Construction of a dock extension
1973	Terminal 3 construction began: Stevedor Building 2 built, Terminal 3 dock, and Trestle 3A are built; Yard 1, 2 improvement
1974-1977	Alyeska Pipeline is under construction
1975	Terminal 3 Yard C is built; Terminal dock is built; City of Anchorage and Greater Anchorage Area Borough unified into the MOA
1977	Transit A and maintenance building constructed
1977	Terminal 3 Phase 3 dock platform completed and Trestle 3A is built
1978	Terminal 3 Dolphin and Trestles 1 and 1B are built
1980-1987	POL Terminal Expansion; addition of third crane, lots, and yards
1982	Trestles 1 and 1B are redeveloped and crane turnout trestle is built
1984	Crane 3 is acquired; Lot 12B is developed
1985	Terminal 1 addition and renovation
1986	Yard D complete
1989	POL Valve Yard is improved; POL terminal rotated
1992	POL 2 (South Terminal) completed; POL Tower Crane replaced
1993	POL Spill Containment Basin liner upgraded
1994-1998	Dock fender replaced; repair and rehabilitation of POL 2; Trestle Pier No. 2 repaired
1994	Lot A, Lot EE, and Terminal Roads improved
1996-1999	Catwalk to access barge constructed
1997	Lot 9A improvements conducted
1998	Lot 4A is developed
1998-2001	Steel bulkhead with an attached dock constructed
2001-2005	Walkway and floating dock constructed
2003	Third trestle at the north end of Terminal 3 constructed
2004	Road and Rail Extension Project began; temporary floating dock for U.S. Coast Guard began

The POA officially began operations in September, 1961 with 38,000 tons of marine cargo moving across its single berth during that year. During the Good Friday Earthquake of 1964, the military dock was destroyed and the existing Terminal 1 and POL Terminal 1 sustained major damage. Although the present Terminal 1 structure did not collapse, it was substantially damaged in many locations with sheared connections between piles and pile caps, vertical displacements, and damage to the crane support system. As a result, the dock was out of service for several weeks. The tsunami generated by the earthquake destroyed the two other ports, Seward and Valdez, which served southcentral Alaska at that time. Consequently, all the materials shipped to Alaska to rebuild the state came through the Anchorage facility. Development of the POA continued during the 1960s with addition of Terminal 2; a north dock expansion; building and rebuilding of Tidewater, Terminal, and Gull roads; and addition of trestles and yard facilities. Cook Inlet was increasingly used for oil production during this time, with peak production of 230,000 barrels per day of crude oil in 1970: The discovery of the Prudhoe Bay oilfield and developing oil industry stimulated additional growth into the 1970s and 1980s. Between 1980 and 1987, North Slope oil revenue boosted the state treasury and nearly a billion dollars worth of capital projects were constructed in Anchorage, including such POA improvements as a third crane, additional lots and yards, and a POL terminal expansion. The POA now has a five-berth terminal, providing facilities for the movement of containerized freight, iron and steel products, wood products, bulk petroleum and cement, and other bulk cargo (Figure 1-3).

Figure 1-3 The POA Today

The POA contains three major functional areas: the dock structure and berthing areas; storage areas (Figure 1-4); and the transportation network (roads, rails, and pipelines). At an elevation of 38 feet above Mean Lower Low Water (MLLW), the dock stands on steel pipe pilings surrounded by rip-rap and supports three container berths, two POL terminals (Figure 1-5), the POA offices and maintenance shop, three 38-gage cranes, and other facilities for loading and unloading dry-bulk and liquid-bulk cargo. Storage and transfer facilities cover most of the POA, extending eastward from the dock to the eastern boundary. Container storage dominates these facilities, although they accommodate liquid-bulk, dry-bulk, and auto/vehicle storage and transshipment. Commercial shipping lines, Totem Ocean Trailer Express (TOTE) and Horizon Lines, are the dominant operators of these facilities. Emerging users include Homeland Security, the military, and Lykes Lines (CP Ships), as well as some cruise ships. A fuel tank farm occupies the southeastern corner of the POA lands. The tidelands in front of and to the north of the dock are owned by the POA and consist of 1,400 acres of undeveloped mudflats. These tidelands stretch from the southern end of the dock northward for more than a mile to beyond Cairn Point. In addition to areas it owns, the POA leases about 70 acres of tidelands south of the POA from the ARRC through 2023.

Figure 1-4 Storage Areas

1.2 MISSION

MARAD administers federal laws and regulations designed to meet the nation's shipping needs for both domestic and international waterborne commerce and for national security. Its mission ensures that the U.S. has:

- efficient ports and effective intermodal water and land transportation connections and
- sufficient commercial intermodal shipping capacity for use by the Department of Defense (DoD) in times of emergency.

Figure 1-5
Port of Anchorage and Vicinity

The POA's mission is to provide a modern, safe, efficient facility capable of effectively handling the quantity (4.4 million tons in 2003) and variety of cargo entering and leaving the POA, and to stimulate economic development while meeting future growth demands. As an economic leader, it generates more than $750 million annually for the state's economy. In addition, the POA and Kodiak offer the only active Foreign Trade Zone services currently available in Alaska. The POA is self supporting, receives no tax support from the MOA, and funds facility improvements through its revenues and grants. It is the largest of the state's 95 ports and harbors and accommodates cruise vessels and a full range of maritime commodities, including container, trailer, break-bulk, dry-bulk, and liquid-bulk cargos. The POA is a designated strategic location for supporting the rapid deployment of the Stryker Brigade Combat Team and other U.S. Army Alaska (USARAK) combat forces due to its proximity to Elmendorf AFB and Fort Richardson. Direct and indirect employment opportunities for stevedores, truckers, railroaders, warehousemen, the oil and construction industries, the finance-insurance-real estate sector, and a growing number of export-related jobs in petroleum products, forest products, mining, and manufacturing are generated by POA activities.

The POA stages 100 percent of the exports of refined petroleum products from the state's largest refinery (in Fairbanks) and facilitates petroleum deliveries from smaller refiners on the Kenai Peninsula and in Valdez. Approximately 60 percent of inbound freight is destined for Anchorage, with the remainder destined for delivery throughout the state (VZM 1999). The POA handles:

- all of the jet fuel for Ted Stevens Anchorage International Airport, JP-8 fuel for Elmendorf AFB, and petroleum products for Alaska's bush area;
- goods for all major military installations; and
- wholesale goods for major retail distributors like Home Depot, Wal-Mart, and grocery stores.

It provides "just-in-time" service to businesses—the goods that arrive on Tuesday generally are available in stores to customers on Wednesdays. Thus, the POA fulfills a vital role for Anchorage, the State of Alaska, and the nation.

In order to operate efficiently with predicted growth, improvements are needed to increase available draft, increase the size of facilities for container and bulk cargos, develop a multipurpose dock, and reconfigure existing facilities and infrastructure. Previous master planning efforts also emphasized the importance of state and local improvement of landside access to accommodate the increasing number of vehicles entering and exiting the POA. These identified needs are based upon projected growth whether or not facility expansion occurs. They are not based on expanded usage that would be created by the Project.

The POA is a critical national port that has been designated as the 15th "Strategic Commercial Seaport" in the nation by DoD and is considered to be a critical link in the rapid deployment of U.S. troops throughout the world. POA management has noted new opportunities for markets as well as new challenges in meeting the needs of current and future customers. Given these additional demands, the

POA will need a number of improvement projects to accommodate that projected level of strategic and commercial activity. Expansion and improvement of the POA was listed as the first economic development action needed to ensure quality development of the Southcentral Alaska region in the MOA Comprehensive Economic Development Strategy (MOA 2003a). The need for expansion and change has led to the current proposal, the Project, which would increase the POA's capacity, efficiency, and security; provide for transportation of goods through Anchorage and Alaska through 2025; provide critical national security by supporting military deployments; and allow the POA and MARAD to meet their mission goals.

1.3 OPERATIONS

Primarily a receiving port, the POA typically handles twice the tonnage of inbound cargo as outbound cargo. Inbound cargos span the full range of goods, materials, and equipment needed by Anchorage and the remainder of Alaska, including groceries, medical supplies, retail goods, vehicles, and construction materials. Bulk petroleum, delivered to the POA either by rail or pipeline, comprises the primary outbound cargo. Altogether, the POA serves over 80 percent of the state's population and handles over 90 percent of consumer goods in Alaska. The following section discusses vessel and cargo movements at the POA.

1.3.1 Vessel Approach

Vessel approach to the POA is accomplished by navigating north through the Knik Arm from the Gulf of Alaska. There is adequate draft through the southern section of Knik Arm and past the intersection with Turnagain Arm, close to Fire Island. There is a shoal to the southwest of Fire Island, named the Fire Island Shoal, which forces the vessels to the northwest. Approximately two nautical miles northeast of Fire Island is an access channel that provides navigation between the North Point Shoal and the Woronzof Shoal. The channel is dredged to a depth of 37 feet MLLW for a length of approximately 1,020 feet. Vessels can freely navigate the remainder of the distance to the POA, either making a wide turn at the north end of the POA and, with the assistance of one to two tugboats, dock at the POA facing in a southerly direction or in a northerly direction.

1.3.2 Cargo and Ship Movements at the POA

Of the 4.4 million tons of cargo handled by the POA in 2003, 58 percent was POL, 38 percent was containerized cargo, and 3 percent was dry-bulk/cement. In 2003, there were 492 ship visits to the POA, or approximately 9.46 ship visits per week (POA 2004a). In August, the most active month of 2003, there were 75 visits to the POA. During January, the least active month, the POA received 23 visits.

Liquid-Bulk Movement. Liquid-bulk, primarily in the form of POL, is the largest category of port cargo accounting for approximately 2.6 million tons of 4.4 million tons received by the POA in 2003. The capacity for POL products at the POA was estimated to be about 2.8 million tons in the POA Master Plan (VZM 1999). Handling of liquid-bulk products reached for 93 percent of the SPC in 2003.

Petroleum cargo is pumped on and off vessels via two POL terminals (POL 1 and POL 2) at the POA, and is distributed across the POA via underground pipelines to the tenant storage tanks and operating areas. In 2003, POL vessels accounted for 40 percent of the POA ship calls, with vessels ranging from 100 to 600 feet in length (Table 1-2). The average duration at the POA for these ships was 1.5 days.

Table 1-2 2003 Ship Call Summary

Shipping Line	*Number of Calls*	*Vessel Length*	*Vessel Tonnage*	*Primary Berth*	*Average Duration in Port*
TOTE	112	791 feet 840 feet	17,600 35,825	Terminal 3	8 hours
Horizon	95	710 feet	21,000	Terminal 2	1 day
CP Ships	31	617 feet	24,000	Terminal 2	1 day
Flint Hills	142	100 feet 250 feet 600 feet (representative sizes)	200 3,000 28,000	POL 1 and 2	1.5 days
Tesoro	37	127 feet 430 feet	200 8,000	POL 1 and 2	1.5 days
Chevron	6	127 feet 430 feet	200 8,000	POL 2	1.5 days
ASFC	6	127 feet 430 feet	200 8,000	POL 1	1.5 days
Cruise	8	295 feet 650 feet +/-	4,200 35,000	Terminals 1 and 2	0.75 day
AM Const.	13	69 feet	97	Terminals 1 and 3	1 day
Alaska Basic Industries	6	525 feet	15,000	POL 1	17 days
Northland	8	125 feet 400 feet	200 6,600	Terminals 1 & 2 & POL 1	2 days
Miscellaneous	28	100-750 feet (range of sizes)	64-18,000	Terminals 1, 2, & 3	1.5 days

The primary function of the existing rail line at the POA is movement of bulk liquids for companies such as Tesoro and Chevron. Two spurs exist at the POA, one is in use by Flint Hills (formerly Williams) under lease from Tesoro, while the other, which connects with Terminals 1, 2, and 3 is not in use. The off-site ARRC intermodal yard is accessed by container trucks by way of Whitney Road. The POA is in the process of undertaking a multi-phased Road and Rail Extension Project to improve current transport of goods within the POA and to the nearby ARRC intermodal yard. Additionally, the Road and Rail

Extension will support future military deployments. Construction for this project began in 2004 (POA 2004a) and involves the relocation and extension of Terminal Road along the eastern and southern boundaries of the POA, coupled with construction of three tracks and an intermodal yard. An EA evaluated this Road and Rail Extension, and a Finding of No Significant Impact (FONSI) was issued on February 4, 2004 (POA 2004a).

There are five major POL users in the POA complex: Tesoro, Aircraft Service International Group (ASIG), Chevron, Flint Hills (formerly Williams), and Tesoro. The total acreage of their upland facilities amounts to 51.5 acres. Of the five major users, only two of them (Tesoro and ASIG) actually lease POA-owned property, the remainder of the users lease property from the ARRC.

- ASIG, which provides jet fuel to the Ted Stevens Anchorage International Airport by pipeline, receives a third of its fuel via pipeline from Nikiski. The remainder of its fuel is received from other POA tenants and ARRC tenants (Chevron, Tesoro, and Flint Hills) as well as importing fuel from barges and POL vessels through the POA facilities.

- Tesoro receives 70 percent of its fuel from Nikiski via pipeline and the rest from ships and barges. The majority of Tesoro's fuel is sold locally and is delivered by truck. The Tesoro facility is connected to the POA Valve Yard.

- Chevron's primary customer is the military, providing JP-8 (jet fuel) directly by pipeline. Chevron imports fuel through the POA facilities and transfers a percentage of its fuel to ASIG.

- Flint Hills receives its fuel from the North Pole refinery via rail cars. It ships this fuel to western Alaska by barge. It also supplies jet fuel to the Ted Stevens Anchorage International Airport via pipeline. It currently leases the Tesoro rail car rack to deliver jet fuel to ASIG.

Containerized Cargo Movement. Inbound vans, flats, and containers represent the majority of cargo handled by the POA, accounting for 1.7 million tons out of over 4.4 million total tons handled by the POA in 2003, exceeding the SPC estimated in the POA Master Plan. Load On-Load Off (LO-LO) (Figure 1-6) and Roll On-Roll Off (RO-RO) containerized cargo operations are primarily associated with Horizon and TOTE, respectively, the two major containerized cargo port users. Containerized cargo carriers accounted for 48 percent of the ship calls at the POA in 2003.

Figure 1-6 Load On-Load Off Facilities

Horizon currently accounts for two container ship calls per week. Horizon typically uses the berth at Terminal 2, a LO-LO berth, serviced by the three dockside gantry cranes. The cranes offload containers from ships onto chassis connected to a yard tractor or hostler. All of the cargo imported by Horizon is delivered by truck to its final destination.

TOTE carriers arrive regularly on Sundays and Tuesdays. An additional ship call occurs on Saturdays during non-winter months (mid-April to mid-November). TOTE's operation is RO-RO, where cargo is transported on the ship as trailers (or containers on chassis) and automobiles using a ramp system at the berth of Terminal 3. The inbound cargo generally does not stay in the yard for more than 48 hours and is received and delivered to other facilities prior to the arrival of the next shipment.

A third container operation, CP Ships, began handling cargo at the POA in the latter half of 2003. This cargo was transported to the backland area of Northland and North Star (off of POA property) for storage and staging.

Cement Movement. Cement is an inbound commodity and is unloaded and transferred with handling equipment. Alaska Basic Industries is the major dry-bulk tenant at the POA, importing cement. The POL 2 berth is used to off-load the cement. Approximately 145,000 tons were offloaded in 2003, well exceeding the Maximum Practicable Capacity (MPC) of 107,000 tons estimated in the POA Master Plan. There have historically been about eight shipments per year, four by ship and four by barge. The ship takes 10 to 18 days to unload a full load while the barge takes four to nine days to unload. The cement is vacuumed via a portable pneumatic pump and is transferred to the nine silos and rail cars for storage and shipment. Alaska Basic Industries does not have enough static capacity on site to store a ship load of cement. Rail car storage must be available and planned for when a vessel is being unloaded.

Cruise Ship Passenger Movement. Cruise vessels have typically been accommodated at Terminals 1 and 2. No dedicated cruise terminal is located within the POA complex; however, buses and cabs are allowed to drive directly to the vessel moored at the berth. These operations are limited to Wednesdays and Thursdays to avoid interference with container vessel schedules. Passenger traffic through the POA has been sporadic, with vessel calls ranging from none to twelve per year over the past decade. A limiting factor for cruise ship traffic is that the travel time to Anchorage from the lower 48 states is one day longer than to Whittier and, as a result, does not conveniently fit into the normal seven-day cruise packages. Approximately 2,700 passengers came through the POA in 2003, about 22 percent of the SPC estimated in the Master Plan.

Military Port Usage. Currently, most of the military shipments into the POA arrive by commercial carrier (TOTE). Military ships used the POA three times in 2003 and four times in 2004. These visits were for deployment of equipment for combat missions and to support training in the region. One ship occupied Terminal 3 for four days and loaded 660 tons of cargo. Two Military Sealift Command ships

also called on the POA in 2003 (Figure 1-7). These ships are 750 feet long and draw less than 30 feet of water. These size limitations are the direct result of operational limitations at the POA. The ability to support larger military ships is a critical piece of the POA's role as a Strategic Commercial Seaport. Each of the two Military Sealift Command vessels took on between 1,000 and 1,550 tons of cargo apiece. No loading or offloading of military personnel occurred during these deployments. The military used both Terminals 2 and 3, with cargo loaded through a RO-RO operation. Backland storage requirements for these loadings used a nine-acre area and superseded all other commercial port operations in those areas until the deployments were complete. No specialized equipment was required for these operations.

Figure 1-7 Cape Henry Class Ship

The POA has been designated as a Strategic Commercial Seaport and plans are underway for port usage by the newly forming Stryker Brigade Combat Team, Airborne BCT, and the USARAK. It is difficult to predict when deployment events will take place. Therefore, the POA is being called on to support the Stryker Brigade Combat Team, Airborne BCT, and other USARAK combat forces on short notice. If the Stryker Brigade Combat Team needed to deploy with the current POA configuration, there would only be ten to twelve acres of staging area available instead of the recommended 40 acres. The Stryker Brigade Combat Team is targeted to begin deployment in 2005. It is likely that the Navy would have to use the smaller Cape Henry class ships instead of larger vessels, resulting in a slower deployment time. The process to load these ships for deployment would be to stage a portion of the equipment in the POA staging area and bring in a ship that would require three to four days to load at one of the existing container berths. Once loading of that portion is complete, the ship would depart and the berth would be available for a commercial operator, allowing commercial goods to be received at the POA during deployment operations. This process would be repeated taking approximately 3 to 3.5 weeks to fully deploy the Stryker Brigade Combat Team (Army 2004). In the case of a large-scale emergency, the military could take over all of the available berthing and could load ships simultaneously in a shorter timeframe. This would not allow for commercial shipping operators to bring in cargo for up to two weeks.

Other POA Uses. Two general cargo barge operations, Douglas Management (Northland) and North Star, occur at ARRC property south of the Project boundary and adjacent to Ship Creek. These general cargo barge lines handle a wide variety of cargo, including specialized, containerized, dry-bulk, and break-bulk cargo. Northland, North Star, and other miscellaneous barge users accounted for 36 ship calls at the POA in 2003, with an average duration in the POA between 1.5 and 2 days. These ship calls occurred primarily at Terminals 1, 2, and 3 and at POL 1. In addition, Northland operates a 6.4-acre

terminal divided between container, dry-bulk, and break-bulk storage at ARRC, and North Star operates a 22.3-acre terminal with dedicated container storage area and break-bulk storage area at the ARRC.

1.3.3 Current Scheduling and Logistical Constraints

POA usage is limited by its facilities and the conditions at the port, resulting in congestion at all of its five terminals. For example, in 1998, 84 occurrences of congestion at the POA were identified (VZM 1999). Due to the extremes that expose deep draft vessels to hazards at low tide, conventional bulk carriers with a laden draft of over 40 feet are required to schedule arrivals and departures in order to avoid being delayed by low tide. In addition, POL 1 is not considered to be sufficiently stable to support the pneumatic off-loader needed for moving dry-bulk cargo, and neither POL 1 nor POL 2 has the capability of supporting the heavy lift equipment required for containerized cargo. Cruise ships are sometimes required to use Terminal 3 during times of congestion when a cement vessel is stationed at POL 2. A cement vessel can require over two weeks to unload, resulting in shipping traffic congestion.

1.4 PURPOSE AND NEED

In 1999, the POA Master Plan (VZM 1999) identified the following key findings about the growth of port operations at the POA through 2025:

- containerized cargo throughputs at the POA are expected to grow at an annual rate of 2.5 percent according to moderate forecasts and
- market opportunities included growth in domestic and international container traffic, automobile and bulk cargos, and cruise activities.

Demand for port services has grown even faster than these forecasts, and, due to its limited infrastructure and increased throughput, the POA is operating at an average of 18 percent over SPC. In addition, the increasing role in military deployment has created added demands on POA facilities and resources not anticipated in the Master Plan. Therefore, the need for the proposed action is urgent.

The purpose of the Project is to meet the currently identified needs of the citizens of Alaska and the MOA through 2025 by replacing functionally obsolete structures; increasing POA capacity, efficiency, and security; and accommodating the newly introduced needs of the U.S. military for rapid deployment. The POA provides critical goods to Anchorage and the State of Alaska. However, it lacks necessary features to meet current and predicted additional needs and to maintain its level of service over the next 20 years given forecasted growth in demand for port services. These critical features fall into seven categories: 1) repair and replacement of existing infrastructure; 2) ability to withstand harsh environmental conditions; 3) capacity for existing customers; 4) space for new customers; 5) improvement of berths and facilities; 6) improvement of security infrastructure; and 7) space for military requirements.

1.4.1 Repair and Replace Functionally Obsolete and Potentially Degraded Infrastructure

The original POA terminal was constructed in 1959 to 1961, with a 20-year design life. Its use has continued nearly 25 years beyond the end of its design life in 1979 to 1981. As part of this aging process, many elements of the POA's existing infrastructure have deteriorated to the point that they are near or below design standards under normal conditions and are significantly below design standards for seismic events. The 2004 annual inspection of the dock (R&M 2004) concluded that:

1) Pile conditions at Terminals 1, 2, and 3 and POL 1 are poor. The structure was not damaged excessively during 1964, and therefore has not been upgraded to address current seismic standards. The 1959 piles were installed with a typical wall thickness of 0.44 inches, with an assumed corrosion rate of 0.06 inches of loss per year. Thus, the original design assumed the minimum wall thickness would be reduced to no less than 0.38 inches in 1979, still meeting the minimum design standard from that time. In 1981, the POA began annual condition assessments to monitor the physical condition of the POA facilities. This revealed corrosion issues and weaknesses in some welds. The POA implemented a maintenance program to strengthen lost and poor butt weld connections in the highest corrosion zone temporarily until the weakened piles could be replaced during a future redevelopment. In 2004, inspection revealed the average wall thickness of all piles ranged from 0.17 inches to 0.27 inches across the terminals (with the minimum wall thickness below each terminal ranging from 0.01 inches to 0.09 inches). Ongoing analyses of the structural integrity of the POA's infrastructure indicate many steel piles supporting the terminals are near or below design standards and continue to corrode.
2) The capacity of the dock to withstand significant earthquakes is diminished. There could be collapse of portions of the pier in a significant earthquake event. Given the high level of seismic activity in the area, the diminished piles and other existing design issues substantially limit structural integrity and resilience.

The load carrying capacity of portions of the dock and trestles has been reduced (Figure 1-8), limiting the structural functionality. The rate of corrosion will continue to increase exponentially. Use restrictions have been imposed at certain dock areas and trestles.

Figure 1-8 Pile Welds on a Corroding Pile

A cathodic protection project was completed in 1992 to protect the steel piles from further corrosion and has been in continuous operation since that time. Recent test results from the 2004 Annual Inspection (R&M 2004) indicate that most areas of the main dock still lack adequate levels of cathodic protection. The large electrical requirement that results from the bare surface area of the piling and cathodic protection current shielding effects associated with the

densely arranged piling prevents the existing system from providing adequate levels of cathodic protection. Supplemental cathodic protection and coatings of piles are needed to adequately protect these areas.

Repairs that strengthen steel piles through the corrosion zone are complicated, costly, and temporary. Existing methods to reinforce and strengthen corroded piles over several feet in length would be a challenge to apply at the POA. Strong currents, poor visibility, cold water, extreme tidal variation, and the tight pile spacing under the dock would make this work difficult and potentially compromise its success. Existing pile repairs made from 1990 to 1992 are already showing signs of deterioration, which is not unusual for the type of repairs performed under the severe working conditions afforded at the dock. In order to maintain current operating levels, large portions of the existing dock would need to be replaced.

1.4.2 Withstand Harsh Environmental Conditions

POA infrastructure must be able to withstand the stresses and strains of widely fluctuating tides, strong currents, ice buildup throughout several months of the year, and earthquakes. Each of these conditions constrains the design of port facilities that can function and be adequately maintained over a 25-year period.

Tides/Currents

Knik Arm experiences a tidal range of approximately 42 feet, the second largest in the world (Figures 1-9 and 1-10). The following conditions exist in Knik Arm:

- Estimated Highest Water +34.59 feet MLLW
- Mean Higher High Water +29.16 feet MLLW
- Mean High Water +28.44 feet MLLW
- Mean Sea Level (MSL) (Average Tide) +16.47 feet MLLW
- Mean Tide Level +15.34 feet MLLW
- Mean Low Water +2.25 feet MLLW
- MLLW +0.00 feet MLLW
- Estimated Lowest Water -6.39 feet MLLW

Figure 1-9 Existing Dock Low Tide

Figure 1-10 Existing Dock High Tide

The extreme tides in the area and the configuration of Upper Cook Inlet can produce extreme currents in the Knik Arm. Tidal currents in Cook Inlet regularly exceed six miles per hour (mph) in open areas and 6.9 mph near constrictions. Currents in the main channel of Knik Arm between Cairn Point and Point Woronzof are generally stronger on the ebb tide. Additionally, currents farther up Knik Arm have a moderate velocity near the west shore and are strong in the mid-channel. Tidal currents are extreme in Upper Knik Arm because of shallow water.

Since the POA is located in a backwater between two constrictions, tidal currents are more moderate in this area and outward toward the main channel. This is beneficial because strong tidal currents can cause numerous problems for ships transiting, maneuvering, and docking in these conditions. There is a significant potential for a ship to be pushed out of the navigation channel and turning basin, which could result in the ship running aground. Such conditions can make the berthing of the ship extremely difficult, requiring tug assistance. While at the berth, these currents can cause extreme stresses on the ships, its mooring lines, the dock, and the fendering system depending on the ship's and dock's orientation to the currents. These conditions greatly affect the designed orientation of docks in relation to the current. Therefore, it is essential that any port design option maintain docking that is parallel to the existing dock and limits westward expansion to within the zone of moderate currents.

Ice

Dock structures in the Upper Cook Inlet are subject to ice build-up during the winter months (Figure 1-11). During winter berthing and mooring, ice blocks trapped between the ship hull and under the dock area become compacted. This compacted ice greatly increases the weight on piles and other

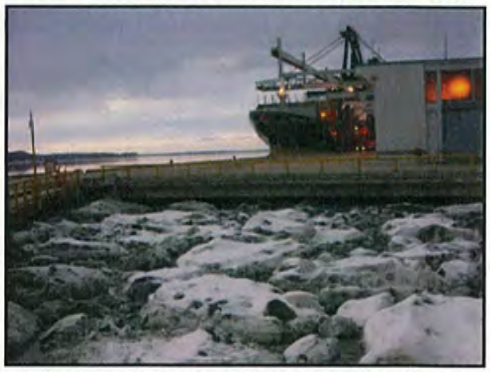

Figure 1-11 Ice Build-Up at the POA

structures and requires additional pilings or other supports in areas most likely to turn to solid ice. Given the large tidal ranges at the POA, ice can accumulate over large sections of structures, creating substantial additional weight. Several feet of ice can also form between fenders and neighboring piles. Ice accumulation may render the fender system ineffective, resulting in berthing forces directly against the dock support. Steel structures in Cook Inlet also have the potential for increased abrasion and corrosion due to fluctuating tides combined with suspended sediment in the water and ice movement. Ice containing sediments can be very abrasive and may contribute to corrosion. The effects of additional weight from ice loading, interference in fendering systems, and abrasion from ice movement require greater strength of materials and additional support than would be necessary at most ports in the U.S. Therefore, any design option for POA expansion needs to minimize the opportunities for ice buildup and abrasion effects that would compromise structural integrity.

Earthquakes

The American Society of Civil Engineers Port Design Guidelines Document recommends that a two level design approach be undertaken for port construction (Werner 1998). Ports are now designed for two levels of earthquakes, termed the "operating" and "contingency" events. The design operating event typically has a 72-year recurrence interval and ports must be designed to accommodate this earthquake with minimal damage and continue to operate. The design contingency event has a 475-year return interval and port structures must have sufficient strength to prevent collapse during these severe earthquakes. Recommendations by the MOA Geotechnical Advisory Commission adopted by the MOA in 2004 include considerations of designing and building one berth to a contingency event in order to provide an emergency point of entry for goods and supplies to the rest of the community. Therefore, any design option for POA expansion must assure that fill materials, fill designs, and structural features have sufficient local, global, and lateral stability to meet these established design requirements.

1.4.3 Additional Capacity to Accommodate Growth in Current Customers

The POA covers 129 acres with facilities leased to Horizon, TOTE, Tesoro, and ASIG (Table 1-3) and a ground transportation network of over eleven acres. In addition to lease areas, approximately 17 acres are also provided to the U.S. Coast Guard for security facilities, for transportation corridors, and for the POA's own administrative and maintenance facilities. Thus, the entire available developed POA lands are used, and no suitable land is currently available for additional operational expansion.

Table 1-3 Existing Terminal Facilities			
Berth	***Vessel Size***	***Acreage***	***Facilities***
Terminal 2 TOTE	791 feet, 840 feet	42.4	1,000-foot berth 35 feet draft Three ramps for RO-RO 12,000 ft^2 warehouse 4,800 SF office
Terminal 3 Horizon	710 feet	40	610-foot berth[1] 35 feet draft Three 38-gage cranes 38,000 ft^2 auto storage 12,000 ft^2 office
Terminal 1 Military/Other Cargo	Various	17.1	600-foot berth 35 feet deep RO-RO or LO-LO 27,000 ft^2 heated transit shed
POL 1 POL 2	612 feet 655 feet	17.8	612 feet by 35 feet deep POL 1 berth 655 feet by 35 feet deep POL 2 berth

[1]Operational if adjoining berth is not in use

In 1999, the Master Plan assessed existing cargo-handling capability through the development of detailed computerized cargo-handling models for the POA. These models analyzed containerized cargo, break-bulk/neo-bulk, automobiles, liquid-bulk, dry-bulk, and passenger/cruise capabilities. The models compared six key facility components related to maritime terminal cargo throughput capacity:

- Vessel arrival and berth availability;
- Cargo transfer at the dock apron;
- Apron-to-storage transfer;
- Storage yard and dwell times;
- Storage-to-inland transfer; and
- Gate processing.

To analyze the passenger/cruise terminal facilities, the model compared six similar specific facility components related to passenger/cruise terminal throughput capacity. Each cargo model used monthly throughput data to identify peaking requirements for storage and retrieval systems typical of modern container, break-bulk/neo-bulk, liquid-bulk, and dry-bulk facilities.

Seasonality and operational peaks and valleys are typical of all maritime-related businesses and were directly incorporated into the model. This phenomenon is particularly true at the POA, given its unique environmental conditions, such as ice and high tidal range. Therefore, these local peaking characteristics were used to account for operational practices, as well as for seasonality.

The computerized models were applied to each terminal user's operations to identify the average MPC for each terminal. MPC was defined as the high end of a realistic operating scenario. Containerized cargos were measured in 20-foot equivalent units (TEU). For break-bulk/neo-bulk, liquid-bulk, and dry-bulk, the units of measurement were in short tons. Automobiles were measured in number of vehicles per year, and passenger/cruise in number of passengers.

Although the MPC of a terminal is defined as the high end of a realistic operating scenario, this represents the peak operation of a terminal; sustained operation at this level for a significant period of time may be uneconomical, impractical, or unsafe. Planners generally believe that operations at 100 percent MPC are not sustainable over prolonged periods. Prolonged operations at 100 percent MPC tend to drive up operating and maintenance costs and are considered unrealistic for long durations. For this reason, the model estimated a maintainable capacity as well as a maximum capacity for each terminal and used it as the terminal's capacity in the Master Plan (VZM 1999). Known as the SPC, this capacity comprises 75 percent of the terminal's MPC. For cargo amounts to exceed the SPC, the terminal must continue to operate at uneconomical or unsafe levels, build additional terminals, or expand the existing ones.

In the Master Plan, the POA's SPC for containerized cargo was 1,594,000 tons annually given its current size and configuration (VZM 1999). However, in 2003 annual tonnage of containerized cargo exceeded this level (105 percent of the SPC) and estimated growth indicates this trend will continue. Dry-bulk goods were at 175 percent of the SPC in 2003. During 2003, the POA handled a total of 4.4 million tons of cargo, a volume the 1999 Master Plan did not project to occur until 2018. Approximately 4.6 million tons of cargo are projected to pass through the POA in 2004 (Figure 1-12). Given the expected increase in goods through 2025, the POA is expected to experience a continuing increase in demand over the next 20 years.

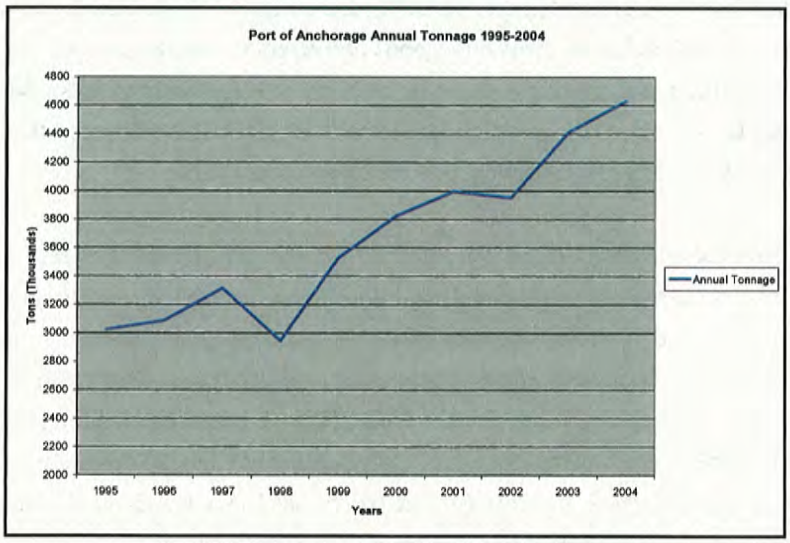

Figure 1-12 POA Annual Tonnage 1993-2004

Summaries of the SPC estimates and the 2003 actual cargo amounts for each cargo type (containerized cargo, break-bulk, automobiles, liquid-bulk, and dry-bulk), as well as passenger cruise ships, are presented in Table 1-4. Automobile, liquid-bulk, and passenger/cruise numbers were projected to exceed the SPC by 2025. Liquid-bulk, dry-bulk cargo, and passengers tend to require berth use, but not storage areas directly on POA property. Based on these analyses, acres dedicated to existing storage and handling facilities for containerized and automobile cargo would not meet demand in the future and berth space would not meet the demands imposed upon it by containerized, automobile, liquid-bulk, dry-bulk cargo, or passengers through 2025.

Table 1-4 Summary of Capacity Analysis by Commodity Type

Commodity Type	*Maximum Practical Capacity*	*Sustainable Practicable Capacity*	*2003 (actual)/% of SPC*	*2025 (projected)*	*Units*
Containerized Cargo	2,125,043	1,594,000	1,677,040/ 105%	2,697,000	Short Tons
Break-Bulk Cargo	68,079	51,000	5,591/ 8%	8,686	Short Tons
Automobile Cargo	39,281	29,000	28,676/ 99%	44,567	Autos/Year
Liquid-Bulk Cargo	3,704,835	2,779,000	2,583,580/ 93%	4,013,643	Short Tons
Dry-Bulk Cargo	107,817	83,000	145,074/ 175%	225,260	Short Tons
Passenger/Cruise	17,354	12,800	2,756/ 22%	27,000	Passengers

Source: VZM 1999.

In addition to the need to increase the POA's capacity for existing clients, the POA needs to supply storage areas and facilities for new customers, including the military. These new areas would include additional space for essential industrial products, goods delivered by a new container/cargo customer, storage for building products, and staging areas to be used for military deployments. Based on these requests and the need to accommodate growth over the next 20 years, it is estimated that the POA needs to add 135 acres to its docks, storage, handling, and transport areas (Table 1-5).

These 135 acres would include an additional 38 acres for a combined container storage area and military use area; 27 acres for new barge customers handling building products, steel, and timber; three acres for a passenger cruise terminal; and 72 acres for a new industrial use area, centralized POA administrative area, and for marine terminals and dock front areas. These estimated needs are based upon projected requirements regardless of the Project; they are not projections of increased demand that would be generated as a result of the Project. Therefore, it is essential that any design option provide a minimum of 135 acres of additional land for POA operations. The additional 135 acres also must be contiguous to allow movement of goods from the berths to the storage and transfer areas.

Table 1-5 Inventory of Existing and Projected Acres			
Cargo/Use Type	*Existing Land (VZM 1999)*	*Projections of Additional Requirements by 2025*	*Total POA Acreage in 2025*
Container	82.7	37.7	120.4[1]
Break-Bulk	12.1	27.1	39.2[2]
Autos/Vehicles	5	-5	0[3]
Liquid-Bulk	19.9	0	19.9
Dry-Bulk	0	0	0
Passenger	0.4	3	3.4
Other (new)	0	72.2	72.2[4]
Total	120.1[5]	135.0	255.1[6]

Note:
[1] *Includes a combination military/container area.*
[2] *Primarily for building products, steel, timber.*
[3] *Included in the acreage for the container area.*
[4] *Includes short term permits/industrial use area (11 acres), future development area (7.8 acres), miscellaneous administrative areas (14.4 acres), and marine terminals/dock front (39 acres).*
[5] *Additional 8.9 acres are roads and circulation areas.*
[6] *In addition, approximately 18 acres are being leased from the military for the Trailer-on-Flat-Car (TOFC) intermodal facility.*

1.4.4 Additional Berths to Provide Service to New Customers

Currently, Terminal 1 is used for both container vessels and dry cargo; Terminal 2 is used for container vessels; and Terminal 3 is used for RO-RO vessels. POL Terminal 2 is used for both dry-bulk and liquid-bulk. POL Terminal 1 is used for liquid-bulk. Cruise ships currently use Terminal 3 for loading and unloading passengers. Terminal 3 can only be used by passenger ships on Wednesdays and Thursdays so there is no conflict with use of the terminal by TOTE. Terminals 2 and 3 are used by TOTE and Horizon and were considered to be close to capacity during the summer months (VZM 1999). Approximately 70 percent of the barges currently use POL Terminals 1 and 2 and Terminal 1. Barges must occasionally wait for berth space before unloading due to changes in the tides, demand, and the length of time needed to unload (VZM 1999). Under the medium growth scenario of 2.1 percent, ship calls will increase by 40 percent over the next 16 years, increasing the number of potential conflicts and increasing waiting time for ships to berth. In addition to the need for berths that would accommodate growth, the POA has a need for berths that could be dedicated to a customer (i.e., cement berth) or would have specific characteristics that would support special requirements (i.e., a floating dock for passengers to facilitate access to the dock). Therefore, any design option must include expanded dock capacity in a configuration that supports more and longer berths.

1.4.5 Deeper Drafts, Longer Berths, Larger Cranes for Offloading, and More Streamlined Intermodal Transportation to Efficiently Handle New Ships and to Move the Increasing Amount of Cargo Out to the Public

Current trends in maritime transportation have produced larger ships with deeper drafts requiring cranes with a wider capacity for unloading (Figure 1-13). Table 1-6 presents ship sizes currently used by TOTE and Horizon. Two POA berths can accommodate ships 600 feet in length. However, current and future shipping will use larger ships than the existing POA infrastructure can support. In order to serve these existing and future customers, the POA needs to have deeper drafts, more storage and handling space for the increased cargo, and longer berths.

Figure 1-13 Change in Ship Size Over Time

Table 1-6 TOTE and Horizon Ship Characteristics									
Owner	***Vessel Name***	***Vessel Type***	***Year Built***	***Length (feet)***	***Breadth (feet)***	***Draft (feet)***	***Propulsion***	***Horsepower***	***TEU***
Horizon	CSX Anchorage	Container	1987	710	78	33	Diesel	14,900	1668
Horizon	CSX Kodiak	Container	1987	710	78	33	Diesel	14,900	1668
Horizon	CSX Tacoma	Container	1987	710	78	33	Diesel	14,900	1668
TOTE	Northern Lights	RO-RO	1974	791	106	28	Steam	30,000	760
TOTE	Great Land	RO-RO	1975	791	106	28	Steam	30,000	760
TOTE	Westward Venture	RO-RO	1977	791	106	28	Steam	30,000	760
TOTE	Midnight Sun	RO-RO	2003	839	118	29	Diesel	63,600	1200
TOTE	North Star	RO-RO	2003	839	118	29	Diesel	63,600	1200

The POA currently employs three 38-gage cranes that can unload vessels stacked nine containers across. However, larger vessels regularly use the POA, and special procedures must be implemented to offload cargo with the outmoded 38-gage cranes; this includes stacking the containers along one side of the ship to facilitate the offload. Such procedures are inefficient, resulting in fewer ships being serviced each day. New vessels will be wider and require cranes able to reach and unload 16 container-wide arrangements (Figure 1-14). New 100-gage cranes with longer booms will be required to unload these larger ships.

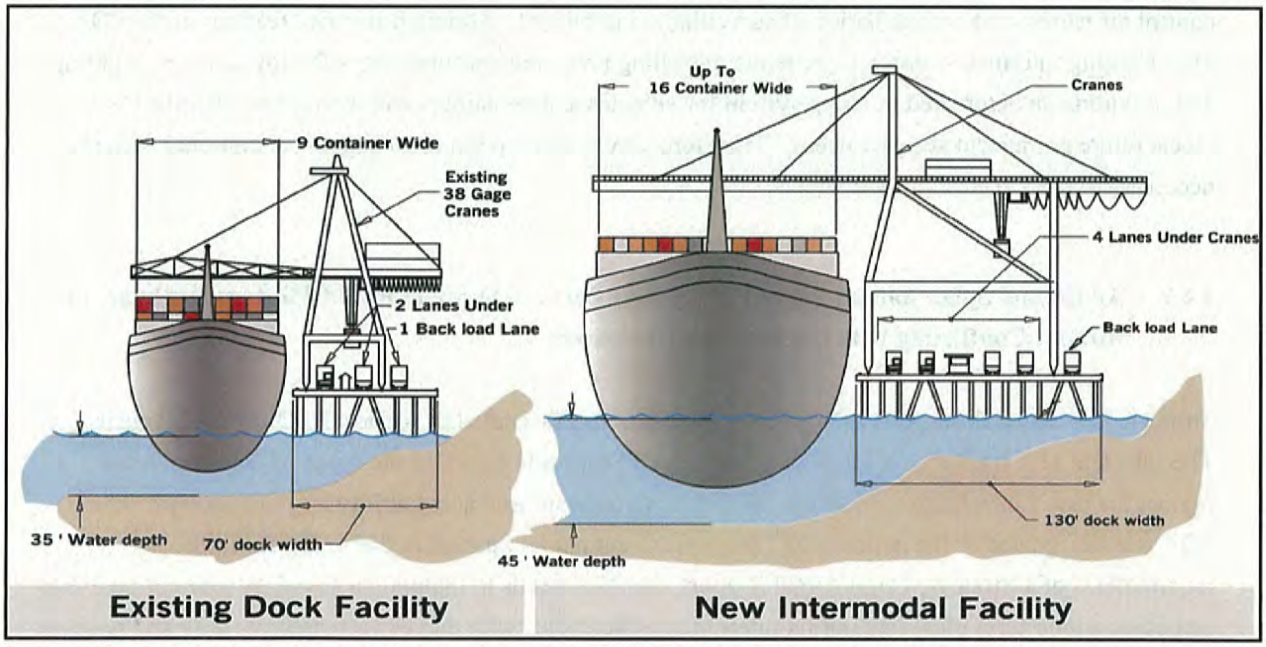

Figure 1-14 Comparison of Draft Depths and Crane Sizes

Also, although Stryker Brigade Combat Team does not provide specific crane size recommendations, it does recommend three cranes with a 150-foot operating apron. The present operating apron for the 38-gage cranes is 70 feet. New 100-gage cranes would meet the Stryker Brigade Combat Team recommendation of 150 feet. Therefore, any design option needs to include more and longer berths with deeper drafts, as well as the areal and structural capacity to support 100-gage cranes.

1.4.6 Lighting, Gates, and Other Improvements to Meet New Security Requirements under the New Maritime Security Mandates

The Maritime Transportation Security Act (MTSA) of 2002, signed on November 25, 2002, is a landmark piece of legislation designed to protect the nation's ports and waterways from a terrorist attack. MTSA 2002 requires area maritime security committees and security plans for facilities and vessels that may be involved in a transportation security incident, among its many measures. The MTSA 2002 significantly strengthens and standardizes the security measures of the U.S. domestic port security team of federal, state, local, and private authorities.

On July 1, 2003, the U.S. Coast Guard published new maritime security regulations that require sectors of the maritime industry to complete security assessments, develop security plans, and implement security measures and procedures. The regulations require security measures that have three scalable security levels. Depending on security needs, measures may include passenger, vehicle, and baggage screening procedures; security patrols; establishing restricted areas; personnel identification procedures; access control measures; and/or installation of surveillance equipment. Although security features at the POA meet existing interim security requirements, installing new, more secure access facilities, adding lighting, and providing an automated tracking system for vehicles and containers will also ensure that the POA meets future permanent security needs. Therefore, any design option must support operational features necessary to meet security requirements.

1.4.7 Additional Space and an Improved RO-RO Berth to Support Rapid Military Deployments without Conflicting with Commercial Customers

Strategic Commercial Seaports are maritime installations designated to support DoD cargo shipments. The selection of a seaport as a Strategic Commercial Seaport is based on the types of facilities in the region, the port's capabilities related to military requirements, and accessibility by road and rail. The POA was designated as the nation's 15th Strategic Commercial Seaport in 2004. To fulfill the requirements of a Strategic Commercial Seaport, the POA needs to maintain a sustained commitment that embodies a long-term plan, integrating intermodal efficiencies with that of increased security and positive cargo control.

The U.S. Army is transforming the 172nd Infantry Brigade into a Stryker Brigade Combat Team. The Stryker Brigade Combat Team mission is to deploy combat forces rapidly in support of worldwide joint military operations, crisis response, and peacetime engagements. Capabilities of the Stryker Brigade Combat Team extend well beyond those of the current forces in Alaska, providing greater mobility and rapid deployment; enhanced situational understanding of friendly and enemy situations; increased lethality; better force protection; and greater force effectiveness. Anchorage is strategically located for this deployment. In the event the Stryker Brigade Combat Team deploys, two-thirds of the force will travel by sea with the remainder by air. The total deployment will amount to 1,500 pieces of rolling stock (Figure 1-15), 3,800 soldiers, and 13,000 tons of cargo. The remainder of the brigade will be deployed by C-17 and C-5 aircraft. DoD has requested that the POA support rapid deployment of the Stryker Brigade Combat Team based on its strategic location and proximity to Elmendorf AFB and Fort Richardson and with a direct and strategic rail connection to the POA from Fort Wainwright.

Figure 1-15 Stryker Brigade Combat Team Major Equipment

In addition to the Stryker Brigade Combat Team, other USARAK combat forces will deploy in support of the global war on terrorism and other contingencies through the POA. This will include the current 1-501 Parachute Infantry Regiment Task Force that will expand to become an Airborne BCT. Army planners are developing facility and deployment plans in support of the Airborne BCT. During times of combat,

the military will handle all of the coordination, scheduling, and delivery of equipment through the POA. It is difficult to predict when these events will take place; therefore, the POA must be able to support the Stryker Brigade Combat Team, Airborne BCT, and other USARAK combat forces on short notice. However, the military will not require a dedicated berth. It will instead use berths that are normally used by commercial carriers, but those berths will need to be longer and have deeper drafts than those currently available at the POA. The types of ships that are expected to be used in this deployment are a Large, Medium Speed, RO-RO (LMSR) ship and a fast supply ship (AOE-6 class). The LMSR ships are approximately 950 feet long, have a beam width of approximately 106 feet, and have a 36 foot draft, requiring 40 feet of water depth. These ships can carry an entire Army Task Force, including 58 tanks, 48 other track vehicles, and more than 900 trucks and other wheeled vehicles. The ships have two ramps for loading and unloading. A typical LMSR ship, the USNS Benavidez, is shown in Figure 1-16. The AOE-6 class ship is 795 feet long and has a beam of 107 feet, requiring approximately 40 feet of water. The main purpose of these ships is to transport fuel, water, and ammunition.

Figure 1-16 USNS Benavidez

The berthing area requirements to deploy the Stryker Brigade Combat Team are three 1,000-foot long berths with at least 40 feet of water depth. It would require a 150-foot wide apron with container cranes at each berth. In the upland area, the Stryker Brigade Combat Team would require between 20 to 40 acres of open staging area, and a 150,000-square foot covered storage area.

The military would also require rail facilities within the POA. The TOFC facility being constructed as part of the Road and Rail Extension would support the switching of at least 200 loaded rail cars per day and access to at least four portable rail end ramps. Table 1-7 summarizes the Stryker Brigade Combat

Team port infrastructure and equipment requirements and current and future POA capabilities. Therefore, any design option will require that land, dock, and berthing requirements for military deployment be met, and be met in a manner that will continue to allow commercial operations to function at the same time.

Table 1-7 Summary of Stryker Brigade Combat Team Requirements and POA Capabilities

Stryker Brigade Combat Team Requirement	*Current POA Capability*	*Marine Terminal Redevelopment Project*
Three 1,000-foot berths with 40-foot water depth	2,220 feet with 35-foot water depth	3,000 feet of berthing with 45-foot water depth
150-foot wide apron with three container cranes	70-foot apron with three cranes	150-foot apron with three 100-gage cranes
Four 1,000-foot rail offloading spurs	New TOFC facility would provide spurs	More than 4,000 feet of rail spurs
Access to four portable rail end ramps	Access to two end ramps	At least four portable end ramps
150,000 square feet covered storage	77,000 square feet	150,000 square feet

1.5 SUMMARY OF NEED

In short, for the POA to meet the needs of their users and customers through 2025, the POA needs to undertake redevelopment with new facilities, new infrastructure, intermodal transportation (ship, truck, and rail) networks, and increased overall acreage (Figure 1-17). To meet these needs, the POA must:

- Repair and/or replace existing functionally obsolete and potentially degraded infrastructure;
- Construct POA facilities to withstand fluctuating tides, strong currents, ice, and earthquakes;
- Expand the size of the POA approximately 135 acres to provide space for current and identified future customers;
- Increase the number of berths to reduce conflicts between multiple customers and construct berths specifically for passenger ships and barges;
- Increase the draft around the berths to -45 feet MLLW and increase the length of berths to accommodate larger commercial ships and military requirements;
- Reorganize storage and transportation within the POA to move goods directly from ships to rail and trucks;
- Upgrade existing equipment with the addition of new 100-gage cranes for offloading larger ships and a platform structure to provide sufficient support and stability for the heavier cranes;
- Improve facilities, lighting, safety, and security; and
- Dedicate areas and movement of goods to military use as necessary.

Figure 1-17
Proposed Action Components

Note: As of May 2004. Berth Arrangements subject to change

The Project will meet all of these needs by filling a maximum of 135 acres of tidal mudflats to expand the total POA acreage; by dredging to -45 feet MLLW; by constructing seven modern ship berths and two dedicated barge berths; and by reorganizing storage and transportation areas in relation to the new berths. After evaluating engineering constraints, particularly those associated with stability of structures given seismic issues at the port, the POA and MARAD have selected three design alternatives that have been carried forward for detailed analysis: 1) sheet pile construction; 2) pile-supported dock construction; and 3) a combination of both methods.