

# **Port MacKenzie Master Plan 2016 Update**

**By**

**Matanuska-Susitna Borough**

CODE ORDINANCE

Sponsored by: Borough Manager

Introduced: 03/22/16

Public Hearing: 04/05/16

Defeated: 04/05/16

Motion to Reconsider Passed: 04/05/16

Adopted: 04/05/16

**MATANUSKA-SUSITNA BOROUGH  
ORDINANCE SERIAL NO. 16-012**

AN ORDINANCE OF THE MATANUSKA-SUSITNA BOROUGH ASSEMBLY AMENDING  
MSB 15.24.030, ADOPTING THE PORT MASTER PLAN 2016 UPDATE.

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BE IT ENACTED:

Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the Borough Code.

Section 2. Amendment of section. MSB 15.24.030(F) is hereby amended as follows:

(F) Point MacKenzie Port Master Plan, January 1998, amended May 1999, amended February 2011, amended April 2016, has been adopted by the Port Commission and Assembly as part of the overall Borough comprehensive plan.

Section 3. Effective date. This ordinance shall take effect upon adoption.

ADOPTED by the Matanuska-Susitna Borough Assembly this  
5 day of April, 2016.

  
VERN HALTER, Borough Mayor

ATTEST:

  
LONNIE R. McKECHNIE, CMC, Borough Clerk  
(SEAL)

**Final Vote:**

YES: Sykes, Beck, Colligan, Mayfield, Doty, and Kowalke

NO: McKee

**Reconsideration Vote:**

YES: Sykes, Beck, Colligan, Mayfield, Doty, and Kowalke

NO: McKee

**Original Vote Defeated:**

YES: Mayfield, Doty, and Kowalke

NO: Sykes, Beck, McKee, and Colligan

## NOTICE

This plan and the information contained herein does not constitute, nor shall it be construed as, a waiver of any right, title or interest, including sovereign interest, in any lands owned by or under the jurisdiction of the Matanuska-Susitna Borough or any grantee in trust of Borough lands.

The maps included in the report are for illustrative purposes only and are not intended to accurately depict ownership boundaries.

It is important to recognize that the estimates referenced and utilized in this Update are based on studies and data from experts in various disciplines and are based on the information available at the specific date. It is not possible or feasible to include estimates of the port through-put or business activity that coincide exactly with the completion of this Update. The uncertainties surrounding potential gas lines, mineral commodities, a bridge across Knik Arm, completion of the railroad, and other business developments are all subject to change. The key issue in this Update is the Vision statement found in Section 1.4. Projections of through-put and business activity will change constantly but the key is that the actions of the Port and Borough follow and conform to the Vision as defined in Section 1.4.

## ACKNOWLEDGEMENTS

The Borough owes a debt of gratitude to the Port Commissioners, professionals, and interested parties for their insight, dedication and helpful comments on this update of the Port MacKenzie Master Plan. In particular, the Borough would like to acknowledge the following people for their contributions of time, energy, and support toward the success of this update:

- The Borough Port Commission
  - Greg Bell
  - Christopher Gates
  - Steven Borell
  - Noel Woods
  - Helga Larson
  - Claudia Roberts
- Marc Van Dongen, Director, Port MacKenzie
- Patrick Kelly, University of Alaska Land Management
- Rick Hoggan, P.E., Millcreek Engineering

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Appendix A: Port MacKenzie Layout Drawings

Appendix B: Previous Studies and Reports

Appendix C: History of Port MacKenzie

Appendix D: Port MacKenzie Emergency Services 20-year Plan

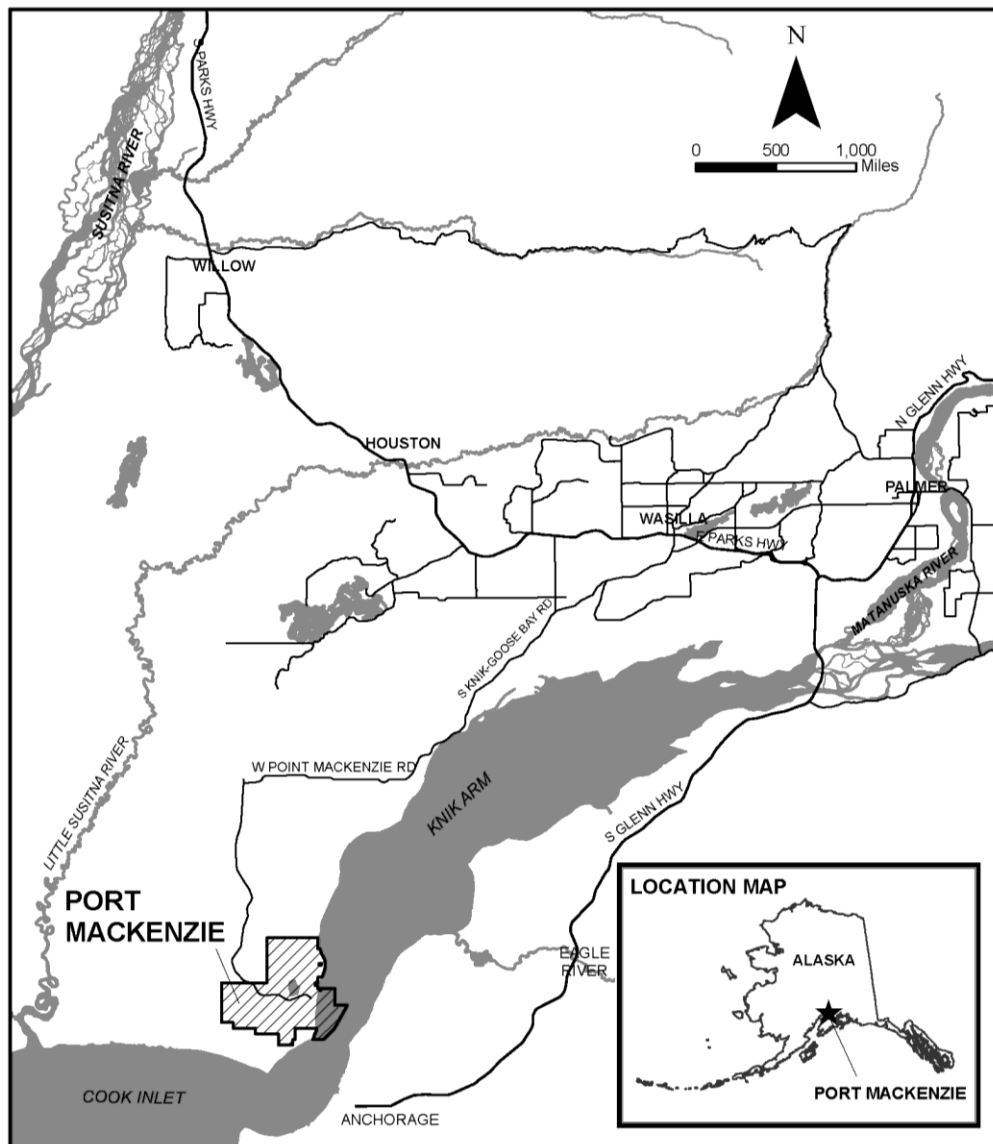
Appendix E: Port MacKenzie Driveway Standards

# 1. Introduction

## 1.1 Overview

Port MacKenzie is located in South Central Alaska at the head of Cook Inlet along the Knik Arm across from the Municipality of Anchorage (see Figure 1 below).<sup>1</sup> The Port is located in and owned and operated by the Matanuska-Susitna Borough. The other key landowner in the Port District is the University of Alaska.

**Figure 1. Port MacKenzie Location**



Port MacKenzie is ideally suited for handling bulk materials, serving the local communities and providing critical tidewater access to the interior of Alaska. Port MacKenzie can easily facilitate

<sup>1</sup> Latitude: 61° 16' 6" N Longitude: 149° 54' 52" W

substantial growth in Alaskan export capacity to complement existing port operations that may be limited by local land, capacity or public restrictions.

The Port District includes large upland areas of currently undeveloped land in close proximity to the existing deep-draft dock and barge dock. As such, bulk materials can be offloaded, stored, reclaimed and shipped via rail, truck, pipeline, barge and ship without prohibitive constraints or growth limitations.

The Borough is constructing a rail link to connect the Port to the Alaska Railroad System. When complete, the rail line will provide the gateway tidewater access to Interior Alaska via the existing rail corridor. The Port will provide the ability to efficiently move materials between ship, rail, truck and barge as needed. An existing bulk material handling conveyor, ship loader and deep water mooring system provide the ability to load any size ship with wood chips, coal, limestone, mineral concentrates and other commodities. This master plan includes utility corridors with additional conveyor, piping, rail and truck access between the docks and upland areas. This plan accommodates mineral, petrochemical, forest products, fabrication, power generation and manufacturing industries in a productive and economic manner.

The Matanuska-Susitna Borough (Borough) has prepared this master plan as an update to the 2011 Port MacKenzie Master Plan. The plan updates land use designations for future land development and use. It also provides guidelines for future port improvements and development to meet cargo demand, community acceptance and environmental compatibility that will complement other modes of local, state and international transportation through 2035.

## **1.2 Land Area**

The Port District is comprised of approximately 8,940 acres of uplands and 1,238 acres of tidelands. The uplands include 7,621 acres of land, and 1,319 acres of waterbodies and wetlands (see Figure 2). The other landowner in the Port District is the University of Alaska which owns about 830 acres of land within the District.

### **Public Access to the Shoreline**

The Borough has been granted approximately 1.9 square miles of tidelands with a shoreline frontage approaching 2.2 linear miles. This master plan makes provision for physical and visual access to the shoreline in a manner that is consistent with the activities being conducted on the land and water areas involved, and the proprietary interests of the private land owners, lessees and public rights and needs. Restricted access to the shoreline within the Port District is necessary for security and public safety factors.



### 1.3 Port MacKenzie Master Plan Update

An overall master planning study of Port facilities was completed in 2011. This document provides updates to that framework to guide the orderly growth and development of the Port over the next 20 years.

This plan contains three primary sections: a land use section, a transportation section and a facilities/utilities section.

This document is intended to provide the layout for the physical development and use of the land, waterbodies and wetlands, tidelands and submerged lands within the Port District.

The usefulness of this plan relates directly to its status as an official statement of public policy adopted by the Matanuska-Susitna Borough Assembly. It serves a number of useful purposes which include use by the Port Commission as a reference indicating needed policy changes and as a guide for policy decisions; by the Port staff as a basis for land use decisions, capital improvements programming and for rendering services; by other governmental agencies as necessary information leading to coordinated efforts; and to individuals as an accurate source of information regarding public land use opportunities for private use and investment, and as a basis for protecting existing development.

### 1.4 Vision

#### VISION

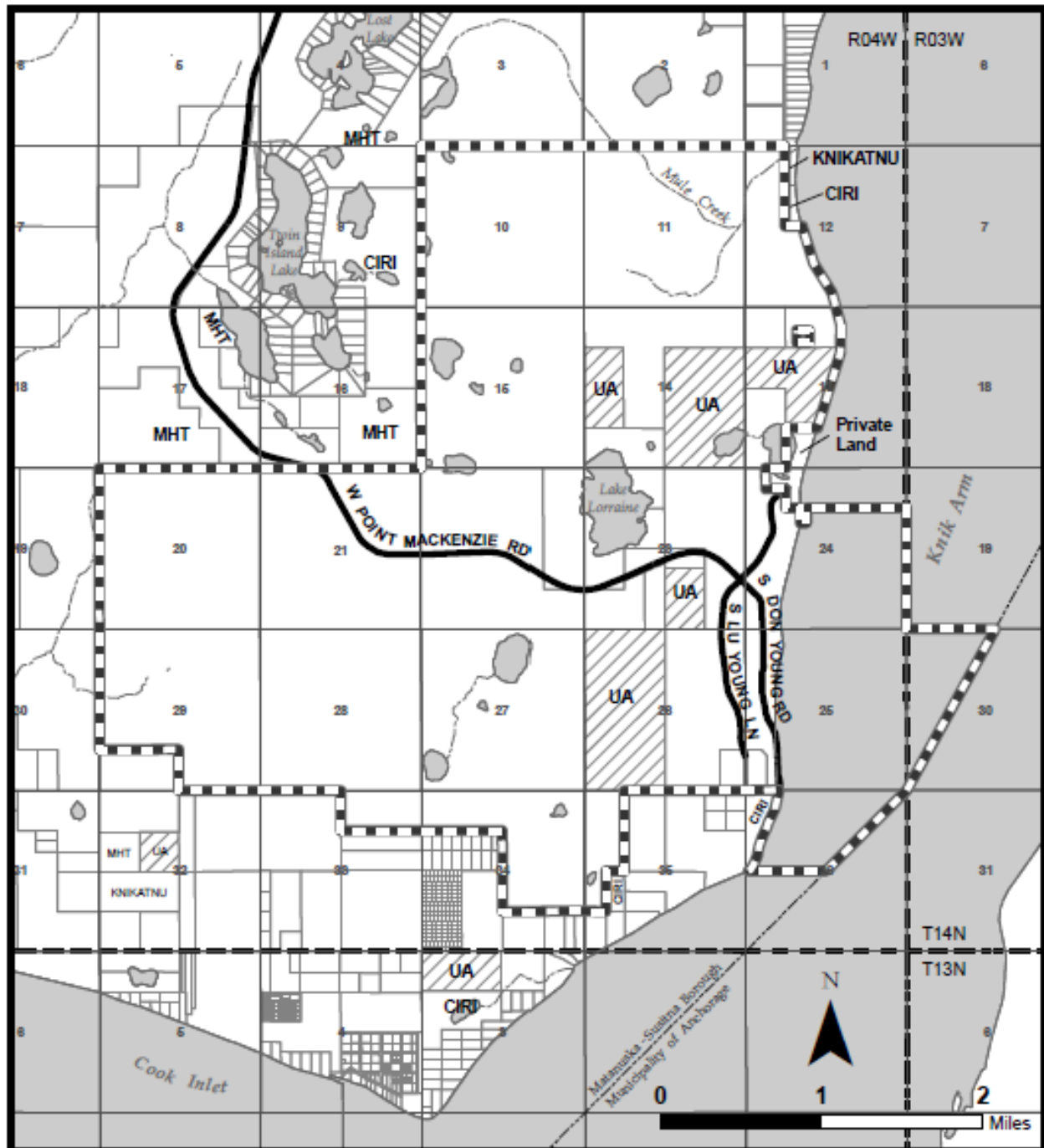
*To develop and maintain waterfront assets in a manner that generates long-term economic benefits for the residents of the Borough, without permanently depleting the usefulness of these assets. Port MacKenzie is envisioned to be an economic engine for resource development throughout Alaska.*

This Master Plan is structured to implement this vision in a timely and organized manner and policies and regulations must be developed to ensure that the integrity of the strategic vision is never compromised.

Port MacKenzie will clearly define its development and investment objectives, publish policies and guidelines for activities and investments that are to be permitted in the Port District and entertain only those proposals that are consistent with its development objectives, guidelines, Master Plan and vision:

- Create new employment opportunities;
- Stimulate economic development in the Port District, Borough and State through capital investment for industrial facilities by private enterprises; and
- Establish a transportation link for exporting natural resources from the State of Alaska.

Figure 2. Port District



## **1.5 Port Commission**

The Port Commission serves as an advisory body to the assembly and the manager on Port development matters and provides advisory input to the Port District's operational and administrative staff. The Port Commission was involved in the update process through their consideration of draft components of the update to the plan.

## **1.6 Planning Efforts**

This Port MacKenzie Master Plan Update was developed as a stand-alone master plan superseding the Point MacKenzie Port Master Plan, as amended (2011). This Master Plan is a living document and should be updated again following significant Port development or significant changes to the economy.

This plan was prepared with input from the Borough Port Commission, Port Director, Economic Development Director, planning staff, land owners, potential users, neighbors and various stake holders. The intent of this Plan is to provide a flexible guide for present use, short-term infrastructure needs, and near, intermediate and long-term future use of the Port. While fully aware that it is impossible to predict the future, the Master Plan must anticipate the future and provide a plan that will best prepare the Port to maximize the use of the land and current facilities, promote sensible and desired growth and facilitate presentation and marketing of the Port's potential. Due to the amount of activity that is happening within the Port District and the many different forms of inquiry and information, a Port Development Team was established. The team includes borough staff from the departments involved with Port development. The team is tasked with reviewing applications for leases and other forms of use in the Port District.

Input for the update was solicited from current and potential future users of the Port, along with the landowners within and adjacent to the Port, in an effort to identify anticipated future development of the Port and associated industrial complex as well as the siting constraints for each development. Previous studies and reports on the Port were reviewed for background information (listed in Appendix B).

A consultant was engaged to assist with updating the infrastructure layout and future operations to ensure functionality, efficiency, compatibility and safety. A mechanical and mining engineer specializing in bulk material handling projects including Port facilities, mining, power generation, cement and various industrial mineral, petroleum and chemical plants provided input to the plan and assisted with interviewing Port Commissioners, Borough staff and potential future Port users. The layout drawings are primarily based on the engineer's experience and knowledge, Port Commission review and previous studies. The layout drawings have been further refined through ongoing discussions with future port industries.

The Port Master Plan Update was developed in three phases. The first phase, known as the observations phase, included the collection of data and the assembly of outreach meetings to gather input from external and internal Port constituents. The second phase involved the review and documentation of the information gathered in phase one to identify siting and infrastructure constraints for existing and future uses. Based on this review, and the input and data collected in

the observations phase, recommended updates to the master plan were developed and presented to the Port Commission for feedback. In the final phase of the process, that feedback was incorporated into a draft of the final Master Plan Update which was then presented for public review, planning commission review and assembly approval.

Industry sectors projected to have the greatest growth potential, and which Port MacKenzie could attract by virtue of its geographical location and facilities, were short listed as the most likely to locate at Port MacKenzie.

The nature and growth potential of current business activities at Port MacKenzie were confirmed through discussions with current tenants of the Port, Borough staff, the Port Commission and Administration. In addition, potential business leads provided by the Borough were investigated through personal and telephone interviews.

Cargo projections are based on the most recent studies, information provided by current and potential Port MacKenzie tenants and from expected future project and construction activity in the region.

## **1.7 Mission and Goals**

### **MISSION**

*To develop a premier deep-water port capable of safely and efficiently transporting bulk commodities and project cargoes into and out of Southcentral Alaska.*

### **GOALS**

- 1) To complete utilities (natural gas, wastewater treatment) to service the Port.*
- 2) To complete docks (barge dock expansion, deep-draft dock expansion).*
- 3) To complete road improvements (Lake Lorraine Loop, Burma Road, Knik Arm Bridge).*
- 4) To complete a rail line from the existing Alaska Railroad to the Port.*
- 5) To construct rail, truck and vessel loading/unloading facilities at the Port.*
- 6) To construct petroleum product storage and processing facilities including a connection to Anchorage via pipeline.*
- 7) To promote the creation of a natural gas liquids (NGL) processing facility, petrochemical facility, refinery, power plant, LNG plant, or other value-added gas processing facility at Port MacKenzie.*
- 8) As Port development continues, ensure the public trust and maintain the system of transparency, accountability, public participation, and collaboration.*

## **1.8 Key Development Needs For Port MacKenzie**

The following are some of the major needs of the Port for successful operations:

### **Road connection to Parks Highway**

Upgrading Point MacKenzie Road and Burma Road to controlled access, four-lane arterials as well as construction of a Big Lake bypass will provide the level of service necessary for the commercial and industrial activities of the Port.

### **Rail connection to Alaska Railroad**

A connection to the railbelt is the essential component to facilitate natural resource exports. The Port is about 32 miles from the railbelt. The efficiency of transporting bulk commodities to tidewater over a rail extension will lead to new natural resource extraction activities.

### **Natural gas supply**

Distribution and high pressure transmission natural gas pipelines must be extended to the Port District for domestic and industrial use. Natural gas has been extended to Alsop Road, nine miles to the north to service the Goose Creek Correctional Center and surrounding area.

### **Deep-draft dock expansion, adding a second trestle**

A second trestle connecting the barge dock to the deep-draft dock will increase the efficiency of loading and unloading vessels. Eventually, the deep-draft dock will need to be expanded to accommodate two vessels.

## **2. Port Operations**

### **2.1 Security**

The Port Physical Security Plan was updated in 2015 and approved by the Coast Guard. Port security inquiries should be forwarded to the Port Director.

### **2.2 Fire Protection and Emergency Services**

The Borough's 20-year plan for Port Emergency Services is in Appendix D.

Fire protection within the Port District is currently a responsibility of the existing lessees. Fire protection consists of a fire hydrant at the barge dock connected to two 20,000-gallon water tanks located up the bluff. The Port District is not within a designated fire service area. The closest fire service area to the Port is the Wasilla-Lakes Fire Service Area No. 130 with Fire Station 6-4 at Mile 3.2 Point MacKenzie Road about 18 miles away.

The Central Mat-Su Fire Department (CMSFD) will provide fire and rescue. to protect the critical infrastructure of the Mat-Su Borough. The Port is currently within the response area of Emergency Services District 1 for EMS and rescue responses. A realistic response time, as long as responders are not assigned to a major incident, would be 40 to 50 minutes for a chief officer and 45 to 60

minutes for fire apparatus, a rescue or an ambulance. A Borough-owned 32-foot airboat was acquired to assist with water rescue operations; however, a boat house is required in order to stage it near the barge dock. For management and timeliness, an Emergency Services District covering the Port District should be established with costs shared by tenants.

In the near term, lessees should install adequate fire suppression systems to control the fire hazards associated with their operations (i.e., natural resource storage with adequate water delivery systems). Structures should have sprinkler systems and fire hose connections at a minimum.

In the mid-term, a 20-acre parcel north of Point MacKenzie Road, illustrated on the layout drawings in Appendix A, should be developed to include a three-bay fire station that will house an aerial rig, a hazardous materials response vehicle, a heavy rescue vehicle and three command vehicles. This facility should be collocated with a five to ten bed emergency medical clinic, an Alaska State Troopers substation, general administrative offices and a FAA-certified helipad.

## **2.3 Cargo Operations**

Port MacKenzie is currently developing the berths and infrastructure for handling commercial cargo for export. The Port presently has three tenants:

- Alutiiq Manufacturing Contractors (AMC) constructs modular buildings and transports these buildings to the North Slope and rural communities in Alaska, both by road and across Port MacKenzie's docks. AMC is expected to continue to manufacture and ship buildings for the next five years and its growth beyond five years is anticipated to be consistent with the rate of growth of the projected economic and construction activity in Alaska (Kane, 2010).
- NPI leases land primarily for bulk commodity export operations at the Port, exporting wood chips and saw logs to Asia.
- Central Alaska Energy is a bulk fuel transport company with plans to construct a tank farm, pipeline and truck load out facility as illustrated in the Port Layout Drawings in Appendix A.

In 2008, the Port exported 451,000 tons of construction-quality gravel for the Port of Anchorage expansion project. Additional material is available for export to projects at the Ted Stevens Anchorage International Airport and for the Knik Arm Bridge causeways.

Importation of cement began in 2009 with two vessels each carrying 17,000 short tons. The cement was bagged and warehoused. About 3,700 pounds of rebar were also imported on vessels. Additional vessels brought more cement in 2011.

Scrap metal export also began in 2009. The last shipment of scrap metal (2012) included about 8,000 tons that was sent directly to South Korea.

Coal export began in 2010 with a test run of a Super Panamax vessel, loaded with 76,000 metric tons of coal in Seward. The vessel docked at Port MacKenzie to be topped off with coal trucked down from Healy.

Approximately 16-miles of concrete-coated pipe was staged on the barge dock in 2014 awaiting trans-shipment in 2015. The pipe was moved to a new underwater natural gas pipeline in Upper Cook Inlet.

There has been a significant increase in the number of local and national business entities expressing interest in establishing various business operations in the Port District but not necessarily using the Port's docks. These proposals include a bulk fuel storage facility, a timber curing facility, a power generation and solid waste disposal plant, natural gas liquefaction plants, a sewage treatment plant, peat processing and ore reprocessing facilities.

## **2.4 Future Cargo Operations**

Future cargo operations at the Port were evaluated based on a two-phase economic analysis completed by Dr. Paul Metz, a registered professional geologist (Metz, 2007a&b) as well as information provided by local entrepreneurs, the Port Director, and other Borough staff.

Port MacKenzie is being developed as a bulk commodities export and import center. The type of bulk natural resources and other cargo expected to be part of the future operations include coal, petroleum products, oil and gas field modules, natural gas pipeline construction, forest products, limestone products and other minerals.

Completion of the rail extension linking Port MacKenzie to the Railbelt will result in a dramatic increase in bulk commodity exports. The following potential commodities are listed in order of priority for Port development based on if the commodity is anticipated in the next five years and the duration the commodity is expected to be handled at the Port:

### **2.4.1 Coal**

Port MacKenzie is well-positioned to provide rail transport and Port facilities for the export of coal from the Usibelli Coal Mine in Healy. The Usibelli Coal Mine is the only active coal mine and current source of coal for export from Alaska. The exports from the mine have fluctuated significantly in recent years, with a peak market of approximately one million tons to approximately 400,000 tons, with an intermediate term annual average of 750,000 tons (Denton, 2010). Currently, up to one million tons of coal is exported through the Port of Seward using a coal loading facility owned by the Alaska Railroad Corporation and operated by Usibelli Coal Mines, Inc. The Usibelli Mine at Healy alone has over 250 million short tons of proven coal reserves. In addition, the Chulitna Basin in the Upper Susitna Valley contains several billion tons of coal that are also provided access to tidewater by the rail extension. Usibelli Coal Mine, Inc. is currently exploring alternatives to mine coal at Wishbone Hill near Sutton and ship it out of Port MacKenzie. If successful, this venture may ship up to 500,000 tons of coal per year out of Port MacKenzie.

The market for the sub-bituminous and low sulfur coals from Alaska is primarily for the power generation industries in South America and Asia (Brown, 2010). In addition, the construction of a coal fired power plant at the Port could lead to the need for an additional million tons per year of coal. Due to transportation savings associated with the rail extension and Port MacKenzie, it is expected that it will be economic to export a significantly greater amount.

During the first five years, after completion of the rail extension, it is possible that an additional one million tons of coal could be transported annually over the rail extension and exported through Port MacKenzie. Due to the design of this relatively high speed freight rail extension, and the inherent transportation cost savings, the amount of coal transported over the extension during the second five years could be up to four million tons (Metz, 2007a).

#### **2.4.2 Petroleum Products**

The development of petroleum storage facilities at Port MacKenzie to accommodate both the export and import of petroleum products will add additional transportation and storage capacity to the Cook Inlet area, as well as facilitate the transfer of fuels to and from Southwest, Interior and Northern Alaska.

There is a growing demand for low sulfur diesel fuel in Interior and Southwest Alaska as a function of mineral and energy development. This demand is associated with federally mandated low sulfur fuel specifications that went into effect in 2009. The new regulations require off-road equipment (i.e. mining operations) to only use low sulfur fuel. Alaskan refineries do not produce low sulfur diesel fuel. Low sulfur fuel will need to be imported. It is expected that the rail extension will be used to transport low sulfur diesel fuel to meet Interior and North Slope demands. Fuel suppliers have discussed the possibilities of establishing tank farms at Port MacKenzie and then shipping the fuel north by rail and truck.

It is estimated that at least 60,000 tons of low sulfur diesel fuel will be transported north from Port MacKenzie to Interior Alaska and a similar amount to Southwest Alaska, for a total of 120,000 tons of low sulfur fuel each year. This will begin during the first five years of operations and will continue to grow as more and more diesel fuel is sent north. In addition, fuel suppliers are considering setting up tank farms at Port MacKenzie and annually transporting 80,000 to 90,000 tons of fuel via the rail extension to North Slope markets.

#### **2.4.3 Oil and Gas Field Modules**

Several corporations have discussed using Port MacKenzie to build oil and gas industry modules, specifically sea-lift modules. These corporations include oil companies and oilfield service industries. For example, one oilfield service company expects to supply about 24 8,000-ton gas compression modules for the gas pipeline project over a period of 5 years commencing around 2020. According to the company, these modules will be manufactured at several locations around the world as no single location has the resources to build all of them. The company would like to complete assembly and ship about six of these modules out of Port MacKenzie over a period of three to four years.



#### **2.4.4 Forest Product Exports**

Forest product exports have been a major business activity at Port MacKenzie. The primary product has been wood chips for Japanese, Korean and Taiwanese markets. This low unit value commodity is very sensitive to the cost of transportation from the standing forest to the Port facility. Transport has been by truck with economic haulage distances limited to the Susitna Valley region. Large timber resources occur on State of Alaska lands, Alaska Mental Health Trust lands and Native Corporate lands in the Tanana Basin (see Fairbanks Economic Development Corporation (FEDC) Prospectus, March 2007). These Tanana Basin resources will become economic for export through Port MacKenzie by rail once the rail extension is complete. Total available resources for harvest in the Susitna Valley and Tanana Basin exceed 1.6 billion board feet with an estimated sustainable yield of 30 million board feet per year. It is estimated that a minimum of 60,000 tons per year of forest products could be exported during the first five years following rail extension completion (Metz, 2007b).

#### **2.4.5 Natural Gas Pipeline Logistics**

The natural gas pipeline project under consideration is a 800-mile pipeline from the North Slope along the Parks Highway to the Cook Inlet (see Figure 3). It will be necessary to transport pipe, compressor station construction materials, compressor components, construction equipment, fuel, construction camps and camp supplies from tidewater to inland locations. The most cost effective way to transport these construction materials to the construction areas is by rail, as far as possible, and then by truck the rest of the way. In March 2007, Northern Economics completed a comparative study that assessed the ability of Southcentral ports to transport pipe for a natural gas line project (Burden, 2007). Assuming the Port MacKenzie rail extension is complete, the study concluded that Port MacKenzie would be the most cost effective port for transporting pipeline materials. Accordingly, Port MacKenzie and the rail extension would be used to transport pipeline sections and materials north.

**Figure 3. Alaska Natural Gas Pipeline**



The proposed natural gas pipeline is predicated on 35 trillion cubic feet (TCF) of proven conventional natural gas on the Alaska North Slope. Estimated conventional resources of natural gas in the region exceed 200 TCF. Unconventional natural gas resources are estimated to be several times greater (Metz, 2007b).

A study determined that 122,760 forty-foot long segments of pipe (joints), weighing 12.3 tons per joint, would need to be transported through Port MacKenzie during a two-year period. In addition, appropriate support materials, structures, fuel and supplies would also be transported on this route.

#### **2.4.6 Value-Added Natural Gas Processing**

There has been discussion of a gas liquefaction plant at port MacKenzie once a natural gas transmission pipeline to the Port has been built. This would provide an anchor industry for the Port. Natural gas would be exported from the Port to foreign markets as well as used in Alaska.

It is also possible that petrochemical facilities could be built at Port MacKenzie. The products from a world-class petrochemical complex could include methanol, ethylene, polyethylene, ethylbenzene, ethylene glycol, Styrofoam, alpha olefins, ethylene dichloride, ammonia, urea and caustic soda.

Meeting the energy requirements for petrochemical production would necessitate a large power generation plant. Production rates of a liquefaction plant or a petrochemical plant would depend on the volume of natural gas transported via pipeline. A proposed 4.5 billion cubic feet per day pipeline would result in about 13 million tons of petrochemical products requiring 450 export vessels a year. (Metz, et. al., 2004).

#### **2.4.7 Limestone Products**

The Globe Creek limestone deposit, located approximately 38 miles north of Fairbanks, is the largest known high-quality limestone deposit in Alaska and contains an estimated 1.6 billion tons of high-purity limestone.

Limestone contains the essential materials for the production of lime (calcium oxide) and Portland cement (hydrated calcium and aluminum silicates). The economy of scale of lime production is as small as 100 tons per day, while the economy of scale of Portland cement is at least 10 times larger. Neither of these products is produced in Alaska, thus local needs are met with imports from either the contiguous states or other countries. Current markets for lime in Alaska include: metal mining, water and wastewater treatment and oil well completions.

Lime transported by rail from north of Fairbanks could be more economical to barge from Port MacKenzie to Southwest and Northwest Alaska than lime currently imported from British Columbia. It is possible that lime will be produced in kilns 10 miles north of Fairbanks and transported through Port MacKenzie during the first five years of rail operations.

It is expected that eventually cement will also be manufactured at the limestone site and exported through Port MacKenzie. The export of cement would involve the transport of much larger tonnages. Limestone products are used to help maintain water quality for waters associated with mining operations. Limestone products will be exported across the rail extension through Port MacKenzie for use in Southwest Alaska, in villages and cities, and major mining operations such as Pebble, Red Dog or Donlin (Metz, 2007a). Though the current market for Portland cement in Alaska is small compared to the minimum economic sized operation, Alaskan produced cement would primarily be for export.

#### **2.4.8 Other Minerals**

The rail corridor from Port MacKenzie to the Fairbanks area transects several mining districts and metal-rich geologic provinces (Metz, 2007a). Mineral deposits and mineral occurrences are found as clusters of mineralization referred to as mining districts. These mineralized clusters include copper, molybdenum, antimony and lead that are generally transported as mineral concentrates rather than as intermediately refined metals such as dore bars of gold. Metallic mineral concentrates that will likely be transported by rail through Port MacKenzie include antimony, copper, lead, molybdenum, silver, tin, tungsten and zinc. The 2007 Economic Analysis of Rail Link (Metz), includes estimates of the freight associated with the future mines. The annual expected rail freight load ranges from 9 to 21 million tons. Thus, it is expected that mineral concentrates will eventually be the largest commodity export.

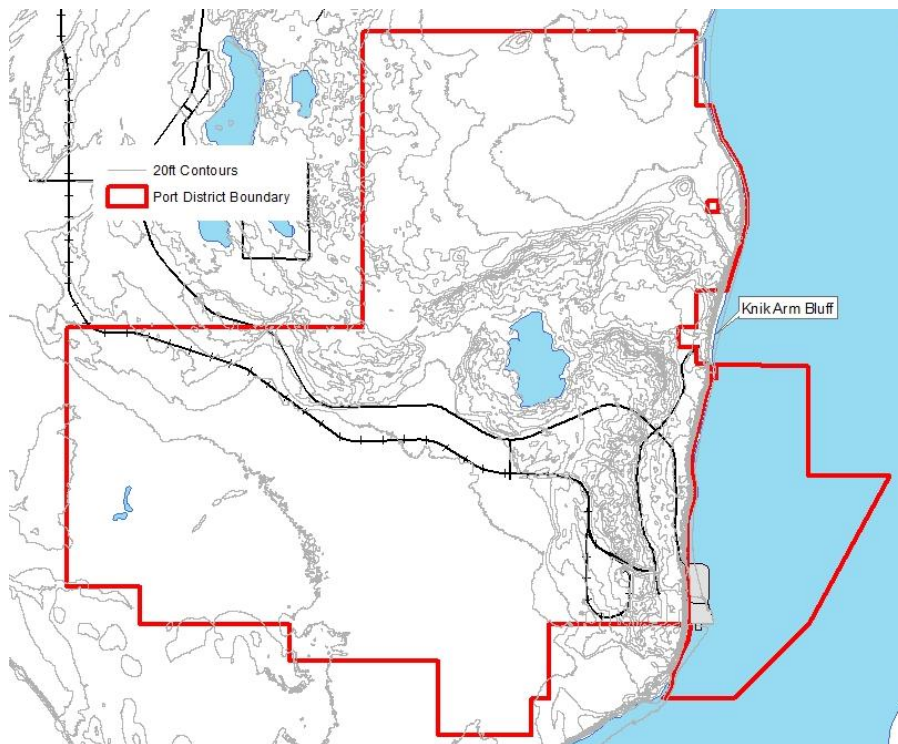
### **3. Land Use**

#### **3.1 Existing Conditions**

Port MacKenzie is divided by the east-west trending Point MacKenzie Road. This division has generally been used to separate heavy industrial uses to the south from the commercial and light industrial uses that will locate north of the road.

The Knik Arm Bluff runs north-south along the waterfront with average bluff elevations over 100 feet above mean sea level as illustrated in Figure 4 below. West of the bluff is a ridge that runs north-northwest. Lu Young Lane is on the east side of the ridge at the top of the bluff. Rail service will be available south of Point MacKenzie Road west of the ridge and docks. Land at the top of the bluff, closest to the docks, is reserved for marine/rail industrial uses including bulk material processing, storage and transfer. Given the proximity to tidewater and the loading conveyor, the disposal of waste soils/materials within the area of the pond or anywhere within the valuable area between Lu Young Lane and Don Young Road is prohibited. An organic material storage area west of Lake Lorraine has been designated disposal of organics and waste soils. If an embankment is constructed in this area, fill must be composed of compacted mineral soils. To maximize future use of the area, any existing organics should be removed prior to placing compacted fill. If it is desired to leave the organics in place, an engineering analysis of subsurface soils should be performed to determine the likely effect on the future uses of the embankment. Marine/rail-related industries require sites within close proximity to waterbodies due to functional dependencies on the industrial activity for direct access or for linkages to waterborne products or processes. A major ridge system occurs north, east and west of Lake Lorraine.

**Figure 4. Port Topography**



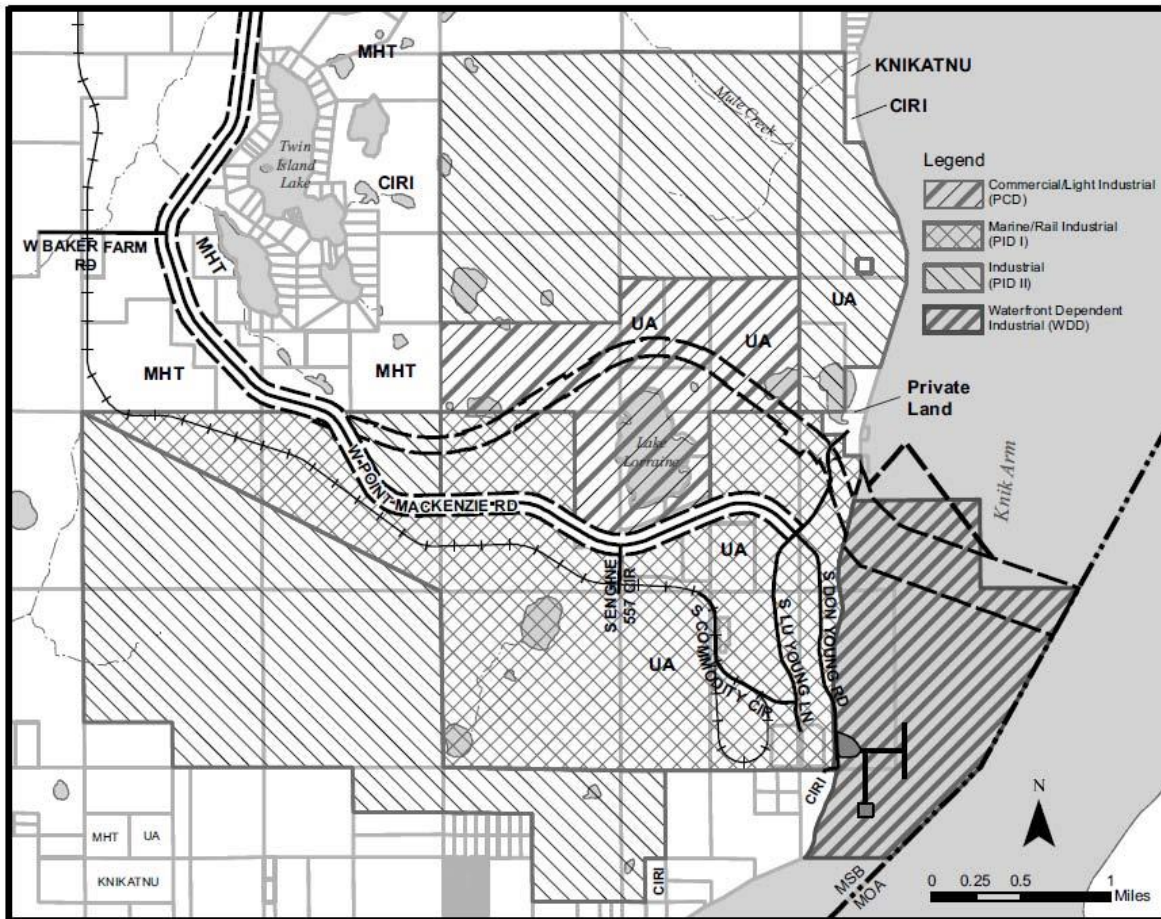
The Port District is comprised of four zoning districts per MSB 17.23:

- Waterfront Dependent District (WDD);
- Port Industrial District-I (PID-I);
- Port Industrial District-II (PID-II); and the
- Port Commercial District (PCD).

The districts are illustrated on Figure 5. The Port District encompasses land use districts (zoning) some of which are further divided into subunits. The locations of the different land use districts within the Port District are described below.

WDD occupies the southeast corner of the Port District and includes tidelands and the docks. PID-I includes the uplands closest to the docks, the land along rail and two areas north of Point MacKenzie Road reserved for future heavy industrial uses. PID-II lies back from the existing roads and the railway and includes land identified for industrial activities not directly dependent on the rail or docks that still benefit from the proximity to tidewater and the railroad. PCD occurs around Lake Lorraine and includes land north and east of the lake. Existing and future land uses within each land use district are described below.

**Figure 5. Future Land Use Districts**



### **3.2 Waterfront Dependent District (WDD)**

The Waterfront Dependent District includes 1,239 acres of tidelands and submerged lands owned by the Borough.

The plan for this area is to locate those waterfront uses that are necessary to operate a commercial/industrial port. Land activities in this area shall be directly related to a water activity and require navigable channels and specialized facilities at the land-water interface.

#### **Land Use**

This district includes the 16-acre open-cell barge dock with a 500-foot bulkhead barge dock and a 1,200-foot trestle pier deep-draft dock extending offshore (see Figure 4 below). The barge dock is available for temporary uses such as staging of material during import or export or final assembly of modules. The deep-draft dock can accommodate both Panamax and cape-sized vessels. Due to the limited space available this asset must be managed carefully to maximize its water-dependent utility. A transportation route from the deep-draft dock across the barge dock to Lu Young Lane must be reserved for truck traffic transporting freight on and off vessels.



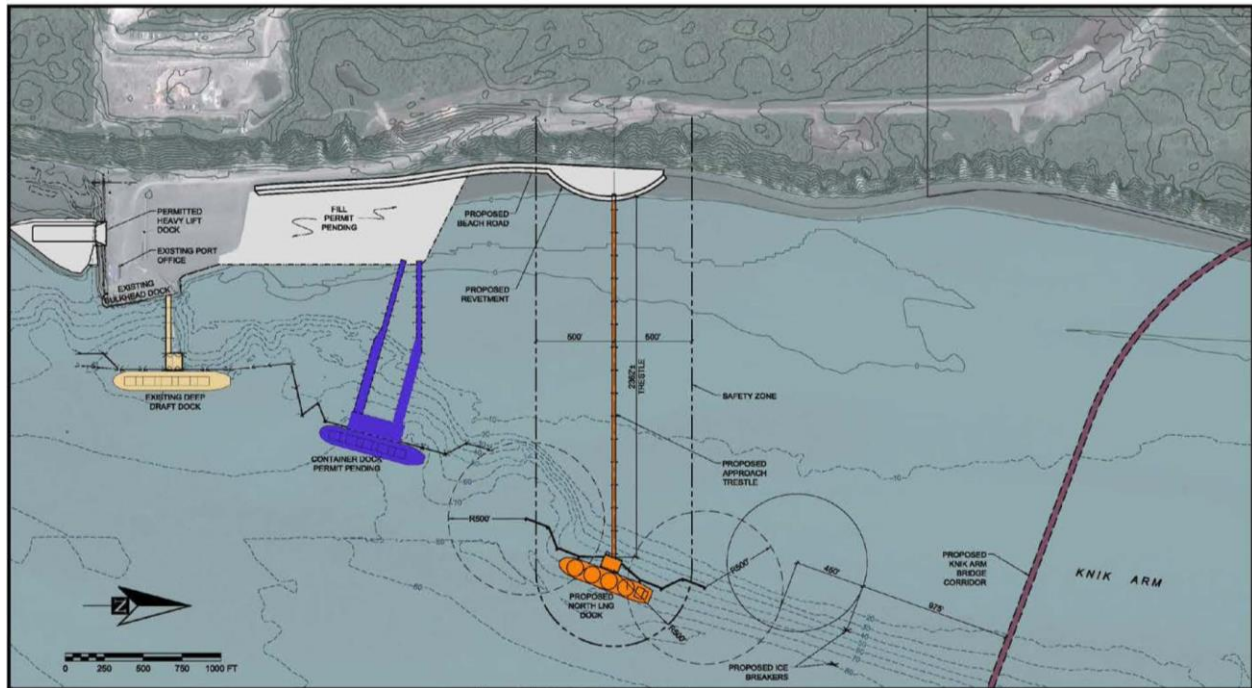
## Dock Design and Expansion

Plans are in place for construction of additional deep-draft docks that include as many as four new trestles. Additional trestles will allow for more rapid transport of cargo on and off vessels. The current dock designs and plans for expansion are illustrated on Figure 6a and 6b. Expansion of the docks will be necessary as use increases.

## Small Ship Repair and Inspection

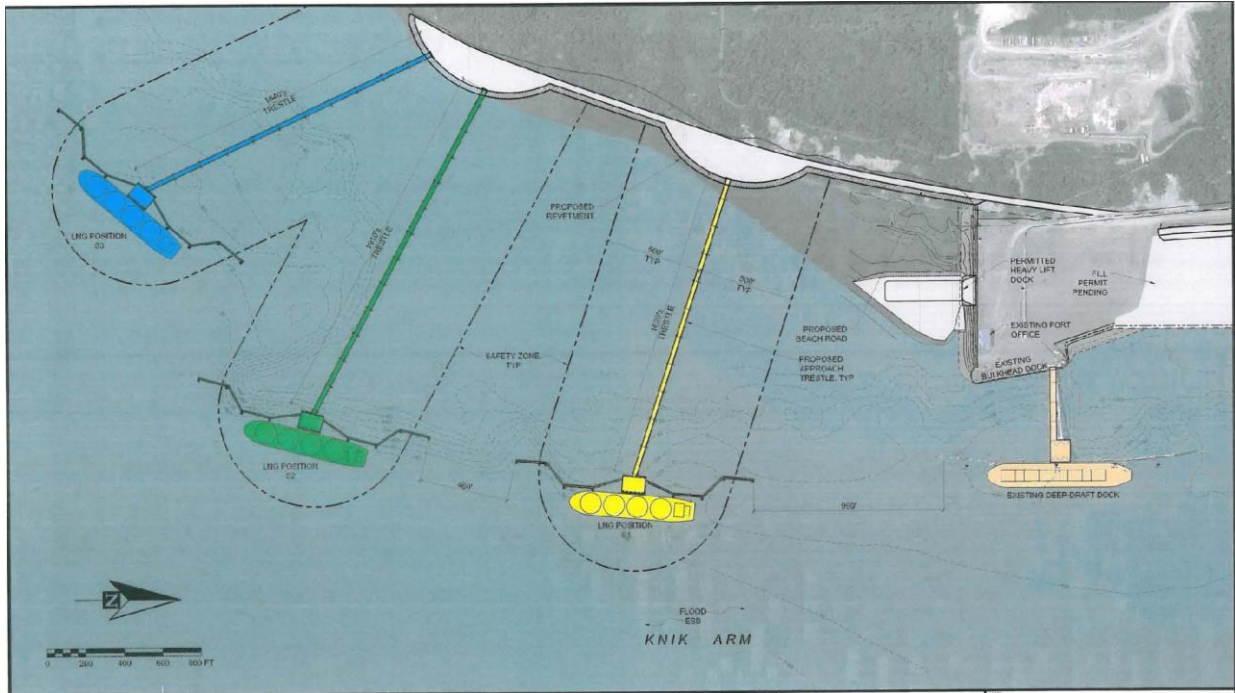
The addition of a future ship repair and inspection facility can easily be added as an addition to the existing dock areas. A single berth dry dock rack can be added south or north of the barge dock. However, the south side of the barge dock has been identified as essential for loading sea-lift modules onto barges.

**Figure 6a. Dock Expansion North**



The figure above shows two additional trestle docks and an expansion of the barge dock north of the existing deep-draft dock. The new docks are shown at -60 MLLW.

**Figure 6b. Dock Expansion South**



The figure above illustrates the plan for trestle docks built to the south of the existing docks at -60 MLLW to accommodate the demand for LNG export.

### **3.3 Port Industrial District - I (PID-I)**

The Port Industrial District – I is a largely undeveloped rail and marine industrial area of great importance to the region’s economic base. This Port Master Plan Update seeks to preserve and protect this unique coastal resource by limiting uses to strictly marine/rail-oriented industrial. This plan continues the existing marine/rail-oriented industrial uses and supports the development of available vacant land with similar uses in order to provide a homogenous industrial climate with an assured, reasonable long-term growth potential.

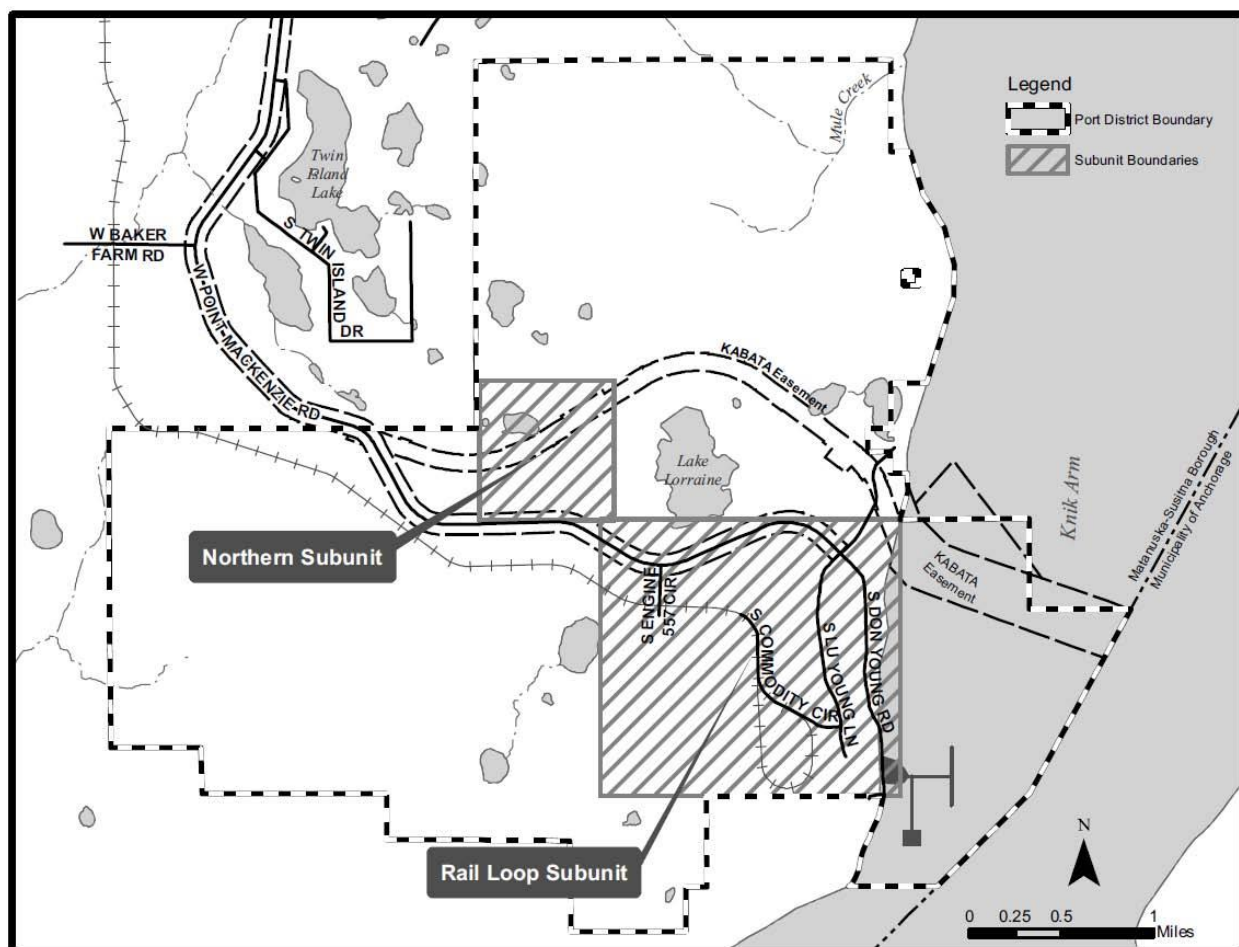
The Port Industrial District – I is reserved for industrial uses that require close proximity to the marine terminal and railroad.

#### **Port Industrial District – I Planning District Subunits**

The Port Industrial District – I consists of 3,047 acres of land. The plan for this area is to retain and continue marine/rail-related industrial uses. To facilitate description of the existing and future uses, portions of this planning district have been divided into the following subunits illustrated on Figure 7:

- Rail Loop Subunit; and the
- Northern Subunit.

**Figure 7. PID-I Subunits**



### **3.3.1 Rail Loop Subunit**

This subunit is comprised of 1,573 acres around a future rail loop and will contain the various industries that relate to the rail loop and marine terminal (see Figure 8).

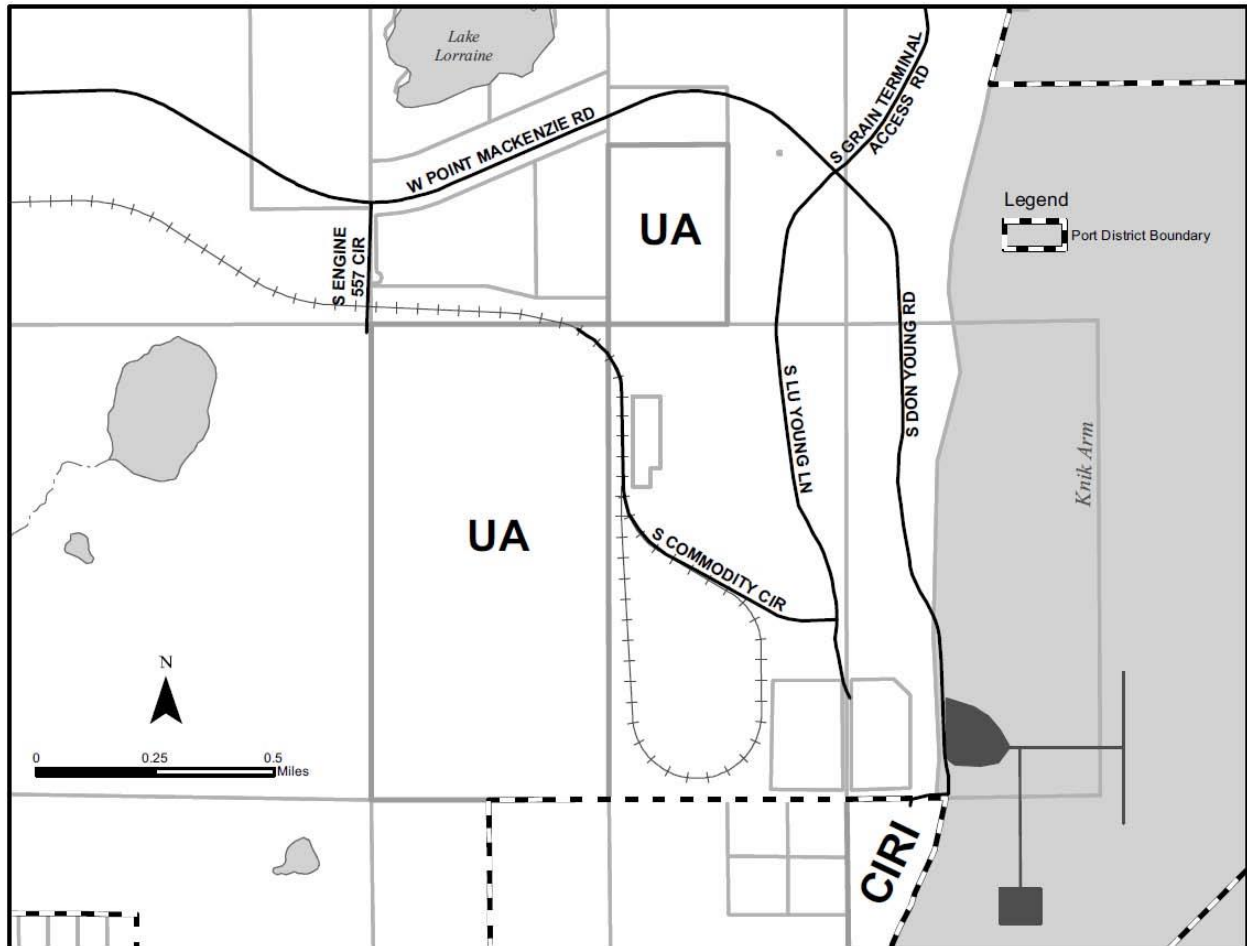
A 30-acre area has been cleared at the end of S. Lu Young Lane, uphill from the dock. The area includes two 20,000-square foot storage warehouses, a paved, five-acre bulk material storage and loading area, and a 60-inch wide, 3,000-foot long privately owned conveyor system. The elevated conveyor system extends from the bulk material stockpile area down to the docks.

A seven-acre pad has been constructed at the northwestern corner of Lu Young Lane and Commodity Circle.

A modular facility construction plant is located on a sixteen-acre cleared area, south of Point MacKenzie Road across from Lake Lorraine. Approximately 30 acres west of the modular construction plant has been cleared and used as a sand and gravel source.



**Figure 8. PID-I: Rail Loop Subunit**



The rail loop is being constructed to handle 110-car unit trains hauling bulk materials. A 110-car train will fit between the loop turnout and the unloader and a second such train between the unloader and the turnout. A loaded train will be able to enter the loop while an empty train prepares to leave. The interior of the rail loop contains about 78 acres reserved for bulk material handling. Expanded rail facilities are anticipated to serve bulk fuel storage, value added gas processing and storage, and other future industrial uses in the area. Bulk commodities will be off loaded and stored within and adjacent to the rail loop. Multiple car unloaders are anticipated to accommodate a variety of commodities.

The Port MacKenzie Layout Drawings in Appendix A illustrate the anticipated future layout of land uses, utilities and the surface transportation network.

Cargo operations in this subunit are expected to continue and expand with additional area used for staging exports and providing for imported commodity storage. Water linked uses should be located in this subunit along the material handling corridor or road system. Expected uses are noted below:

## **Coal**

An area suitable for the projected volume of coal delivered via truck has been identified adjacent to the rail loop nearest the marine terminal. A similar area within the rail loop has been identified for the projected volume of coal to arrive by train. The size and location of both areas were developed based on discussions with several representatives from Usibelli Coal (Denton, 2010) and the recommendations of an engineer specializing in bulk material movement (Hoggan, 2010).

Expansion of the conveyor corridor to service the interior of the rail loop as well as the area identified for truck coal will include additional conveyor belts.

## **Mineral Concentrates and Other Bulk Commodities**

Multiple commodities can be off-loaded from trains and stored inside the rail loop. Area within the rail loop has also been identified as future stockpiling areas for coal, wood chips, limestone products, construction aggregate or other bulk commodities yet to be identified. Land immediately northeast of the rail loop has been identified for additional bulk package/material storage to serve the existing and anticipated mines in Interior Alaska (see Appendix A). This area can also be used for expanded petrochemical product handling and storage, truck coal, cement, gravel or other products that are associated with truck or rail.

## **Petroleum Products**

Tank farm area has been identified for bulk petroleum product storage immediately north of the rail loop.<sup>2</sup> Locations for pipeline, valve yards, truck, rail and vessel loading racks are illustrated on the Port MacKenzie Layout Drawings in Appendix A. It is anticipated that both deep-draft vessels and barges will be loaded and unloaded with petroleum products and the location is close enough to meet this need. The proximity of the tank farm to the rail loop also allows for the loading or unloading of a unit train with petroleum products. A development plan for the area identified for future tank farms is necessary to maximize efficient land use due to topographic constraints.

Two areas are identified for future value-added natural gas processing facilities. One is north and east of the tank farm area. This area is suitable for a natural gas processing and liquefaction plant and would require about 60 acres.

A large petrochemical complex, which could process the natural gas into a host of industrial chemicals, would require about 100 acres. This area has been identified at the western edge of this planning subunit.

## **Pipeline Logistics**

Several lease areas have been identified as suitable for import and processing of the pipe and associated materials required to construct a natural gas pipeline. The lease area labeled

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<sup>2</sup> Tank farm location was based on interviews with potential future port users as well as an evaluation of the Port of Anchorage operations.

fabrication on the Port MacKenzie Layout Drawings in Appendix A is tentatively identified as the location for pipeline logistical support. Prior to pipeline construction use, the fabrication area could be used for initial sea-lift module fabrication before final assembly on the barge dock.

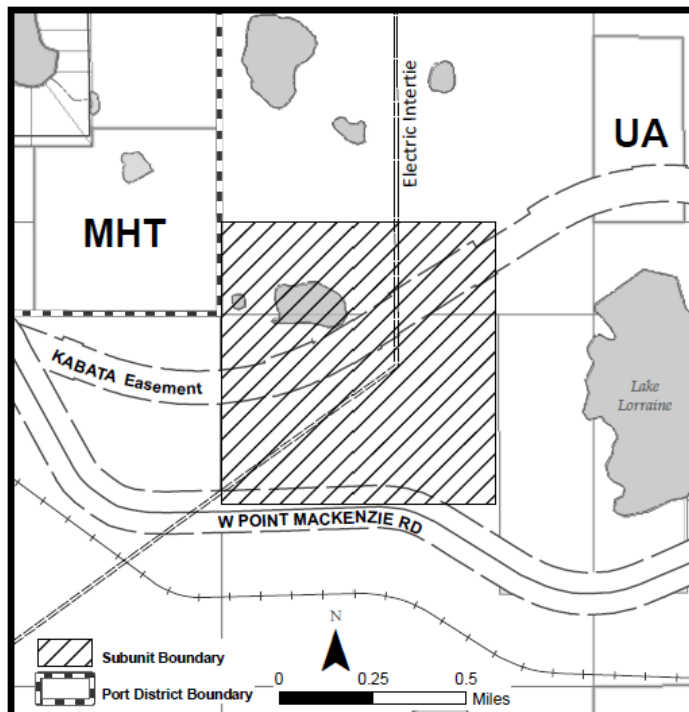
### **Transportation and Logistical Support**

The area adjacent to the eastern boundary of the potential pipeline logistics site has been identified as suitable for transportation and logistical support.

A parking lot south of Point MacKenzie Road is currently used for winter access to Figure Eight Lake as well as private property south of the Port District. The parking lot is being relocated south of the railroad to reduce potential conflicts with the marine/rail-industrial uses of the Port.

#### **3.3.2 Northern Subunit**

This subunit is comprised of 356 acres and is bisected by high-tension power transmission lines (inset to the right). The only development has been construction of an organic material storage area about one third of a mile west of Lake Lorraine and one third of a mile north of Point MacKenzie Road. The southern portion of the subunit (~100 acres) north of Point MacKenzie Road and south of the Knik Arm Bridge easement has been identified as suitable for a power generation plant. Other heavy and light industrial uses that do not require direct access to docks should locate here. A rail spur may be developed into this area. The easement for the Knik Arm Bridge passes through the northern half of this subunit. The remainder of this subunit is suitable for other industrial processes.



### **3.4 Port Industrial District - II (PID-II)**

The Port Industrial District – II consists of 4,836 acres of land in three separate areas. About 2,280 acres occur along the northern boundary of the Port District. About 2,390 acres encompass the southwest corner of the Port District. About 140 acres of this district contain the intersection of Point MacKenzie Road and the Knik Arm Bridge Road. The plan for these areas is to locate commercial and industrial uses that do not require close proximity to the docks or railroad such as general manufacturing. An area within this district has been identified as suitable for a large petrochemical storage and processing facility, directly west of the rail loop. Transient commodity storage is anticipated to occur south of Point MacKenzie Road just inside the Port District Boundary. A quarter-mile noise and lighting buffer along the inside of the northern and northwestern boundaries of the Port is also included in this land use district.

### **3.5 Port Commercial District (PCD)**

The Port Commercial District includes about 1,021 acres around Lake Lorraine, extending to the northeast. The plan for this area is to locate commercial and light industrial uses not reliant on the marine terminal or railroad, incineration or transient storage. The boundaries of this district are shown on Figure 5. Land in this district is primarily undeveloped. A loop road is planned around Lake Lorraine to service the commercial district. Land use within the loop will be restricted those uses commonly found in a business/industrial park. Commercial and light industrial uses are allowed within this district.

#### **Commercial Offices**

Commercial office uses are tentatively planned for the land surrounding Lake Lorraine. Lake Lorraine is an ideal area for employee open space to be incorporated with offices. Corporate and general lease office space will serve as a picturesque setting for Port related businesses. The construction of the Knik Arm Bridge will further enhance the value of the Port Commercial District. Though this is set aside for Port-related commercial business and office uses, it is openly acknowledged that it is in close proximity to heavy industrial activities and that off-site effects of the industrial activities such as noise are an accepted component of the area. A 200-foot, no development buffer zone around the circumference of the entire lake ensures that the water's edge will be maintained in its natural state. A non-invasive pedestrian pathway and a series of pocket-parks should be designed and constructed around the lake.

#### **Foreign Trade Zone**

A tax free industrial and manufacturing area is identified northeast of Lake Lorraine to provide a secure area that businesses can bring materials into the 'Free Port,' provide assembly and value added services, and then export the finished items through the Port without incurring value added taxes. The Point MacKenzie Freeport Center would provide manufacturing, warehousing, and distributing facilities to serve the Pacific Rim. As a separately controlled security area, the Freeport Center will meet all necessary customs and quarantine requirements.

## **4. Transportation**

### **4.1 Introduction**

This chapter addresses the existing and future transportation facilities and traffic to integrate the transportation needs of the Port District into a regional context.

The Port, as an intermodal facility, requires unimpeded access to the surface transportation system beyond the Port District. Port traffic is largely industrial with a subset of public traffic utilizing the Cook Inlet Ferry System or accessing nearby private property.

#### **4.1.1 Existing Conditions**

**West Point MacKenzie Road**, as a major arterial, is the primary access road for the Port entering the Port District from the west and heading east for about three miles. The route becomes Don Young Road at a three-way intersection and continues 1.5 miles to the docks.

**South Lu Young Lane**, a minor collector, provides access to lease lots on the land above the docks. The roadway is about one mile long and heads south from the three-way intersection terminating at the east-west to the south of the NPI lease area. This roadway is currently used by industrial truck traffic to transport bulk materials to a 22-acre bulk material storage area.

**South Grain Terminal Access Road**, a minor collector, extends about three-quarters of a mile northeast from the three-way intersection ending just outside the Port District at the Knik Dock, a privately owned parcel.

The **Bi-Modal Bulk Facility (BMBF)** was renamed **John Riggs Memorial Way** in 2014. This road is a minor collector, located approximately one mile northwest of the docks. This facility includes a one-mile long roadway and an adjacent bulk material storage pad of approximately 82 acres inside the area designated for the future rail loop.

## 4.2 Transportation Trends

Significant growth and development are anticipated over the next ten years in the Point MacKenzie community. About 2,026 people are currently estimated to live in the community (2014<sup>3</sup>). Opening of the Goose Creek Correctional Center and construction of the rail connection between the Port to the Alaska Railroad is continuing to create and sustain jobs leading to a local population boom. A conservative annual population growth rate used in the MSB density and build-out study for the Point MacKenzie community is four percent.

The primary mode of travel in Point MacKenzie is by road. In the next five to ten years, bus and share-a-ride van pools will be used for transit services to and from the Port and area businesses.

Traffic count data was available for two points along Point MacKenzie Road: one at the beginning of Point MacKenzie Road at the intersection with Knik Goose Bay Road, the other at the intersection with Ayrshire Road at Mile 7.4. Table 4.1 lists the annual average daily trips for Point MacKenzie Road. The significant decreases in traffic volume are related to completion of development projects at the Port and Correctional Center.

**Table 4.1. Traffic Count Data**

<b>Pt MacKenzie Road AADT</b>				
<b>Location</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>DVMT</b>
Mile 0	1157	904	656	4864
Mile 7.4 Ayrshire Road	220	232	235	3242

ADOT&PF 2010-12 Traffic Volume Report

<sup>3</sup> Alaska Department of Labor Population Estimate

Increasing local population, increasing industrial traffic, and operation of the correctional center are increasing the number of vehicles using Point MacKenzie Road. Insufficient data exists to project traffic growth rates on Point MacKenzie Road.

Anticipating significant and steady increases in traffic along Lu Young, the initial subsurface explorations, laboratory testing and geotechnical engineering studies were conducted in support of the required Lu Young Lane improvements. A study was conducted to evaluate the subsurface conditions along the existing road and to provide geotechnical engineering recommendations for the required widening and structural section improvements to meet the Port road standards (Shannon and Wilson, 2014).

Additional data is required to determine the average daily traffic count for the Port District.

Currently the roads in the Port are maintained through road service area funds. As development expands, the method of maintenance funding should be reviewed.

### **4.3 Multi-Modal Opportunities**

The Port MacKenzie transportation network is designed to incorporate multiple modes of travel and freight/bulk material transportation. Upgrades to existing conditions, an understanding of regional transportation trends, and infrastructure requirements of future industrial activities assist in facilitating multi-modal transportation opportunities. The transportation system is designed to be multi-modal, containing roads, rail, marine, and pipeline/conveyor transportation elements.

The Bi-Modal Bulk Facility (BMBF), renamed John Riggs Memorial Way in 2015, is critical in providing multi-modal transportation opportunities to aid the development of Port MacKenzie as a major exporter of bulk commodities. The BMBF includes 82 acres of bulk material storage. Aggregate storage pads will be serviced primarily by truck during the initial stages of operation. The facility has one mile of roadway that provides connectivity to South Lu Young Lane.

As a world-class export facility, shipping operations are more dependent on rail as the principal bulk materials delivery method. The element of the Port MacKenzie transportation system that stitches together multi-modal opportunities are the intermodal transfer connections. These intermodal transfer connections consist of internal roadways, rail lines, pipelines and conveyor systems for bulk commodities and liquid products, a barge dock, and a deep-draft dock to import and export materials from Port MacKenzie. A fully developed multi-modal port will serve as a key transportation asset for the State of Alaska and positions the Port District to attract significant new private investment and employment opportunities.

### **4.4 Rail Service**

The forthcoming Port MacKenzie Rail Extension connects the Port District to the Alaska Railroad Corporation mainline system. With about 32 miles of new rail, the rail extension will terminate in a loop enclosing approximately 78 acres for storage of bulk commodities, such as coal, limestone, aggregates, and other minerals resulting in greatly increased industrial activity.

The loop was designed to accommodate storage of multiple bulk commodities. At least two bulk material car unloaders will be needed: one for coal and one for limestone and other minerals. A location for a bulk fuel loading and unloading system has been identified adjacent to the tank farm located along the rail loop. This facility will provide piping, pumps, and discharge equipment to fill rolling stock tank cars for fuel delivery. The location is designed to supply a 110-car train with bulk fuel without having to split the train load.

Parcels ideal for industrial manufacturing and fabrication operations which are not dependant on proximity to tidelands will be serviced by a combination of rail and roadway elements. As the Port develops, various rail spurs will be constructed as offshoots of the rail extension project. These spurs are anticipated to service industries largely dependent on rail as a primary mode of transporting material and products. Areas identified as fabrication, modular fabrication, bulk aggregate storage, tank farm, and gas-derived products can be served with multiple rail spur extensions. A second rail loop is shown on the long-term layout. The long-term rail configuration includes a larger, second rail loop to the north of the initial teardrop loop. Future rail configuration may be a combination of both spurs and a second loop.

## **4.5 Truck Service**

In the near term, trucking will serve as the primary method for moving bulk commodities and other materials in and out of the Port District. The Port offers various routes to facilitate efficient transport. Heavy industrial vehicle trips are distributed depending on the type of material being transported and the delivery schedules of such materials. Shipments scheduled to be directly loaded on a barge or staged on the barge dock access the docks by traveling on Don Young Lane. An additional 22 acres has been identified as suitable for coal storage transported by trucks that are accessed by South Lu Young Lane. This route will offer direct access to bulk commodity storage areas where material will be stored and delivered to ships by conveyor.

## **4.6 Traffic Circulation**

Efficient and safe traffic circulation is predicated on an understanding of the trips generated from overall Port activities. The Bi-Modal Bulk Facility serves as an initial conduit for distributing bulk commodity truck traffic from other industrial material shipments accessing the docks.

While some industrial traffic will continue to utilize Point MacKenzie Road as a means to access the docks, industrial traffic will be controlled to mitigate conflict between private vehicles and heavy industrial traffic.

This Master Plan recognizes the existing section line easements that occur in the Port District as legal access to privately owned land in and around the district. Any vacations of section line easement will require provision of adequate alternate access and Borough support.

As land around Lake Lorraine develops as a commercial district, traffic generated from various professional, commercial and office-related land uses will also be distributed prior to entering the industrial districts. A road network is designed to surround Lake Lorraine which will be accessed

from Point MacKenzie Road. This second-tier road network will provide on-site circulation to individual lease lots within the Port District.

The Knik Arm Crossing easement is designated for a roadway that conveniently and efficiently bypasses the commercial and industrial districts of the Port. Although heavy industrial, light commercial and recreational traffic will access Point MacKenzie Road, trips generated from the Kink Arm Bridge will be redirected prior to entering both the commercial and industrial boundaries of the Port (Frazier, 2010).

## **4.7 On-Site Circulation**

On-site circulation focuses on the design of access connections serving site development and the relationship between site circulation and access to the abutting roadway. Roadway functions, access hierarchy and the principles of safe and efficient access should be considered to promote well-organized transportation development of the Port District. Level of Service (LOS) classifications for the road network will determine the right-of-way required to design a circulation system capable of establishing safe and efficient on-site circulation patterns. Guidelines should be drafted to include driveway operations for various commercial and industrial activities, including ingress/egress maneuverability and speed, throat length and driveway geometrics.

Proper on-site circulation design is achieved when three major elements – access location and design, site circulation and parking, building footprint and location – are integrated into the overall development plan. Site circulation directly affects the safety, traffic operations and the assigned LOS function of the street system. Good site circulation is necessary to protect the integrity of the public streets. Driveways should allow for sufficient stacking distances to meet the needs of tenant operators. Lessees shall provide adequate on-site parking and adequate space for loading and unloading at all times.

## **4.8 Future Transportation Improvements**

Future transportation improvements will be necessary to facilitate efficient and safe multi-modal surface transportation of vehicles, people, and commodities. The Borough will pursue geometric roadway improvements such as widening for anticipated roadway and utility expansion, potentially adding roundabouts or signals to high volume intersections, acceleration and deceleration lanes, and/or adding turning lanes. These improvements will be required to mitigate the traffic impacts from homogenizing industrial, commercial, and recreational traffic usage and maintain required LOS grades for Port MacKenzie roadways. Roadway LOS is a measure of roadway congestion ranging from LOS A (least congested) to LOS F (most congested). The LOS grading structure is a qualitative assessment heavily based on rate of speed and travel distances. LOS is one of the most common terms used to describe how "good" or how "bad" traffic is projected to be along a particular roadway in a defined geographical area. LOS serves as a benchmark to determine whether transportation improvements for Port MacKenzie will comply with existing LOS grades.

Industrial and commercial driveway standards were adopted by the Port Commission



Future transportation improvements should also consider Volume to Capacity (V/C) ratio in conjunction with LOS grades to develop an appropriate and proficient surface transportation system. The V/C ratio is a measure of traffic demand on a facility (expressed as volume) compared to its traffic-carrying capacity. Traffic volumes of a particular roadway are generally expressed as average daily traffic (ADT) or vehicle per hour (VPH) for a specific street segment. Potential choke points due to future rail service, transportation of modular products via heavy trucks, and peak ferry traffic may indicate that a roadway facility is operating at or near capacity. Port traffic moving at an acceptable rate of speed will perform at suitable LOS grades. However, segments of the transportation system may indicate the facility is operating at or near capacity despite acceptable LOS grades. In-road traffic counting loops should be installed to provide long-term data for use in determining need for future improvements.

## **5. Facilities/Utilities**

### **5.1 Introduction**

This chapter addresses the existing and future facility and utility needs for development of Port MacKenzie. Utilities, as a group, include emergency/fire suppression, potable water, wastewater, storm water systems, electrical service, pipelines, conveyors, and natural gas. The availability of such utilities and facilities will encourage the development of Port MacKenzie for large-scaled industrial, manufacturing and commercial uses. Utility layout is shown in the Port MacKenzie Layout Drawings in Appendix A. All utilities should be buried when crossing public roads and railways to allow for unfettered movement of tall freight.

An important consideration for future utility and facility requirements is the estimation of potential industrial, manufacturing and commercial activity. Utility and facility needs can be estimated by the overall utility usage of certain land uses and the distribution and intensity of these uses.

Identification of locations/routes of major infrastructure and utilities in the Port needs to be a priority. When parcels are leased for development, it needs to occur in a manner that ensures Port infrastructure needs are not compromised.

### **5.2 Terminal Building**

A 7,000-square foot terminal building was constructed in 2006 at the southeast end of the barge dock. It was originally intended to act as the terminal for the proposed ferry, however, since the ferry is no longer being considered, the building is currently being used for Port activities. The terminal building includes office space, storage, and restroom areas. There are seven office spaces, three of which are currently being used by the borough, and 4 which are being leased out.

### **5.3 Security Posts**

Two security posts have been installed. One is at the end of Don Young Road at the beginning of the barge dock. The other is at the intersection of Point MacKenzie Road and Lu Young Lane. The general public will be directed by signage to a security post at the beginning of Don Young Road.

The Security Gate will control traffic proceeding along Don Young Road to and from the dock. Locations for future security posts are illustrated on the Port layout drawings in Appendix A.

## **5.4 Deep-Draft Dock**

Port MacKenzie contains a fully integrated and operational deep-water marine port with a 1,200-foot deep-draft dock. The deep-draft dock, with -60 feet Mean Low Water (MLLW), is capable of handling the world's largest vessels. The deep-draft dock is equipped with a conveyor system capable of loading bulk commodities at up to 2,000 tons/hour. An additional trestle will allow for more rapid transport of cargo on and off vessels. The design will also allow for roll-on/roll-off containers. Future development of the deep-draft dock must accommodate fuel and cement loading and unloading.

## **5.5 Barge Dock**

The 14.7-acre open-cell barge dock has a 500-foot bulkhead barge dock with a depth to MLLW of -20 feet. Improvement of the barge dock with a bulkhead landing on the south side should occur to assist with loading large modules. Space for loading and unloading racks for liquid petroleum and liquefied natural gas should be established in the near term.

## **5.6 Conveyors**

A 3,000-foot long, 5-foot wide, privately owned elevated conveyor system extends from the 22-acre bulk material stockpile area down to the deep-draft dock. Expansion of the conveyor corridor to service the interior of the rail loop as well as the area identified for truck coal will require additional conveyor belts. This expansion will allow bulk commodities to be loaded at a higher volume per hour. The existing conveyor was designed to accommodate a second conveyor on the same support structures. Additional conveyors are anticipated to be necessary to service the expanded deep-draft dock.

## **5.7 Pipelines**

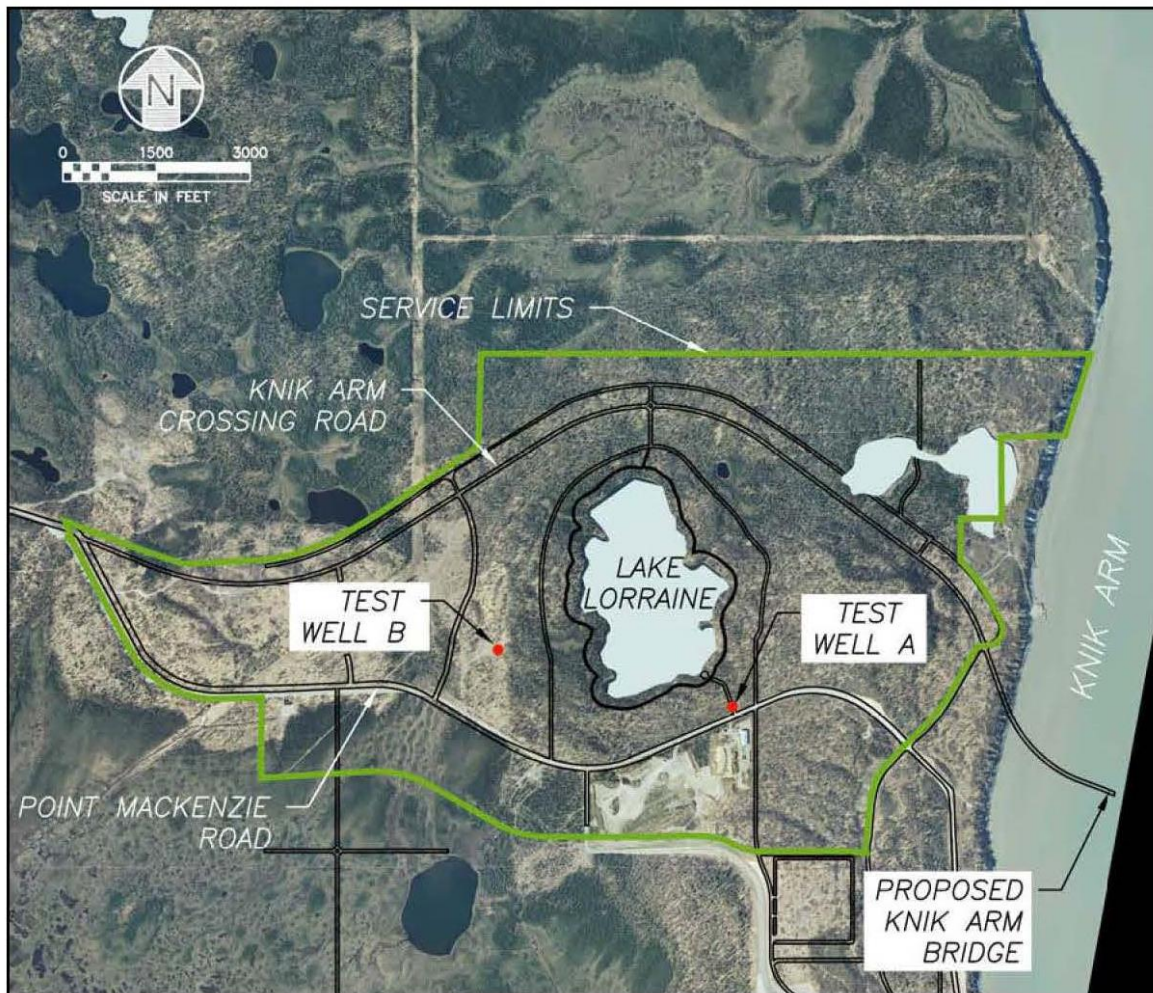
Pipelines are a necessary component of Port infrastructure. Pipelines will be constructed on the east and south sides of the tank farm to facilitate the loading and unloading of bulk fuel shipments onto both rail tankers and tanker trucks. The pipeline corridor is illustrated in the port layout drawings in Appendix A. A portion of the pipeline corridor has been surveyed and monumented from the southern end of the tank farm to the waterside of the barge dock. Multiple pipelines will be constructed to permit the loading and unloading of not only bulk liquid products but also bulk cement, liquefied natural gas, and other liquid petroleum products. Additional pipeline corridor must be engineered and surveyed from the tank farm to the Knik Arm Crossing.

## **5.8 Potable Water**

In the near term, incremental development of industrial land uses will require the construction of on-site well systems for potable water. As the Port develops into a world class export facility, placement of storage tanks, treatment facilities, pumping stations and piping need to be carefully

considered in the overall facility and utility evaluation. The demand for potable water will be evaluated based on the composition of commercial and industrial land uses compared to the consumption of each type of use. Placement of potable water systems will be evaluated based on industrial density, soil composition and the topographical features of the Port District. A six-inch well was constructed and tested to determine the availability and suitability of water within the Port Commercial District. The locations of the two test wells drilled as part of the water and wastewater evaluation are shown on Figure 9 as well as the service area limits.

Figure 9. Water Well Locations



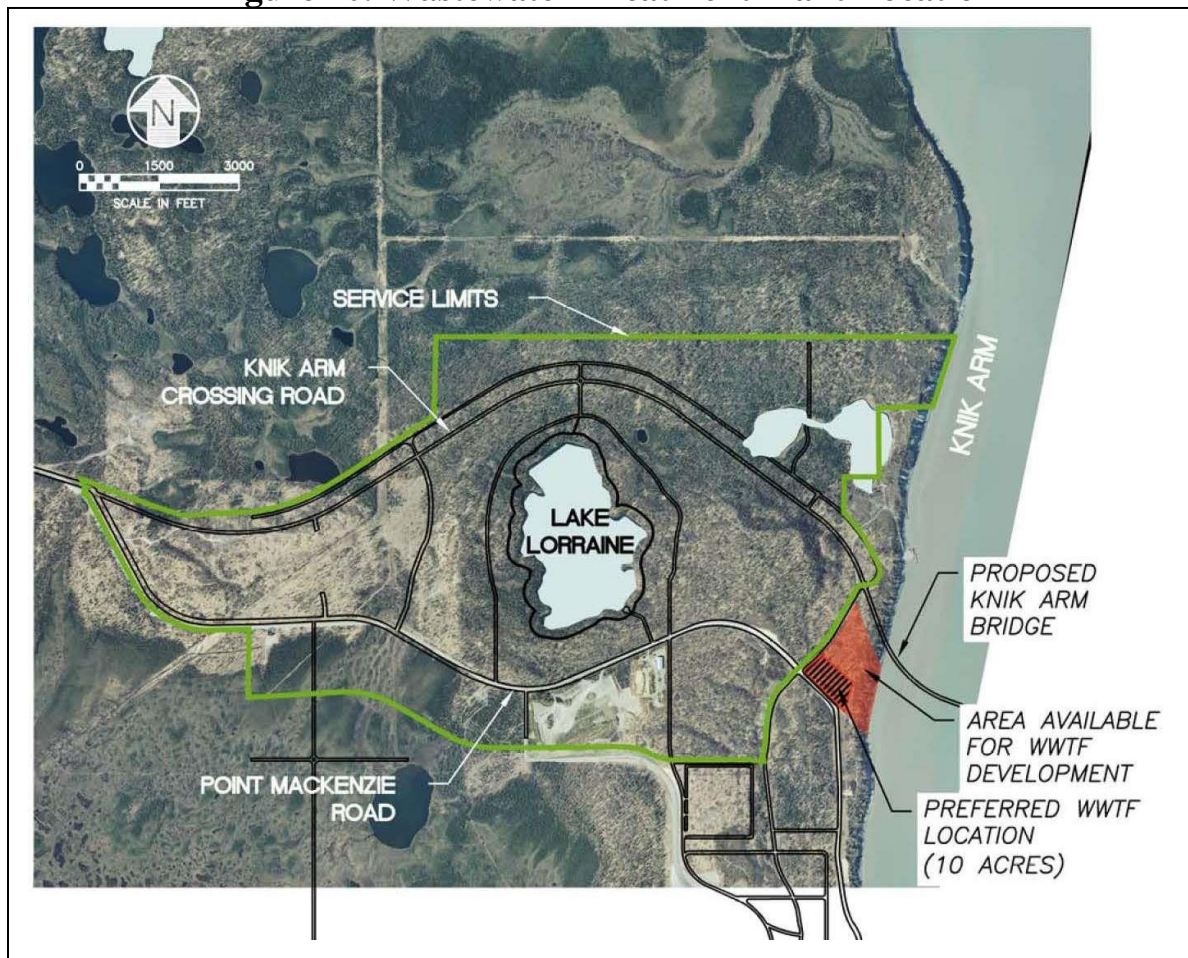
## 5.9 Wastewater Management

Development of industrial land uses will utilize on-site septic facilities for wastewater management. Continuous development of industrial and commercial uses will require the construction of large-scale treatment facilities to efficiently manage wastewater. Location of treatment plants, pumping stations and possibly irrigation land (to meet federally mandated tertiary treatment standards) must be identified and planned to meet local demand.



An area has been designated to be served by piped sewer and water service to achieve maximum development density. Because of the uncertainty and flow limitations with large subsurface discharges, this Master Plan includes a Waste Water Treatment Plant (WWTP) that will surface discharge into the Knik Arm. The future WWTP must be capable of treating the expected flow at full build-out. A WWTP is typically sized to treat the design flow rate for a 20 to 30-year planning horizon, plus additional space to at least double the plant size should forecasts underestimate growth. The shaded region in Figure 10 identifies an approximate 70-acre area that is suitable for a future WWTP. The preferred WWTF location within the available area is also shown. This location is ideal because it is inside of the Port's secure perimeter and is situated lower than the surrounding areas.

**Figure 10. Wastewater Treatment Plant Location**



## 5.10 Storm Water Management

Storm water is the surface runoff that results from rain and snowmelt that flows over land or impervious surfaces. Development at Port MacKenzie will alter the land's natural retention and absorption capabilities. An increase in industrial and commercial activity will introduce a host of pollutants (i.e., sediment, oil, grease, metals, salt, pathogens and/or other toxins). These pollutants can accumulate on impervious surfaces such as rooftops, roads, storage areas, and parking lots

which can be picked up by storm water runoff as it moves across these surfaces. Uncontrolled storm water discharges from Port activities can negatively affect water quality, elevate pollutant concentrations and change natural hydrologic patterns.

The state's approved program is called the Alaska Pollutant Discharge Elimination System (APDES) Program. The APDES storm water permit requirements are based largely on a pollution-prevention approach. The most effective storm water management techniques emphasize preventing rain and snowmelt from coming into contact with pollutants and preventing discharges directly to nearby receiving waters. APDES storm water permits require operators of permitted activities or systems to use best management practices (BMPs) designed to effectively protect water quality for their particular site conditions and activity. BMPs include ditches, curbs, gutters, man-made channels, storm drains, storm sewers and similar means of collecting or conveying runoff that do not connect with a wastewater collection system or treatment plant. Development of the Port District shall utilize BMPs for the facilitation of storm water management systems.

Two efforts have occurred documenting various storm water challenges at Port MacKenzie (USKH, 2012 and PND, 2013). Both studies include similar recommendations. In general, a Drainage Plan should be prepared to address the long-range development at the Port to provide a phased approach for installation of storm drainage collection, conveyance, treatment and disposal infrastructure to support development of industry and ongoing Port operations. An alternative is to develop an Area-Wide Drainage Plan for approval from the Alaska Department of Environmental Conservation (ADEC) in addition to an Area-Wide Storm Water Pollution Prevention Plan (SWPPP). The Drainage Plan should display drainage basins and where they will drain in addition to the proper treatment of the discharge while the Area-Wide SWPPP will set minimum standards for temporary and permanent erosion and sediment control within the Port District. Future developers in the Port District will need to conform to the Area-Wide plans, and developers would be able to utilize the SWPPP and amend their individual project into the document.

Allowing lessees to individually determine how best to manage on-site storm water runoff is unlikely to result in an overall coordinated, efficient and functional storm water management system at Port MacKenzie. Some near-term storm water management issues were identified in these reports and should be addressed in the next five years. The highest priority is engineering and constructing a storm water management system for the Knik Arm Bluff along Don Young Road and above the barge dock.

Finally, the groundwater movement within the Port District is not well understood but has clearly contributed to erosion of the bluff, cut slopes, roadway saturation, winter icing and generally increased the cost of constructing and maintaining facilities in this area. Additional site investigations and studies should be conducted to determine the location, extent, and nature of the groundwater near the bluff face and within Elmendorf Moraine where it will have the greatest effect on future development and operation of the Port.

## 5.11 Electric

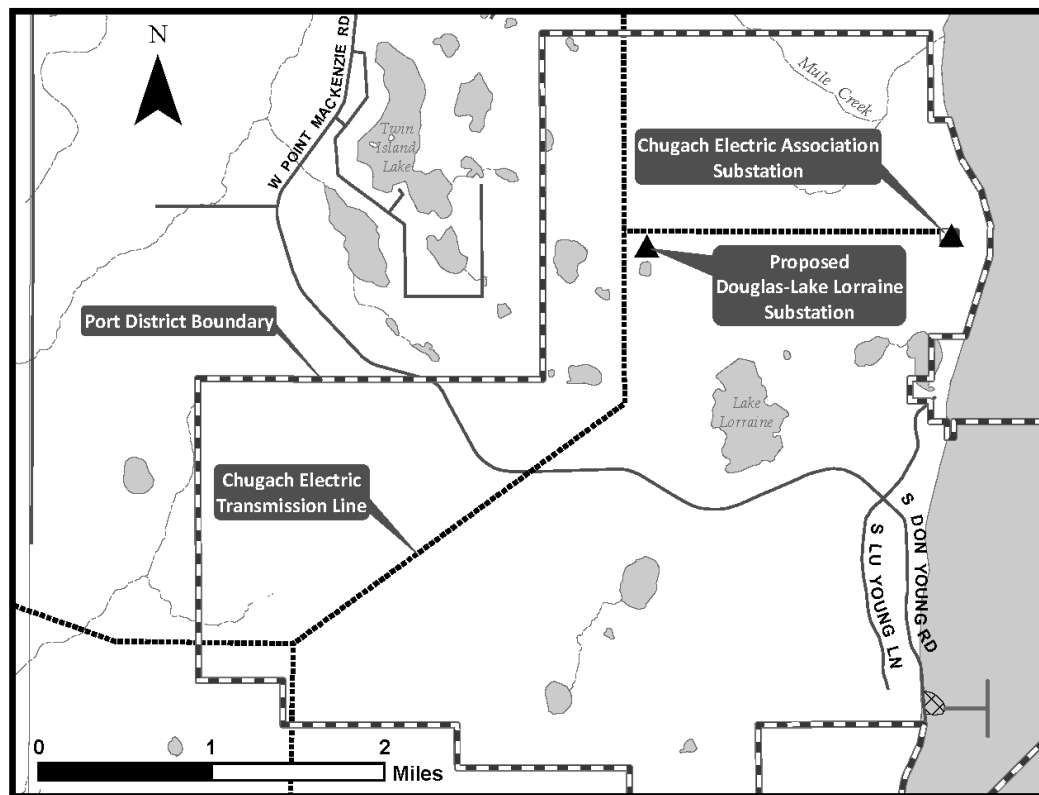
Two high-voltage electric transmission lines (230 kilovolt) enter the Port District from the southwest heading northeast. The lines turn north after crossing Point MacKenzie Road and branch once to the east where a buried transmission line crosses the Knik Arm to Elmendorf Air Force Base.

Three-phase electric power is available along Point MacKenzie Road to the barge dock. The lines are buried the last 2.3 miles. Matanuska Electric Association currently supplies electric power to the Port District via a substation and multiple 13.8 kV overhead lines. Although this power output is sufficient for the demands of current operators, incremental development will require additional electrical power loads. Electric service requirements will be determined by the electrical demand of future land uses. The location for future substation development and easement is illustrated in Figure 11.

### Lake Lorraine Sub-Station

As development occurs, electric power use will need to maintain capacity to power individual industrial and commercial uses within the Port District. A substation should be pursued as a top priority to encourage the development of industrial and commercial land uses. An ideal location is north of Lake Lorraine, where dense commercial development is encouraged. The area west of Lake Lorraine and north of Point MacKenzie Road has been identified as suitable for a power generation facility.

**Figure 11: Electrical Substations**



## **5.12 Natural Gas**

Planning for a Port MacKenzie power plant is prudent given the anticipated capacity of industrial, manufacturing and commercial uses. Natural gas delivery will be developed to sustain large-scale industrial and commercial activity at Port MacKenzie. Currently plans call for a 10-inch, high-pressure gas transmission line to be extended from Mile 39 Beluga pipeline located approximately 14 miles away for near-term natural gas usage. Distribution lines within the Port District will be developed in multiple grid patterns.

## **5.13 Communications**

A telephone-microwave-relay facility was constructed by Matanuska Telephone Association to receive signals from another tower in Eagle River. Telephone lines are also buried within the utility easement. Internet service was upgraded to high speed DSL in 2007. Fiber optic lines were installed later.

## **6. Recommendations**

The following recommendations are the result of issues that arose during the Master Plan development that were not addressed in depth in the plan because of timing or other appropriate reasons. They include suggestions of future assessments, reviews and studies to meet or enhance specific actions to support the business of a successful Port District. The recommendations are not listed in priority order.

### **6.1 Administrative**

- 1) The Master Plan should continue to be a living document with updates after significant Port development activities or every three to five years.
- 2) A Port Management Code should be developed to serve as guidance for items such as:
  - administrative operating procedures
  - leasing procedures and requirements, including timing of environmental audits before, during and after leasing;
  - standards and special permit and lease stipulations unique to the Port
  - tenant responsibilities
- 3) Review of Borough Code 17.23, Point Mackenzie Port Special Use District, 18, the Port and others to offer changes which will make management of the Port District more efficient.
- 4) Create a more informative, interactive web presence both as a marketing tool and as a means for public access to information about the Port.
- 5) Develop a forward-thinking marketing plan for the Port that examines potential positioning strategies best suited for the Port.
- 6) Develop a Port Business Plan that guides future infrastructure maintenance and investment.
- 7) Develop options for leasing practices. Evaluate if competition for leases, rights or franchises will be effective in sustaining competition and maintaining incentives for Port improvements. The evaluation should include consideration of:

- Availability of private funding for investment in the Port
  - Which categories of Port assets should private investors be at risk for providing, maintaining and repairing versus those for which the public sector will be responsible
  - On what basis should user fees or subsidies be used to cover the cost of long-lived Port assets?
- 8) Designate the Port District as a Fire Service District.
  - 9) When necessary, provide for special subdivision regulations within the Port district, to accommodate the unique road construction situations.

## 6.2 Infrastructure

- 1) Develop a Transportation Plan for the Port District which in part considers and addresses the following:
  - a. Guidelines for driveway operations for various commercial and industrial activities, including ingress/egress maneuverability and speed, throat length and driveway geometrics, etc.
  - b. Increasing the load capacity and width of the roads within the Port
  - c. A Road Corridor Access strategy for Point MacKenzie Road through Burma Road to the Parks Highway
  - d. Relocating the parking lot south of Point MacKenzie Road used to access Figure Eight Lake and private property south of the Port District so it does not conflict with the marine/rail industrial uses of the Port
  - e. Assessing the need and location of permanent access through the Port District to property south of the Port District
  - f. Water flowing along Don Young Road suggests that a perched aquifer surfaces along the bluff above the road; develop a bluff slope stability strategy that recommends appropriate dewatering and water control methods.
  - g. Evaluate and design the basic material handling infrastructure layout common to a majority of the commodities anticipated to be moved between the rail loop and the docks, ensuring the necessary easements are reserved for this essential connection.
- 2) The Port Commission should determine what additional facilities will be necessary to accommodate and support Port tenants and users. Evaluate the need for facilities such as transient housing (motel/hotel/temporary trailer, etc.), office space, commercial space for restaurants, gas stations, office space, ATV sales and maintenance, etc.
- 3) Develop a utilities plan that identifies sources and corridors for water, sewer, power, communication and gas utilities to meet Port and tenant needs. The plan should include designation of the water and wastewater treatment facilities.



### **6.3 Environmental Studies**

- 1) A study on the Hydrology and Hydraulic Environment of Knik Arm included information on the sedimentation effects of the proposed Knik Arm Bridge embankments on sediment deposition, but no details about how far to the south that sedimentation extends (i.e., how it would affect the Port). Additional analysis is necessary to determine the effects of the proposed Knik Arm Bridge on Port operations. Extent and magnitude of sedimentation resulting from the proposed causeways should be a focus of the analysis.
- 2) A hydrologic study of the Port District should be conducted to determine where future potable and industrial water supplies should be developed.
- 3) A regional wetland assessment was conducted in 2006. The assessment did not include a classification of the wetlands. Additional wetland mapping and classification should be completed for the Port District.
- 4) Conduct a noise study as the port develops. Include a description of the buffering necessary to mitigate identified potential negative effects of noise.
- 5) Conduct a baseline wind analysis to determine predominate wind directions and speeds throughout the year. Document ambient air quality.

### **6.4 Port Land Management**

- 1) Additional cultural resource inventory transects must be conducted in advance of Port development. Inventories should be conducted according to the anticipated development schedule illustrated in Appendix A. Cultural resource inventory transects that have been completed, and that need to be completed, are shown in Appendix B.
- 2) Develop a landscaping plan for the Port District that utilizes the benefits of vegetative cover in buffering roadside views, or providing small rest and outdoor lunch areas, etc.
- 3) Develop an erosion control and stabilization plan for the Knik Arm Bluff above the docks and S. Don Young Road.

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