Anchorage Freight Mobility Study

ANCHORAGE, AK

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Prepared for:

Anchorage Metropolitan Area Transportation Solutions

Prepared by:

HDR
Solstice Consulting
RSG
CPCS

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Acronyms and Abbreviations

3C	Comprehensive, Cooperative, and Continuing
AADT	Annual Average Daily Traffic
AADTT	Annual Average Daily Truck Traffic
AAFES	Army and Air Force Exchange Service
ADA	Americans with Disabilities Act
AMATS	Anchorage Metropolitan Area Transportation Solutions
APMP	Anchorage Port Modernization Project
ARDSA	Anchorage Roads and Drainage Service Area
ARFF	Aircraft Rescue and Fire Fighting
ARRC	Alaska Railroad Corporation
ATA	Alaska Trucking Association
CBD	Central Business District
CMP	Congestion Management Process
DOT	U.S. Department of Transportation
DOT&PF	Alaska Department of Transportation and Public Facilities
EAFB	Elmendorf Air Force Base
EPM	Electrical Preventative Maintenance
FAA	Federal Aviation Administration
FAC	Freight Advisory Committee
FAF-4	Freight Analysis Framework, Version 4
FARS	Fatality Analysis Reporting System
FAST	Fixing America's Surface Transportation Act
FASTLANE	Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies
FHWA	Federal Highway Administration
FMS	Freight Mobility Study
FRSA	Federal Railroad Safety Act
GO	General Obligation
HPMS	Highway Performance Monitoring System
HSIP	Highway Safety Improvement Program
JBER	Joint Base Elmendorf-Richardson
KISS	Keeping It Short and Simple
MOA	Municipality of Anchorage
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
NCFRP	National Cooperative Freight Research Program
NFPA	National Fire Protection Association
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program

NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NPRM	Notice of Proposed Rulemaking
P3	Public-private Partnership
PHMSA	Pipeline and Hazardous Materials Safety Administration
POA	Port of Anchorage
RI_{95}	Truck Travel Time Reliability Index
SMART	Specific, Measurable, Attainable, Realistic, and Timely
STRAHNET	Strategic Highway Network
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TAC	Technical Advisory Committee
TAPS	Trans-Alaska Pipeline System
TDM	Transportation Demand Management
TIWC	Transportation Worker Identification Card
TOC	Traffic Operations Center
TOFC	Trailer on Flat Car
TRB	Transportation Research Board
TSA	Transportation Security Administration
TSAIA	Ted Stevens Anchorage International Airport
TTTI	Truck Travel Time Index
VMT	Vehicle Miles Traveled

1. Introduction

Every day, products and goods move into, out of, and around Anchorage. The freight transportation business sector moves goods, employs workers, generates revenue, and consumes materials and services produced by other sectors of the economy. Almost all of the goods purchased by Anchorage residents and the entire region are transported here by some combination of ship, barge, plane, train, and truck. In order to maintain the region's high quality of life and to support long-term economic growth and activity, this goods movement process uses an essential, yet outdated multimodal freight transportation system.

Anchorage's growth and development is shaped by its prime geographic location at the crossroads of important transportation connectors. Originally established as a rail construction port site near Ship Creek, Anchorage quickly grew during the early development of the Alaska Railroad between 1915 and 1923.

Anchorage – "Air Crossroads of the World"

Due to its strategic military location, the U.S. Government established Fort Richardson in 1938 and Elmendorf Air Force Base (EAFB) in 1940. Anchorage's unique position between Asia and Europe made both installations critical outposts for the United States. Military presence and resource development would eventually propel Anchorage into the 21st century, helping grow important water and air transport routes that would connect the city and Alaska to various intra-state and inter-state United States markets.

Further, the construction of the Port of Anchorage's (POA) ocean terminal in 1961 provided important transportation infrastructure for the city and the state. The POA would play a critical role both after the devastating 1964 Good Friday Earthquake as the only surviving marine port in Southcentral Alaska, and during the expansion of the Trans-Alaska Pipeline System (TAPS) when a large influx of pipeline workers moved to Anchorage and other parts of the state, increasing the demand for goods.

Currently, Anchorage relies heavily on highway, barge, rail, and air transportation to move freight. In contrast to many other regions in the United States, there is a higher concentration of air and barge traffic to and from Anchorage and other Alaskan communities due to the lack of road surface developed across the state. Transportation facilities built early in the 20th century continue to play an ongoing role in providing services to Alaskan communities and will do so into the future.

Also, as the "air crossroads to the world," approximately 95 percent of the world's industrial population is within 9 hours of Anchorage by air. The city serves as a trans-shipment center between North America, Europe, and Asia. The Ted Stevens Anchorage International Airport (TSAIA) facilities have

grown extensively to accommodate for shipping companies that make critical refueling stops in Anchorage while moving goods across the globe.

As Alaska's largest metropolitan area, Anchorage provides critical services for major international and domestic trade. Anchorage's role in the movement of freight is critical in the city's and region's ability to grow. Future economic development of the city, the region, and the state will remain defined by freight infrastructure and mobility opportunities.

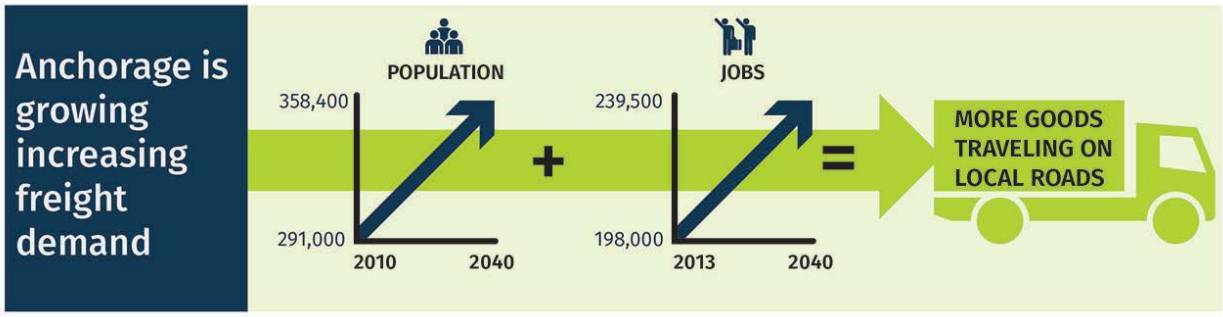
What is Freight Mobility?

Freight mobility refers to moving goods from one place to another by any mode (including truck, plane, train, pipeline, and/or ship). It is the process by which goods move from origins to final destinations.

Why is AMATS developing a FMS?

According to the U.S. Census, Anchorage population grew from 226,338 in 1990 to 291,826 in 2010, roughly equating to 1.4 percent annual population growth (Figure 1-1). With this population growth, there is also an increase in local jobs and consumer spending. Evaluating freight movement and mobility is critical to Anchorage's future increased demand for freighting various goods for a growing population. More efficient multimodal transportation mobility and intermodal freight movements and connections will mean consumers will receive goods faster and at potentially lower costs.

Figure 1-1. AMATS Population and Jobs Growth from 2015 to 2040



Source: RSG, 2016

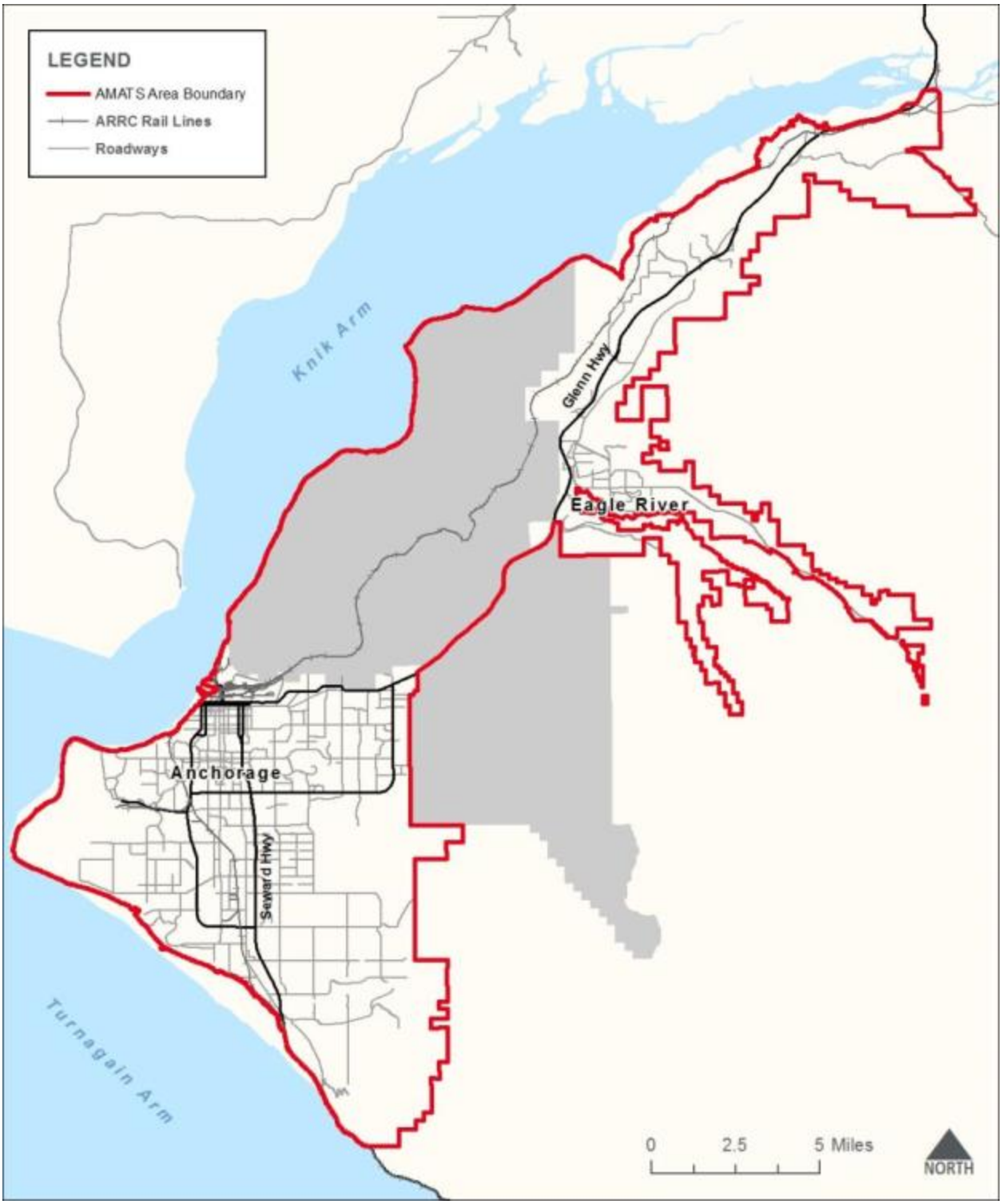
The Anchorage Metropolitan Area Transportation Solutions (AMATS) crafted the Anchorage Freight Mobility Study (FMS) to prepare for future growth within the AMATS area and in surrounding communities that depend on Anchorage's multimodal freight transportation network to deliver important goods. Development of the FMS will allow AMATS to:

- Better understand existing and projected regional freight flows, issues, concerns, and needs;
- Identify relevant infrastructure improvements and policy changes to improve freight mobility in the region; and
- Create a multimodal transportation network that allows freight to operate and move efficiently across and between each mode.

Study Area

The FMS study area includes the AMATS region, including the Anchorage Bowl and the Chugiak-Eagle River area (Figure 1-2).

Figure 1-2. AMATS FMS Study Area



FMS Planning Process

Figure 1-3 illustrates the FMS planning process. Core elements of the FMS are as follows:

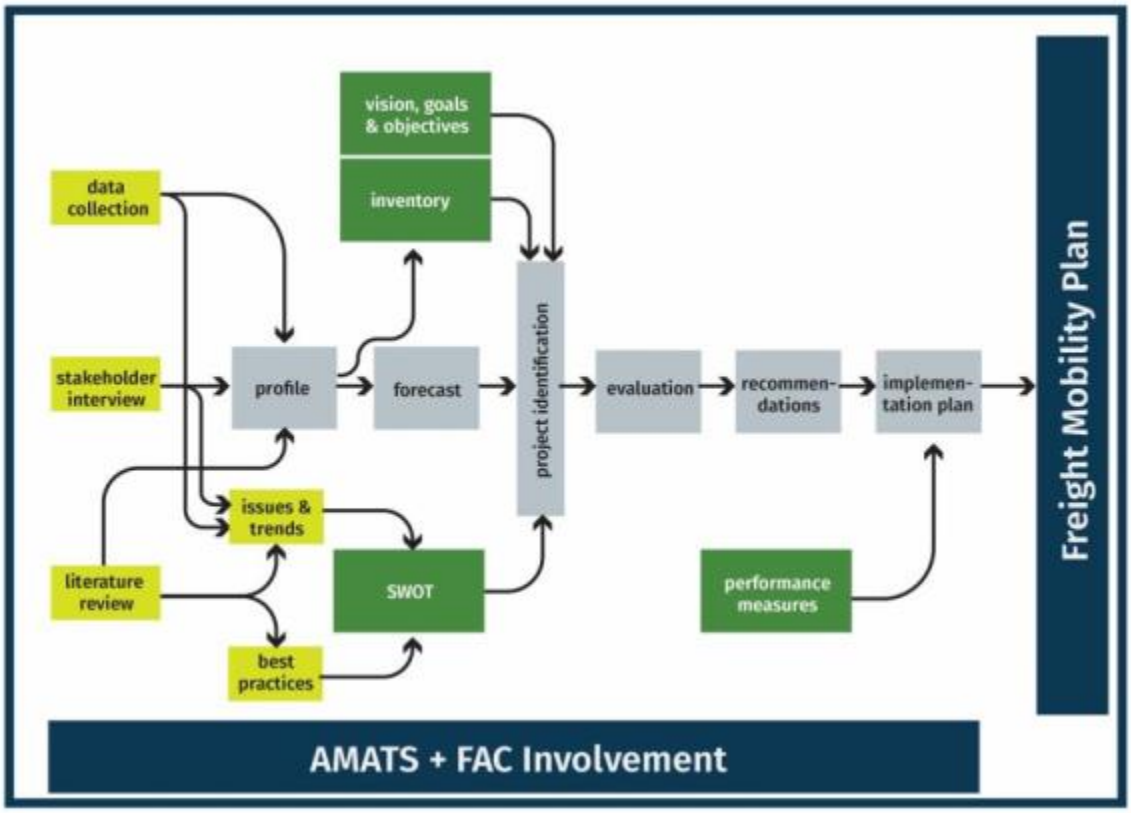
- **Data Collection, Stakeholder Interviews, Literature Review, and Best Practices** conducted by the consultant created the existing and future conditions information used to support the development of the FMS. In addition, an extensive literature review and collection of relevant federal, state, and regional/local freight related projects, studies, and data, including AMATS freight travel demand models and other datasets established existing conditions and future forecasts. Stakeholder interviews of regional organizations actively using the AMATS system to move freight helped to define critical current and future freight transportation issues and needs of transportation system users. Best practices in metropolitan freight transportation also helped to inform the development of potential future transportation planning processes and strategies of the FMS.
- **Issues and Trends** of the multimodal freight transportation system used the results of data collection, stakeholder interviews, and literature review to support both existing and future freight transportation systems analysis. This included the development of the **Existing and Future Freight Inventory, Profile, Forecast** as well as the **Strengths, Weaknesses, Opportunities, and Threats (SWOT)** analysis. The freight inventory and profile considered the potential future multimodal transportation system envisioned for the AMATS region.
- **Vision, Goals, and Objectives Statements** also employed the various sources identified above, in combination with AMATS and the Freight Advisory Committee (FAC) input into the planning process. The goals and objectives reflect an understanding of the freight inventory, profile of existing and future conditions and forecasts, and SWOT analysis.
- Based on the results of the FMS planning processes through each of the above elements—including the definition of the FMS' vision, goal, and objectives statements—AMATs and the FAC defined a process to screen and prioritize the potential future implementation of freight projects and policies for implementation. This process is referred to as **Project and Policy Prioritization**.
- The **Project and Policy Prioritization** analysis evaluates and recommends future FMS projects and policies. Working with the FAC, the project team identified possible future project and policy improvements, prioritized recommended projects and policies, and created an **Implementation Plan** for the FMS. **Performance Measures** identify how the projects and policies will perform once they are implemented in the future.

Each element of the FMS presented above provided the input needed to prepare the FMS White Papers, Technical Memoranda, Reports, and analyses used to develop the core content of the **Draft FMS** presented in this report. These documents included, but are not limited to, the Literature Review; Stakeholder Interview Guide; Best Practices; Existing Conditions; Future Freight Profile and Inventory; Vision, Goals, and Objectives; and Project and Policy Prioritization Screening Process.

AMATS and the FAC are instrumental in developing, assessing, reviewing, and refining the technical analysis and documents during the entire FMS planning process. Each of these reports is shown in

the Technical Appendices associated with the Draft FMS and can be reviewed to understand the full detail of the analysis conducted in support of this study.

Figure 1-3. Summary of Planning Process



Organization of the AMATS FMS Draft Plan

The FMS is organized into 11 chapters:

- **Chapter 1, Introduction,** provides a brief historical context for the FMS study area and an overview of the report.
- **Chapter 2, Stakeholder Involvement Process,** describes the process for gathering comments and input from the public, FAC, government agencies, and freight-oriented businesses to support the FMS.
- **Chapter 3, Vision, Goals, and Objectives,** describes the specific process used to identify the vision, goals, and objectives of the FMS.
- **Chapter 4, Freight Planning Best Practices,** describes existing successful freight planning processes that can be applied to the AMATS FMS.
- **Chapter 5, Freight Profile,** describes AMATS existing freight conditions analysis for all transportation modes, including highway, water, air, rail, truck, and pipe.
- **Chapter 6, Freight Flows,** describes the movement of goods in the context of the state and AMATS region as well as the inter-relationship of various freight transportation modes.

- **Chapter 7, Local and Regional Freight Issues and Trends,** describes Anchorage's economic, employment, and population forecasts as well as how these trends affect freight supply and demand.
- **Chapter 8, Freight System Strengths, Weaknesses, Opportunities, and Threats (SWOT),** describes this analysis, with the goal of identifying more effective future freight programming for the FMS.
- **Chapter 9, Performance Management Framework and Measures,** describes the freight planning performance measures that are recommended to monitor the impacts of the recommended projects after future implementation.
- **Chapter 10, Recommendations,** describes the screening process and criteria for determining immediate, mid-term, and long-term project and policy recommendations for the FMS.
- **Chapter 11, Implementation Strategy,** describes the potential funding sources available for freight-related transportation projects as well as a timeline for implementing the top priority projects.
- **Chapter 12, Next Steps** describes how the plan can be actively used and the potential opportunities for sharing information about freight and goods movement in other planning processes.

2. Stakeholder Involvement Process

Understanding the AMATS region's freight mobility issues and needs is critical in the development of the FMS. To understand these issues and needs, two phases of outreach gained further input from the AMATS FAC. The first phase engaged freight stakeholders, and the second phase engaged the freight community and the general public.

Who is a stakeholder?

A stakeholder is an **individual** or **group** of people that is affected by, or who can affect, a project's outcome.

Freight Advisory Committee (FAC)

AMATS convened their existing FAC to provide the AMATS Technical and Policy Committee with insight on freight issues affecting the region. The FAC consists of representatives from TSAIA; POA; Alaska Trucking Association (ATA); the Alaska Railroad Corporation (ARRC); Joint Base Elmendorf-Richardson (JBER), Alaska Department of Transportation & Public Facilities (DOT&PF), Commercial Vehicle Enforcement Division; and trucking and other freight related companies. The FAC provides an opportunity for various stakeholders to participate as active listeners and commentators in regional freight planning, and act as personal bridges between the potential projects and policies and their organizations. The FAC met multiple times during the FMS schedule and provided an important forum for developing many of the core elements of the FMS. FAC members provided critical input in helping AMATS maintain strong connections and communications with key freight stakeholders across the region. Equally, the annual Freight Forum hosted by the FAC offered additional opportunities for input on the FMS by many private and public stakeholders.

Phase 1: Information Gathering/Stakeholder Interviews

To learn more about stakeholder needs throughout the AMATS area, the consultant conducted a series of stakeholder interviews to support the FMS. The stakeholders represented diverse users of the freight network's highway, aviation, marine, and rail services network. These groups use the freight network most frequently and are most impacted by any changes to the existing and potential future freight system in the AMATS region. The goal of the stakeholder interviews not only solicited input on existing freight conditions and needed improvements for the future, but also publicized the development of the FMS.

All stakeholders interviewed during the FMS process represented public and private organizations responsible for moving commodities and goods for transport. The majority of these goods included general merchandise, coal, cement, chemicals, lumber products, and containers. Freight stakeholders believed that oil prices and economic conditions greatly influence freight opportunities in Anchorage and the state.

Further, stakeholders expressed concern over various safety issues and bottlenecks within the AMATS region. Stakeholders identified specific issues, some of which are presented below, as well as indicated the following types of strategies they thought could help improve the existing freight network within the AMATS region:

- Raise awareness about the importance of moving freight safely and efficiently;
- Identify more efficient transportation routes:
    - Ensure freight can move more efficiently into and out of key areas (e.g., POA, shopping centers, etc.)
    - Improve intermodal connectivity, especially better access to the POA and TSAIA
    - Improve last mile connectors to commercial/industrial destinations, as well as residential areas
    - Reduce congestion by identifying freight strategies to help facilitate these improvements;
- Consider formal, designated freight corridors and ensure they are designed for freight by accommodating trucks and/or providing separation of freight from other users;
- Develop a better understanding of the interaction between land use and freight movement by maintaining industrial/commercial zones near the TSAIA and POA as well as ensuring preservation of these land uses (i.e., do not convert to other uses such as residential zoning); and
- Work toward resolving existing and potential land use conflicts such as developing noise compatible land uses near industrial areas, preserving right-of-way, and changing land uses to be compatible with freight movement.

Interviewed participants identified the Anchorage Port Modernization Project (APMP) as the main priority project in the AMATS region. Other major projects identified included improving access to major industrial and commercial areas such as the Tikahtnu Commons Shopping Center, POA, TSAIA's North and South airparks, and the industrial zone surrounding 92nd Avenue.

Phase 2: Public Review of the draft FMS

Comments received during the public review of this Draft FMS Report will be used to develop a Final FMS that will be submitted to the AMATS Technical and Policy Committees for review and adoption.

3. Vision, Goals, and Objectives

To provide a clear direction for the FMS, a refined vision statement, with associated goals and objectives, became the guidepost to develop and implement the plan. The vision, goals, and objectives spearheaded by input from the AMATS FAC, also used best practices, and included a literature review of several regional plans and studies. Equally, the stakeholder interview process also provided additional direction from various freight user groups to support the development of vision, goals, and objectives.

Vision Statement

The vision statement provides a definitive direction for the FMS and provides an aspirational description of what the plan aims to accomplish over the long term. Effective vision statements define the core ideals of any given project's purpose. This statement also provides guidance about what freight mobility in Anchorage should look like in the future and provides the long-term perspective needed to make decisions on freight related issues as they arise.

The FMS vision statement is as follows:

> ***"Anchorage has a highly mobile, safe, and efficient freight delivery system that provides safe, cost effective, sustainable, secure, and reliable freight mobility; and supports job creation, economic growth, and promotes improved quality of life for the area's residents."***

This vision is accomplished by implementing the plan's goals and objectives. While the vision describes the end result, the goals and objectives are intended to work together to describe how to achieve the vision. Goals provide the FMS with more specific elements of the overall vision; describe what the region wants to achieve with the plan; and provide ways to measure the expectations of the plan related to time, quantity, or quality. Goals are generally agreeable to most people. Objectives are then used to quantify and clarify the goals and represent specific actions to be taken to achieve the goals.

AMATS and the FAC identified the goals and objectives of the FMS, and linked them with the goals and objectives of the Interim 2035 AMATS Metropolitan Transportation Plan (MTP). The FMS goals, and associated objectives for each goal, are presented below.

Objectives should be:

- Realistic and achievable
- As simple and understandable as possible
- Measurable
- Practical and applicable

Goal 1 - Provide a freight transportation system that moves goods safely and securely throughout the community; improves access; provides mobility; and supports a thriving, sustainable, broad-based economy.

Objectives for Goal 1:

- Minimize conflicts between freight, transit, and passenger vehicles and non-motorized travelers to reduce vehicle, pedestrian, and bicyclist crashes and reduce and/or eliminate road versus rail conflicts.
- Identify short-term and low cost freight infrastructure improvement strategies.
- Monitor system performance and make progress toward meeting performance targets.
- Optimize the transportation system to meet the needs of the POA, TSAIA, ARRC, JBER, employment centers, and industrial and commercial areas.
- Develop alternative multimodal access strategies to support major freight hubs and improve first/last mile connectivity between freight modes and major generators.
- Define transportation links with freight investment(s) and economic activity.
- Promote better integration of transportation and land use, and target redevelopment/development in locations that are well-located and well-served by freight infrastructure.
- Promote development of an effective roadway network (including a road hierarchy) that meets capacity needs and is designed to enhance freight mobility while reducing infrastructure impediments and bottlenecks.
- Provide transportation choices and improve system connectivity for all freight modes while improving intermodal system linkages and interactions between modes.

Goal 2 - Develop an efficient freight transportation network that considers the cost of building, operating, and maintaining the system; the equity of all users; public health impacts; community values; and social justice.

Objectives for Goal 2:

- Consider the life-cycle costs and return on investment of projects when evaluating and selecting them.
- Identify policies and initiatives to support an efficient freight network and corridor(s)
- Minimize adverse impacts on the community, such as neighborhood through-traffic movements; noise, air, and light pollution; and impacts to the natural environment such as water resources, fish habitat, watersheds and wetlands, and parklands.
- Design and landscape roads to maintain and enhance the attractiveness of neighborhoods, open spaces, and commercial corridors and centers.
- Use context-sensitive strategies, especially to support the development of mixed-use centers (e.g., town centers, employment centers, and redevelopment areas) and transit-supportive corridors with more pedestrian-, bicycle-, and transit-oriented street environments while recognizing the need to move freight into and throughout the community.

Goal 3 - Incorporate technology and best management practices that allow for improved freight movement in the Anchorage region.

Objectives for Goal 3:

- Develop a multimodal freight system that incorporates advanced technology.

- Incorporate freight technology trends into the region's transportation planning process.
- Use technology, when appropriate, to develop an efficient multimodal system.
- Integrate/implement Intelligent Transportation Systems while partnering with federal, state, municipal, and local agencies to optimize technologies.

Goal 4 - Integrate freight needs and financing into transportation project prioritization processes for the region.

Objectives for Goal 4:

- Develop a reliable funding source for multimodal freight projects.
- Refine freight project prioritization process.
- Increase consideration of freight infrastructure needs in the MTP project prioritization process.
- Improve forecasting techniques and long-term needs assessment.
- Consider all potential funding mechanisms and increase use of innovative funding strategies.
- Educate key stakeholders and the public about the cost and benefit to constructing and maintaining freight infrastructure.
- Collaborate and coordinate with key stakeholders regarding project planning and delivery.
- Invest in freight projects that enhance global competitiveness, freight mobility and reliability, and economic activity.
- Improve project delivery and implementation processes and scheduling.

Goal 5 - Develop a multimodal freight system that includes effective public and stakeholder partnerships to leverage opportunities and resources.

Objectives for Goal 5:

- Continue working with the FAC to help define freight-oriented policy.
- Provide additional opportunities for collaboration and information sharing with the private sector/businesses (freight community).
- Advocate for establishing and supporting public-private partnerships where they make sense.
- Continue to improve interagency relationships to better coordinate freight system regulation.
- Encourage development and sharing of freight expertise and knowledge within and across all agencies and among elected officials.

Relationship between FMS and MTP Goals

The AMATS MTP is one of the primary tools that will be used to implement the project and policy recommendations presented in the FMS. The FMS goals and objectives are intended to align with the Interim 2035 MTP, so that AMATS and its partners will be able to work with and integrate both plans to develop a long-term, multimodal transportation system that meets the needs of all users, including freight users, in the region. Table 3-1 shows the relationship of the FMS goals to the 2035 MTP goals most recently confirmed in the Interim 2035 MTP by AMATS in early 2016.

Table 3-1. Relationship between the FMS and Interim 2035 MTP Goals

		AMATS FMS Goals				
		Goal 1 - : Provide a freight transportation system that moves goods safely and securely throughout the community; improves access; provides mobility; and supports a thriving, sustainable, broad-based economy.	Goal 2 - Develop an efficient freight transportation network that considers the cost of building, operating, and maintaining the system; the equity of all users; public health impacts; community values; and social justice	Goal 3 - Incorporate technology and best management practices that allow for improved freight movement in the Anchorage region.	Goal 4 - Integrate freight needs and financing into transportati on project prioritization processes for the region.	Goal 5 - Develop a multimodal freight system that includes effective public and stakeholder partnerships to leverage opportunities and resources.
Interim 2035 Goals	Goal 1 - Ensure development of a balanced transportation network for people, goods, and services that provides an acceptable level of service, maximizes safety, minimizes environmental impacts, provides a variety of transportation choices, and supports planned land use patterns.	X	X	X		
	Goal 2 - Provide a transportation system that moves people and goods safely and securely throughout the community.	X		X		
	Goal 3 - Develop an attractive and efficient transportation network that considers the cost of building, operating, and maintaining the system; the equity of all users; public health impacts; community values; and social justice.	X	X			
	Goal 4 - Develop a transportation system that supports a thriving, sustainable, broad-based economy by locating and using transportation infrastructure and facilities to enhance community development.		X			
	Goal 5 - Establish community connectivity with safe, convenient, year-round automobile and non automobile travel routes within and between neighborhoods, commercial centers, and public facilities.			X	X	
	Goal 6 - Improve access to goods, jobs, services, housing, and other destinations while providing mobility for people and goods in a safe, affordable, efficient, and convenient manner.				X	X
	Goal 7 - Provide a transportation system that provides viable transportation choices among various modes.		X	X		X

4. Freight Planning Best Practices

Freight transportation planning and policy "best practices" used in in the United States provides strategies and policies that are designed to move freight as efficiently as possible in and around metropolitan areas. In the FMS planning process, several "best practices," as defined in transportation research for metropolitan freight planning helped to develop the FMS recommendations. A thorough review and assessment of these best practices for use in the FMS are presented in Figure 4-1, with each described in detail below. Additional information about best practices is found in Appendix A.

Figure 4-1. Metropolitan Freight Planning Best Practices Concepts

The guidelines for best practices included the following concepts, in no particular order of importance:

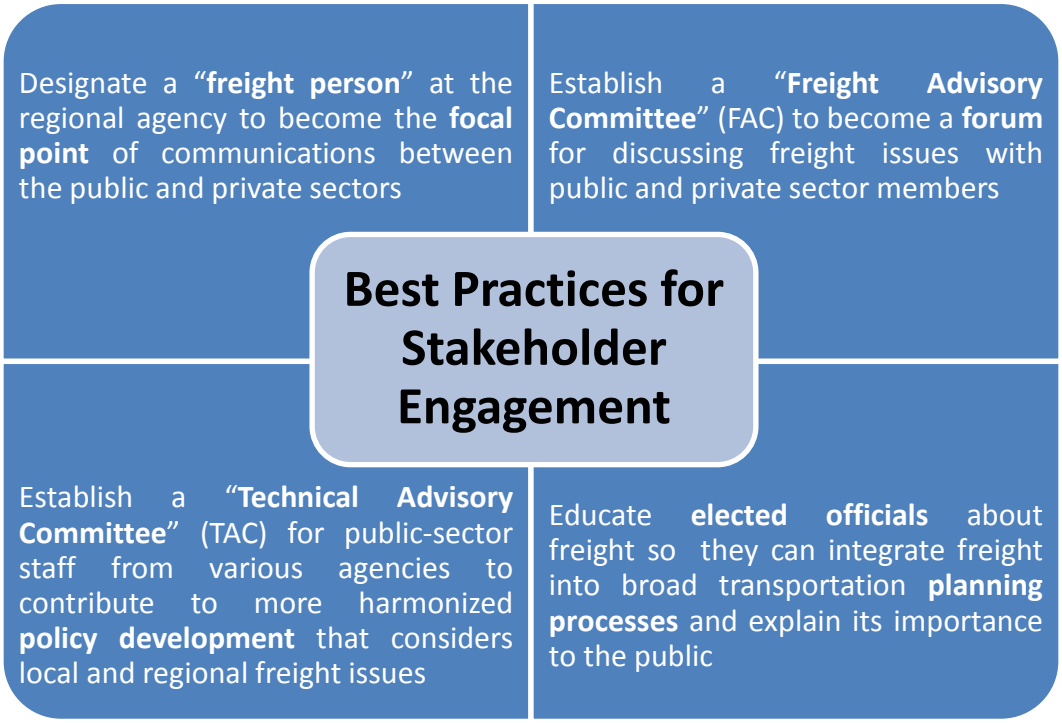
- Use innovative stakeholder engagement;
- Engage the private sector;
- Define freight issues and challenges;
- Identify root causes of freight problems;
- Manage and address land use compatibilities;
- Use pilot schemes to test solutions;
- Include Transportation Demand Management (TDM) in the freight planning process; and
- Use performance measures.

Each of these guidelines are further discussed below, including how these concepts support the FMS.

Use Innovative Stakeholder Engagement

To address goods movement issues within a region, a proactive method for forming partnerships with freight stakeholders in both the private and public sectors is to actively involve them in the metropolitan planning process (Figure 4-2). Many of these partnerships are already established and defined across different levels of government and include neighboring jurisdictions. This includes partnerships among governments—municipal, regional, state, and federal—and inter-organizational partnerships that work toward common goals. Collaboration between different groups is essential to achieving planning and implementation goals.

Figure 4-2. Stakeholder Engagement Process Guidelines for Freight Planning



Critical to the success of metropolitan freight planning initiatives is to gain the support and to build continued consensus with stakeholders. With early involvement and consensus-building at the development stages of a freight planning program such as the AMATS FMS, the less likely conflict will occur in the future. For example, when freight stakeholders are negatively impacted or inconvenienced by the freight planning process, timely engagement can help them understand the purpose and benefits of freight planning to their operations. The AMATS FAC, which includes members of the public and private sectors, are and remain closely involved in the development of the FMS, providing input and recommendations throughout the planning process. Stakeholders, through the use of in-person interviews, provided additional input into the FMS planning process on how the existing freight network is working, what inefficiencies may happen, and what additional opportunities could improve the current system.

Engage the Private Sector

It is important to engage the private sector in the freight planning process because they are involved in different aspects of freight acquisition and distribution in any given region. The private sector in freight planning includes all types of business sizes (small, medium, large) as well as a range of vehicle types (e.g., delivery vans, small trucks, and large trucks) and various freight modes (e.g., truck, rail, and air). The objectives of involving the private sector in metropolitan freight planning are different from those of the public sector because private companies are interested in revenue and profit levels, while public agencies are interested in increasing economic benefits for society as a whole (and their regions) and reducing negative externalities.

By addressing freight mobility issues for the private sector, the general public will benefit from improved efficiencies and increased economic activity. Nationally, while not typically involved in transportation policy development, private sector organizations and companies are increasingly more engaged in the region because they offer innovative ideas and solutions for freight delivery and can recognize regulations that have a detrimental impact on their operations. Because private companies are actively involved in moving and receiving freight on a day-to-day basis, they are also able to pinpoint key infrastructure bottlenecks and other road impediments that occur on the network. In Anchorage, there are several representatives from the private sector on the FAC.

As presented in Chapter 2, a series of stakeholder interviews supported the AMATS FMS in identifying the concerns and needs of various regional freight stakeholders, both the public and private sector. The interviews provided great insight into existing freight challenges and conditions in the AMATS region while helping to determine local freight operator issues and requirements to implement a more efficient freight system. The process allowed private trucking companies and organizations an opportunity to provide input in the freight planning process for the FMS and learn more about potential ways to communicate with the FAC and AMATS about freight system decisions and routes.

Define Freight Issues and Challenges

Stakeholders and AMATS FAC members helped to define the key freight issues and challenges facing the region. There are many competing issues and if the focus on the freight planning process is too broad, then an overly complicated planning process will result and potentially spread agency resources too thin. If the focus is too narrow, then some important items could be left out of the planning process. By defining specific freight issues and challenges, the FMS can help increase

Steps to Defining Freight Issues:

- Create potential short-, medium-, and long-term project and policy portfolios;
- Determine a prioritization process; and
- Evaluate potential funding sources.

the visibility of these problems and guide the direction of freight planning in the process. Creating a "Freight Portfolio" with a short-, medium-, and long-term inventory of specific problems and associated solutions (e.g., strategies, projects, and policies) will help with funding projects and incrementally draft policies that may be used to push for change.

Also, this prioritization process may determine which portions of the freight system are most critical to freight mobility and the region's economic competitiveness. As identified during the development of the FMS, freight issues and challenges are validated by using existing literature, data, and stakeholder interviews as well as documenting the AMATS FAC concerns. Identifying and defining these issues, as synthesized in Chapter 5, guided the future recommendations for projects and policies in the FMS planning process.

Identify Root Causes of Freight Problems

To notice and understand the reason for freight issues and problems, as well as address the root causes of these problems, is a critical factor in the development of freight plans. For example, truck idling is often caused by the inability or unwillingness of businesses (receivers) to accept deliveries. This type of truck idling in the vicinity of large buildings is frequently aggravated by delivery-time restrictions that shorten the period when deliveries are made (Transportation Research Board [TRB], 2015:7). These constraints and restrictions result in roadway bottlenecks, delays, and congestion, as well as increased emissions. Therefore, grasping the impacts of freight congestion on roadways that are traced to delivery truck idling (as the root cause) is a key policy discussion in the freight planning process. This example, among many others, requires further evaluation and examination that will assist agencies to outline and address these freight issues and the accompanying potential mitigation strategies.

As shown in Figure 4-3, a variety of work can be undertaken to recognize important root causes in regional freight issues. Because individuals and groups interact with and use the freight system differently, stakeholder outreach is essential. Continued and ongoing stakeholder outreach is valuable because it provides additional information on the freight system characteristics important to users and supplements the data collection process. Agency participation also helps pinpoint freight problems and concerns; it is imperative for agencies to work with each other, stakeholders, and the public to find and proposide solutions to freight problems. Assessment of the stakeholder outreach information, agency input, and the data collected can then be linked to identify the root causes of any current and on-going freight problems.

In the AMATS FMS planning process, some root causes for freight issues are identified by system users. The FMS stakeholder interviews provided specific background information that guided and determined such root causes. For example, the Municipality of Anchorage's (MOA) noise ordinance may conflict with traffic management. Gravel operations must be finished by 10pm, resulting in ARRC blocking C Street near 68th Avenue during heavy commuter periods so gravel operations can be completed by 10pm to comply with local ordinances.

The identification process aids in establishing the root cause to any given problem or impact. As a result, the issue can also support and provide a wide range of potential solutions.

Figure 4-3. Tasks Involved in Determining Root Causes to Freight Issues

Manage and Address Land Use Compatibilities

Logistics-oriented facilities often require large parcels of land and access to the freight transportation network. Various agencies in the United States and Canada have advanced land use and development regulations along with guidance that supports appropriate buffer zones between logistics-intensive land uses and other, incompatible land uses (to these logistics-oriented facilities) such as residential or commercial mixed-use. To optimize the use and location of appropriate transportation facilities, these agencies also designed logistics-oriented businesses that clustered near intermodal connectors and services. Ensuring that policies are in place to cluster freight transportation facilities will help increase the efficiency of the freight transportation system while limiting the other land use disturbances.

Moreover, stakeholders regularly stressed preserving existing and future commercial and industrial sites in Anchorage; especially those areas that are accessible between major freight generators such as TSAIA and POA. However, other encroaching land uses can result in potential land use conflicts such as noise compatibility and right-of-way issues while also increasing the potential for safety problems (e.g., slowing down ARRC freight trains allows pedestrians to cross tracks).

Use Pilot Schemes to Test Solutions

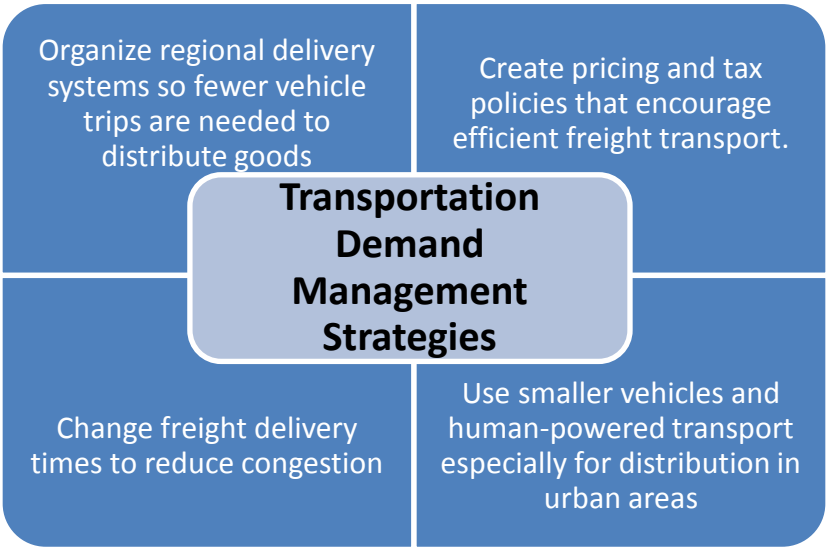
When there is high certainty that the benefits from a possible solution to freight access, safety concerns, etc. outweigh the negative costs, then public-sector changes that may affect freight activity should be implemented. For instance, pilot projects could allow public agencies to adjust (or cancel) the initiative based on stakeholder impact and other data analysis. Next, once the freight project and policy recommendations are implemented through the FMS planning process, then promising pilot schemes can be analyzed and determined. Examples of viable pilot projects include a cargo bicycle delivery program and an off hours freight delivery program.

Include Transportation Demand Management (TDM) in the Freight Planning Process

TDM is typically associated with addressing policy objectives such as energy conservation, environmental protection, shifting commuters to alternative modes (e.g., transit, rideshare, and walking), and passenger travel congestion reduction. Historically, TDM policies have focused on personal travel, including "smarter" or "more efficient" transportation system projects specific to commuter ridesharing, telecommuting, and trip reductions. Increasingly, however, public agencies at the federal, state, and local levels are trying to apply TDM to goods movement and freight policy.

During the development of the AMATS FMS, freight stakeholders and the public expressed the need for specific freight route designations/corridors/districts within the region and the creation of policies to ensure that these routes increase not only the efficiency of freight transportation, but also enhance public safety. Other quality of life issues such as reducing the amount of time freight vehicles spend idling and emitting pollutants at intersections, especially during heavy commuter periods can also be improved through such policies. Figure 4-4 illustrates various TDM policies that are currently being implemented to support metropolitan freight transportation systems.

Figure 4-4. Example Transportation Demand Management Strategies used in Metropolitan Freight Planning



Use Performance Measures

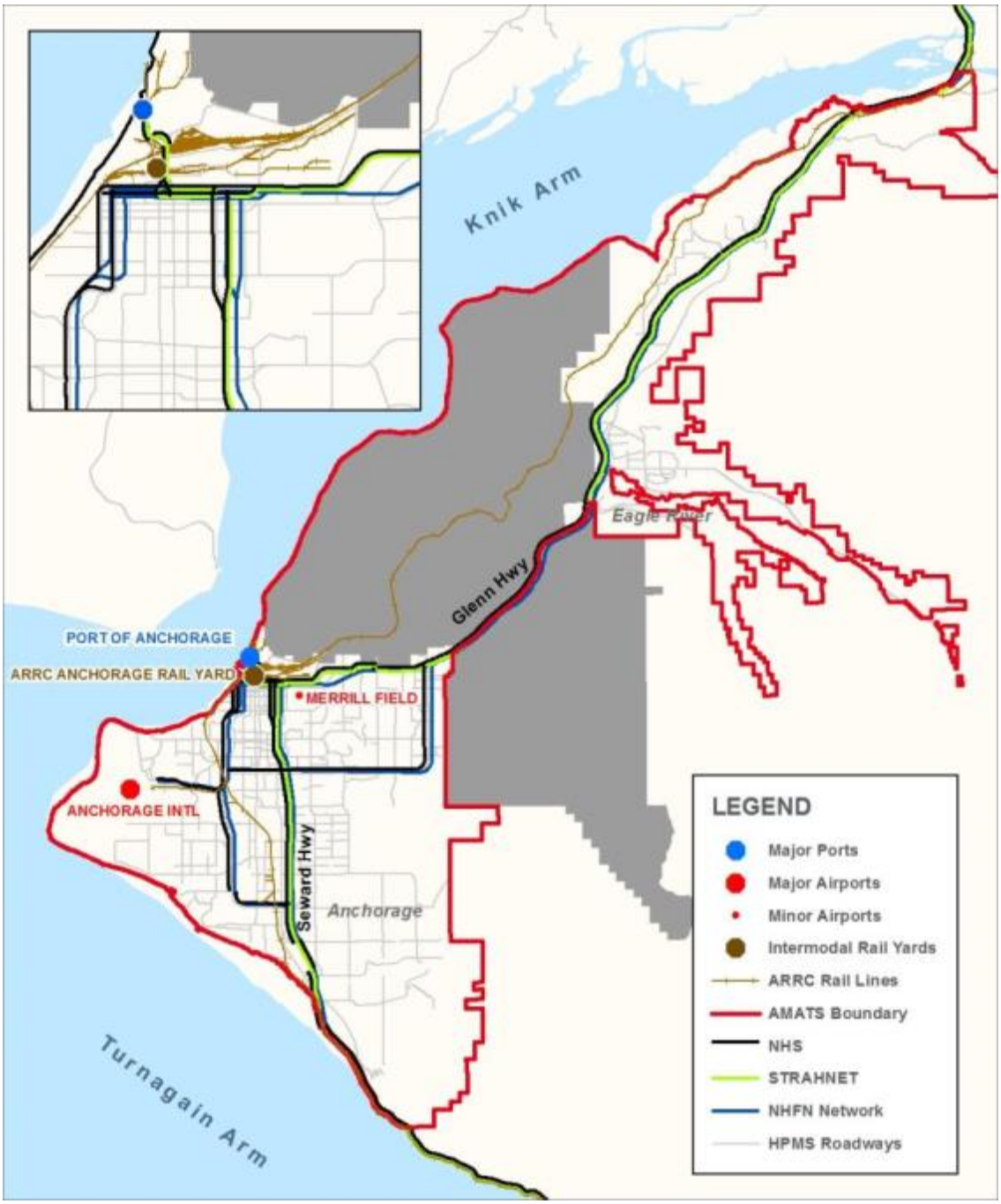
Performance measures are a part of the standard planning process for states and regions in the United States, and are growing in use over the past two decades or more. Measures gauge the degree to which goals and objectives are achieved, and are linked directly to the vision, goals, and objectives on long-range transportation planning and metropolitan freight planning. MAP-21 (and now the Fixing America's Surface Transportation, or "FAST," Act) requires undertaking systematic performance measurements to determine the impacts of the strategies, programs, and funding used to address freight issues in the planning process. Performance measures (e.g., safety, parking, use of alternative fuels, and reliability)

should be directly related to a single objective, easily quantifiable, and able to measure the entire range of levels of achievement (e.g., using a scale, not just “achieved” or “not achieved”). Because performance measures evaluate how conditions that can affect system performance, these metrics provide early warning signs to freight problems that may need to be addressed and planned for in the future. Performance measures are significant to the freight planning process. In the development of the AMATS FMS, the project team reviewed literature and gathered data from local agencies and stakeholders to determine relevant and suitable freight performance measures. Detailed performance measures and specialized data supporting the AMATS FMS are presented later in Chapter 6.

5. Freight Profile

The current AMATS freight transportation system consists of multimodal systems that incorporate highways, air, ARRC, and the POA, as illustrated in Figure 5-1.

Figure 5-1. AMATS 2015 Multimodal Freight Transportation Network



HPMS = Highway Performance Monitoring System; NHFN = National Highway Freight Network; NHS = National Highway System; STRAHNET = Strategic Highway Network

Over time and in response to many regional demands, including steady population growth, the Anchorage freight transportation network also expanded. Equally, with a heavy concentration of transport-dependent industries that rely on Anchorage's freight network to move bulk goods such as petroleum, heavy equipment, and seafood this required an efficient and interconnected freight network. In order to continue to evolve and provide a solid foundation to Anchorage's long-term economic well-being, the freight network must respond to these and any market changes. See Chapter 7 of this report for a detailed discussion of Anchorage's population, employment, and industry trends. The following section presents the existing (2015) and anticipated 2035 freight networks (including potential freight system improvements) by mode as well as the system's relation to the AMATS economy.

Highway

Although water and air cargo largely dominate Anchorage's freight movements, truck movements are critical to the region's supply chain. The 2035 AMATS MTP indicated that high levels of truck traffic are expected to use the arterial street system in Anchorage well into the future. In 2040, TSAIA, POA, and JBER are anticipated to remain the top three locations for truck trips in the region with 1,869, 930, and 850 daily truck trips respectively. Figure 5-2 illustrates the existing 2015 highway and roadway facilities in the AMATS region that are heavily used by truck traffic. Truck traffic percentages are relatively stable over the past two decades, with the following major freight-oriented roadways in the AMATS region:

- Glenn Highway;
- Seward Highway;
- Minnesota Drive;
- International Airport Road;
- Tudor Road;
- Spenard Road;
- Industrial Street;
- Postmark Drive;
- C Street; and
- Northern Lights Boulevard.

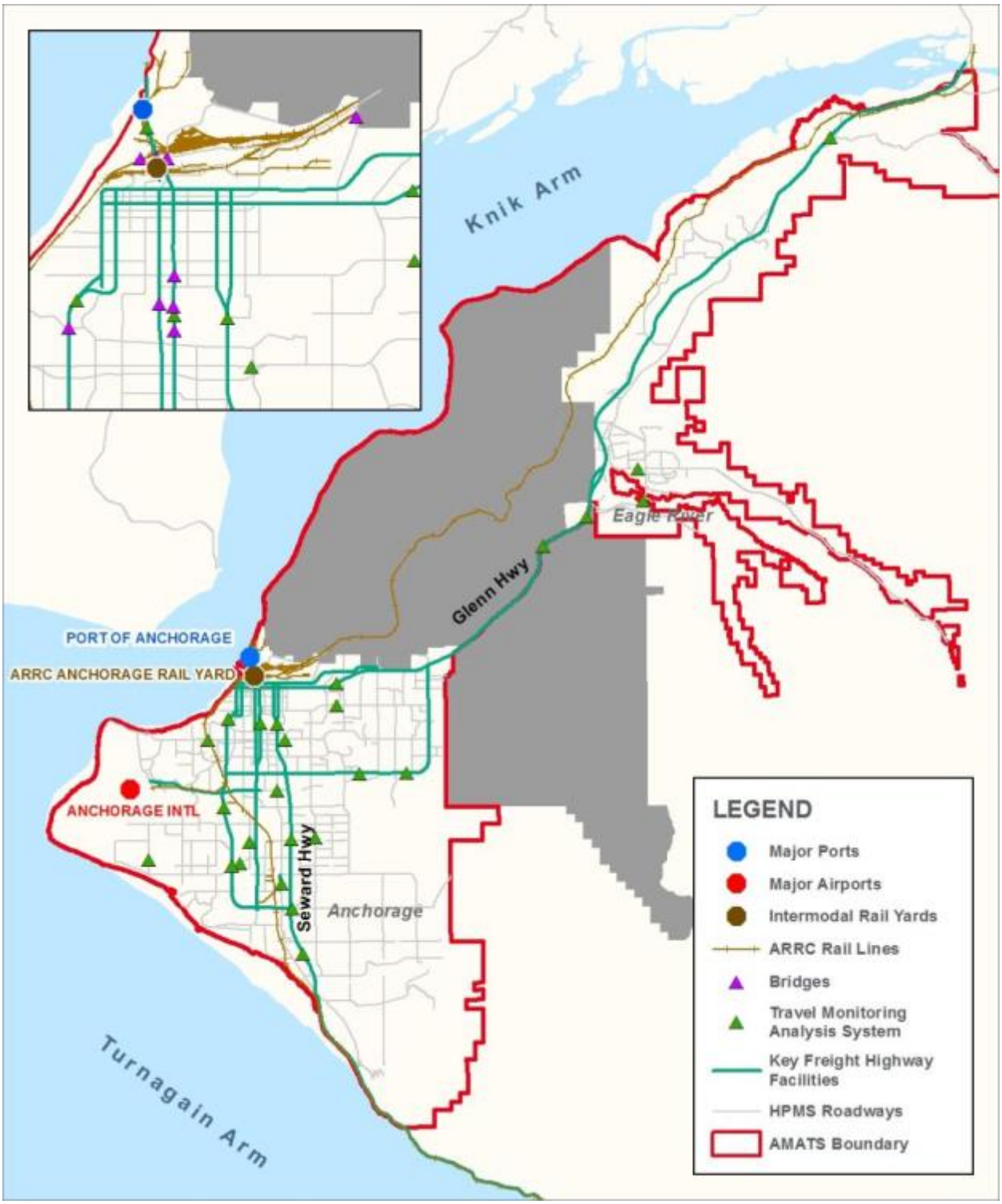
Table 5-1 Average Daily Truck Counts, 2014

Location	Single AADTT	Combination AADTT	%AADT
Alyeska Highway, Girdwood	291	38	11%
De Armoun Road, Anchorage	568	32	11%
Old Seward Highway, Anchorage	332	97	5%
O'Malley Road, Anchorage	534	251	7%
Rabbit Creek Road, Anchorage	317	46	5%
Hillside Drive, Anchorage	120	16	6%
Elmore Road, Anchorage	670	612	10%
Jewel Lake Road, Anchorage	458	44	4%
International Airport Road, Anchorage	602	48	5%
Minnesota Drive, Anchorage	932	539	4%
Wisconsin Street, Anchorage	748	145	9%
3rd Avenue, Anchorage	892	399	12%
Debarr Road, Anchorage	314	24	2%
Providence Drive, Anchorage	96	23	3%
Eagle River Road, Eagle River	170	85	7%

The POA generates significant amounts of truck traffic that use downtown streets due to the limited and lack of access to the highway system. Freight traffic problems and issues result at the C Street/Port and Ocean Dock Road intersection because it is the single, primary access point for trucks traveling to and from the Port. Roads critical to the distribution of goods to and from the POA include the Glenn Highway, Seward Highway, International Airport Road, Minnesota Drive, C Street, and Tudor Road as well as Reeve Boulevard, Post Road, and Whitney Road. Ships arrive at the Port on Sundays and Tuesdays, rendering these days of the week as some of the heaviest for truck traffic in the AMATS region.

In general, trucks use Postmark Drive to access TSAIA cargo facilities. Other common truck routes to and from TSAIA include Minnesota Drive, Raspberry Road, Jewel Lake Road, Northern Lights Boulevard, and Spenard Road.

Figure 5-2. 2015 AMATS Primary Highway Facilities Moving Trucks



When traffic incidents or accidents occur, the 2035 AMATS MTP documented the lack of alternative routing to the Glenn Highway. Non-recurring delay caused by incidents/accidents on the highway/roadway network is an ongoing concern for trucks moving through the region. However, there

remains a need for a parallel or redundant highway facility that provides an alternative to the Glenn Highway and also a contingency plan for incident management in the event of a major emergency. The use of military frontage roads is an applicable implementation strategy to provide this redundancy; there are agreements in place with JBER to use their road system should the frontage roads be needed.

Air

Alaska's transportation system is unique in the United States because the state lacks an extensive highway/roadway system. As a result, Alaskans rely more heavily on air traffic to move goods and passengers than the Lower 48 States. Figure 5-1 shows the primary airport facilities in the AMATS region.

TSAIA, the primary airport facility in the AMATS region, is a 4,612-acre complex owned and operated by the State of Alaska. TSAIA and associated entities employ over 15,500 people in Anchorage and offers three runways as well as a variety of surrounding industrial parcels that benefit from excellent airport access. With sufficient storage and movement space to accommodate current levels of freight-oriented air and truck traffic, the North Airpark offers many amenities. More than 265 businesses/agencies currently lease space at TSAIA. The existing facility also offers potential for onsite industrial development to facilitate easy transfer to planes.

TSAIA is also a critical through-point/fueling station and crew stop for international air traffic. Approximately three-quarters of TSAIA cargo includes in-transit international movements, meaning that carriers stop through TSAIA to refuel while on international trips. TSAIA pumps over 2 million gallons of fuel onsite each day (DOT&PF, 2015). TSAIA ranks fifth in international airports for worldwide cargo throughput, and imports from Asia account for a significant amount of this inbound cargo (MOA and URS Corporation, 2012). In 2014, TSAIA ranked second in the nation for all-cargo weight landed (Federal Aviation Administration [FAA], 2015. Table 5-2 illustrates the number of cargo flights and shows these shares by direction.

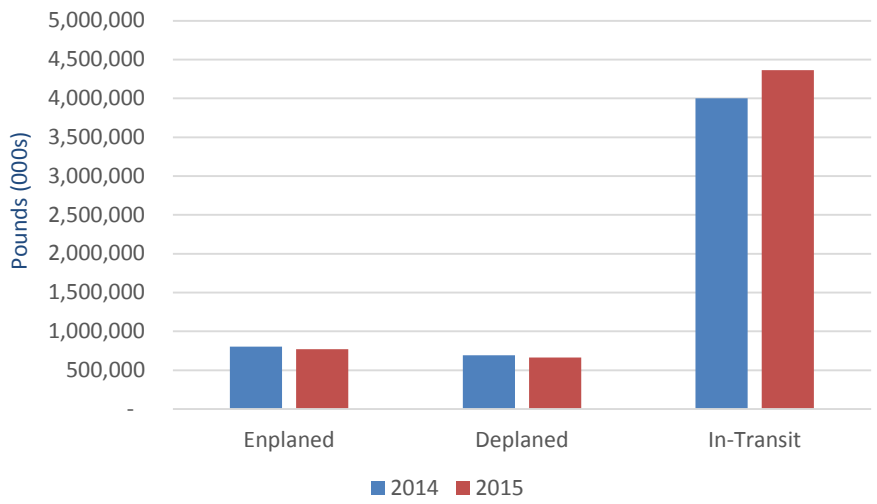
Table 5-2. TSAIA Air Cargo by International and Domestic Share, 2015

Direction	International	Domestic	Total	International % of Total Flights	Domestic % of Total Flights
Enplaned	1,864	769,522	771,385	0%	13%
Deplaned	2,927	661,767	664,695	0%	11%
In-Transit	4,310,040	54,450	4,364,490	74%	1%

Total Flights	4,314,831	1,485,739	5,800,570	--	--

Approximately 10 percent of freight entering the Anchorage region arrives via TSAIA. Air cargo inbound to TSAIA is often "express" cargo, indicating high-priority commodities such as electronics and pharmaceuticals. Commodities that arrive at TSAIA commonly move via truck to distribution centers on dedicated truck routes. Most of the remaining cargo includes domestic movements, either loading or unloading at TSAIA. Major cargo carriers at TSAIA include UPS and FedEx. For in-transit cargo, Polar Air Cargo Worldwide, Inc., and Cathay Pacific Airways move the most freight by weight through TSAIA (Figure 5-3).

Figure 5-3. Cargo Movements by Direction at TSAIA, 2014-2015



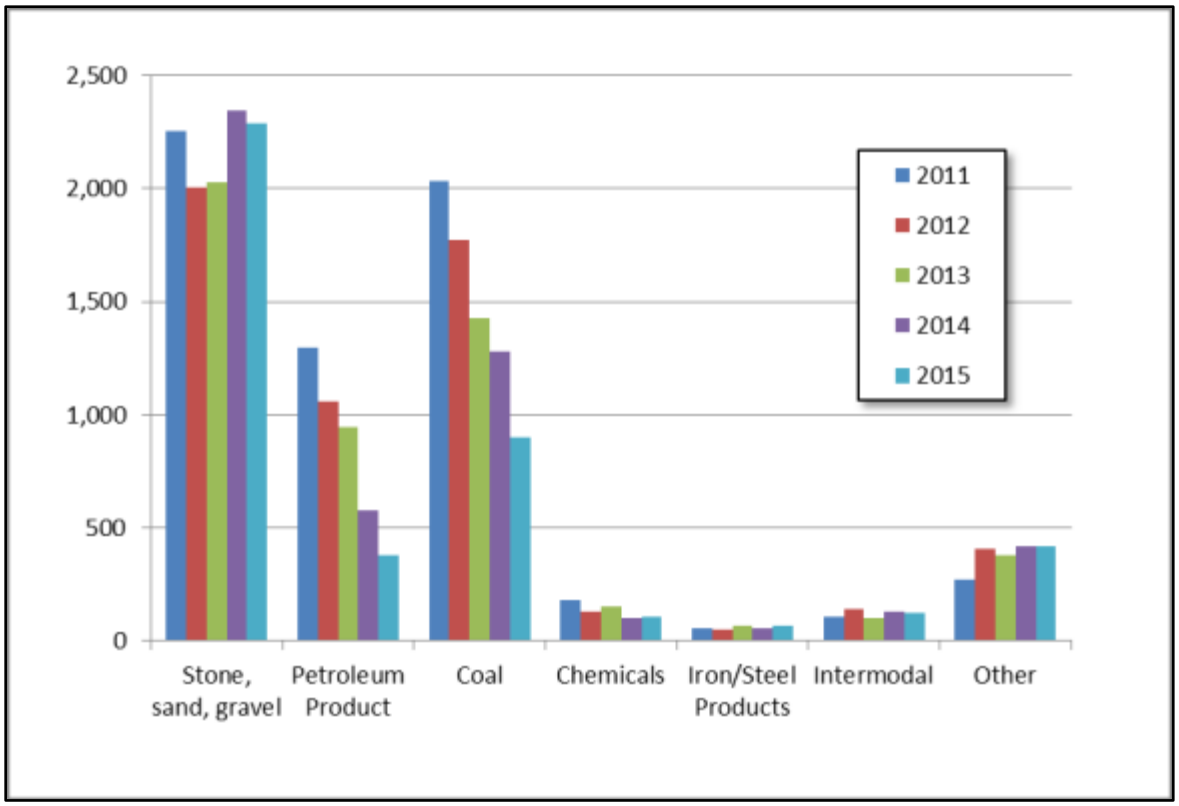
In addition to TSAIA, Merrill Field is a regional airport located just south of the POA and ARRC Rail Yard in downtown Anchorage. Due to its smaller size, Merrill Field experiences limited freight air traffic, with FAA reporting less than 1,000 cargo tons moving through the airport each year.

Rail

As the only railroad provider in Anchorage (Figure 5-5), ARRC operates more than 650 miles of passenger and freight rail throughout the state. In 2015, ARRC reported that more than 10,000 loads of container freight moved in and out of Anchorage. ARRC moves a substantial volume of container traffic to Anchorage from Whittier but also moves a large volume of intermodal traffic originating in Anchorage to Fairbanks. The AMATS 2035 MTP states that the majority of commodities moved via rail consisted of 'gravel,' 'coal,' 'petroleum,' 'military shipments,' and 'general cargo containers.' ARRC reported that the main rail traffic in Anchorage included petroleum trains between Fairbanks and Anchorage (a 356-mile distance) and gravel trains

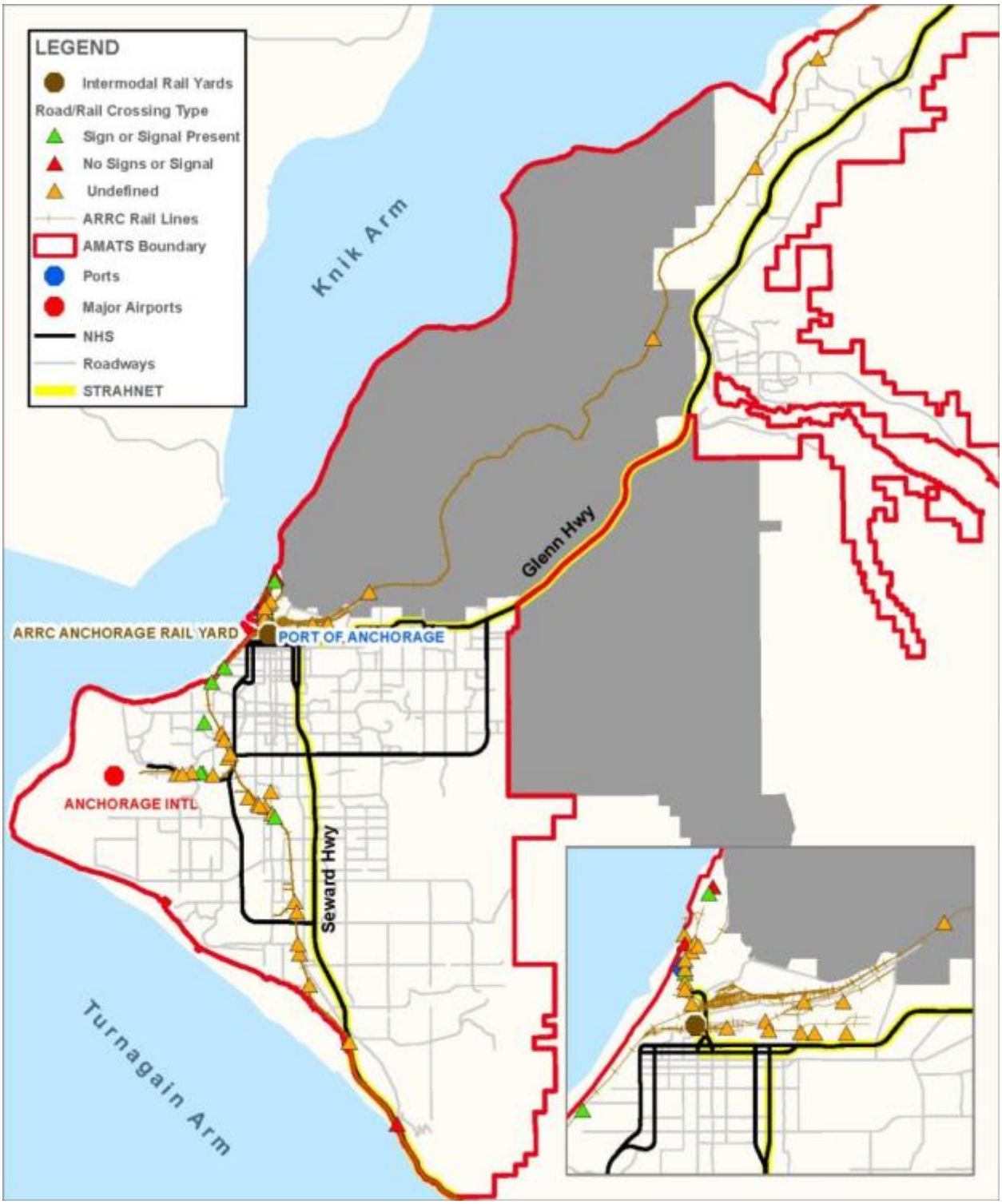
between the Matanuska-Susitna Valley and Anchorage (a 40-mile distance). Export coal primary moves via ARRC lines between Healy, Seward, and Fairbanks (ARRC, 2015). In 2015, the ARRC moved approximately 4,285 million tons of freight of which 381 million tons is petroleum, 900 million tons is coal[1], and 123 million tons is intermodal (HDR, Inc. with CDM Smith, 2015). Figure 5-4 summarizes freight tonnage moved by the ARRC statewide between 2011 and 2015.

Figure 5-4. Freight Commodity Tonnage moved by the ARRC, 2011-2015 in Thousands of Tons



ARRC closed their Seward Coal Loading Facility and there are no current plans to re-open this facility. This is not anticipated to have a significant impact on freight movement in Anchorage.

Figure 5-5. Alaska Railroad Facilities in AMATS Region



ARRC also owns and operates a rail yard north of downtown Anchorage to the northeast of TSAIA that functions as a distribution hub to other modes and facilities, including the POA and TSAIA. This facility offers connectivity between truck, rail, and water cargo. The rail yard connects to Seward in the south

and Fairbanks in the north via Class II railroad lines. ARRC does not connect to any other rail lines in North America except by rail barge.

Figure 5-5 also illustrates all ARRC crossings within the AMATS study area. ARRC tracks include 63 at-grade rail crossings in Anchorage. The majority of these crossings exist near the POA in Ship Creek, adjacent to TSAIA facilities, and along the industrial land use areas located in the middle of and in South Anchorage (Arctic Boulevard, Dimond Boulevard). Eleven crossings lack sign or signal controls, eight crossings have signals or signage, and the remaining crossings are unspecified. There is no publicly available data to assess existing conditions and the level of safety of the ARRC's tracks, facilities, and bridges. ARRC deals with the common issue of property owners building too close to the ARRC right-of-way as well as the rail tracks.

Waterborne Freight and Cargo

Waterborne freight is an essential component of Anchorage's economy and multimodal freight transportation network. The POA is the primary shipping port and accounts for the majority of freight shipped to and from Anchorage by water. Waterborne freight is also the dominant mode for transporting goods to many communities throughout the state that are inaccessible by roadway. The POA is a critical transportation hub for Anchorage and the rest of the state, with goods arriving for transport to other communities.

The POA is the only major port that exists in the AMATS FMS study area. The MOA owns the POA, which is a self-supporting enterprise department that operates using revenue and grant funding. The POA is a major transportation infrastructure asset to the regional economy. Fifty-five percent of the waterborne freight, and 90 percent of all refined petroleum products that enter the State through Alaska's Railbelt region, arrive via the POA. Fifty percent of all waterborne freight that enters Alaska crosses the POA docks annually, as does 32 percent of all refined petroleum used state-wide. Approximately 12 percent of the freight that arrives through the POA moves north to Fairbanks via rail, and another 12 to 15 percent of the total moves via truck to other destinations outside Anchorage. The POA also plays an instrumental role in the distribution of cargo to rural communities throughout the state. Over 350 communities rely on cargo shipped to the POA, which is then distributed via barge to those communities that lack highway and railway connections.

Figure 5-6 summarizes the tonnage moved through the POA 2006 to 2015. The data in Table 5-3 provided by the Port of Anchorage shows tonnage specific to the POA and shows shifts in commodities at the Port from 2006 to 2013.

Figure 5-6. Port of Anchorage Tonnage, 2006-2013

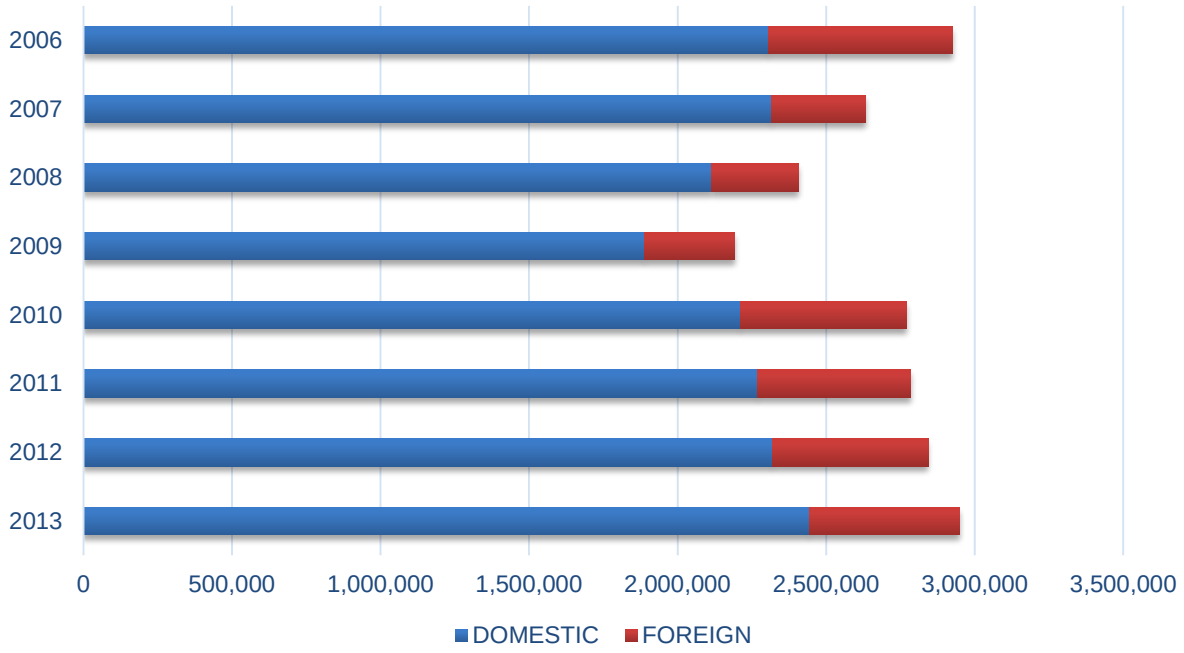


Table 5-3. Port of Anchorage Tonnage Trends by Commodity 2006-2015

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Dry Bulk Goods	126,737	140,684	119,271	119,939	118,280	109,228	81,494	116,789	124,089	134,921
Petroleum, NOS (vessel fueling)	7,013	2,031	2,615	1,454	2,052	1,660	2,032	2,648	2,618	2,888
Vans/Flats/ Containers	1,681,222	1,811,136	1,742,704	1,658,813	1,705,176	1,736,943	1,713,086	1,831,816	1,785,518	1,722,499
Vehicles*	0	0	0	0	864	0	1,473	10,725	5,381	1,158
Petroleum, Shoreside	368,294	916,050	952,631	1,046,636	1,376,909	1,192,705	1,426,711	1,830,848	1,698,581	1,421,133
Petroleum, Rail Rack	0	0	0	0	0	0	0	0	0	76,266
Petroleum, Bulk- Dockside	1,592,317	580,343	586,041	829,900	931,931	922,426	573,352	577,236	699,727	968,684
Total	**3,775,584**	**3,450,243**	**3,403,261**	**3,656,741**	**4,135,211**	**3,962,962**	**3,798,148**	**4,370,061**	**4,315,913**	**4,327,549**

*Note: Since 2011, vehicles are reported as part of the vans/flats/containers category.

The existing facilities at the POA include three general cargo terminals; two bulk petroleum product terminals; cement off-loading facilities; an on-dock public transportation shed; rail mounted electric container cranes; a bulk petroleum valve yard; and intermodal exchange infrastructure to transition goods to rail, road, and air modes. Current on-site issues noted by the POA include annual dock pile repairs, concerns with storm drain integrity (which can cause localized flooding and potholes), inadequate emergency back-up power, silting at the Tote terminal, and outstanding erosion at the Ship Creek Boat Launch. The 55-year-old POA is undergoing a modernization effort (referred to as the APMP) with a variety of improvement projects that will update and renovate the facility to current maritime commerce standards, provide seismic resilience, and ensure a capability to parallel the region's expected population growth.

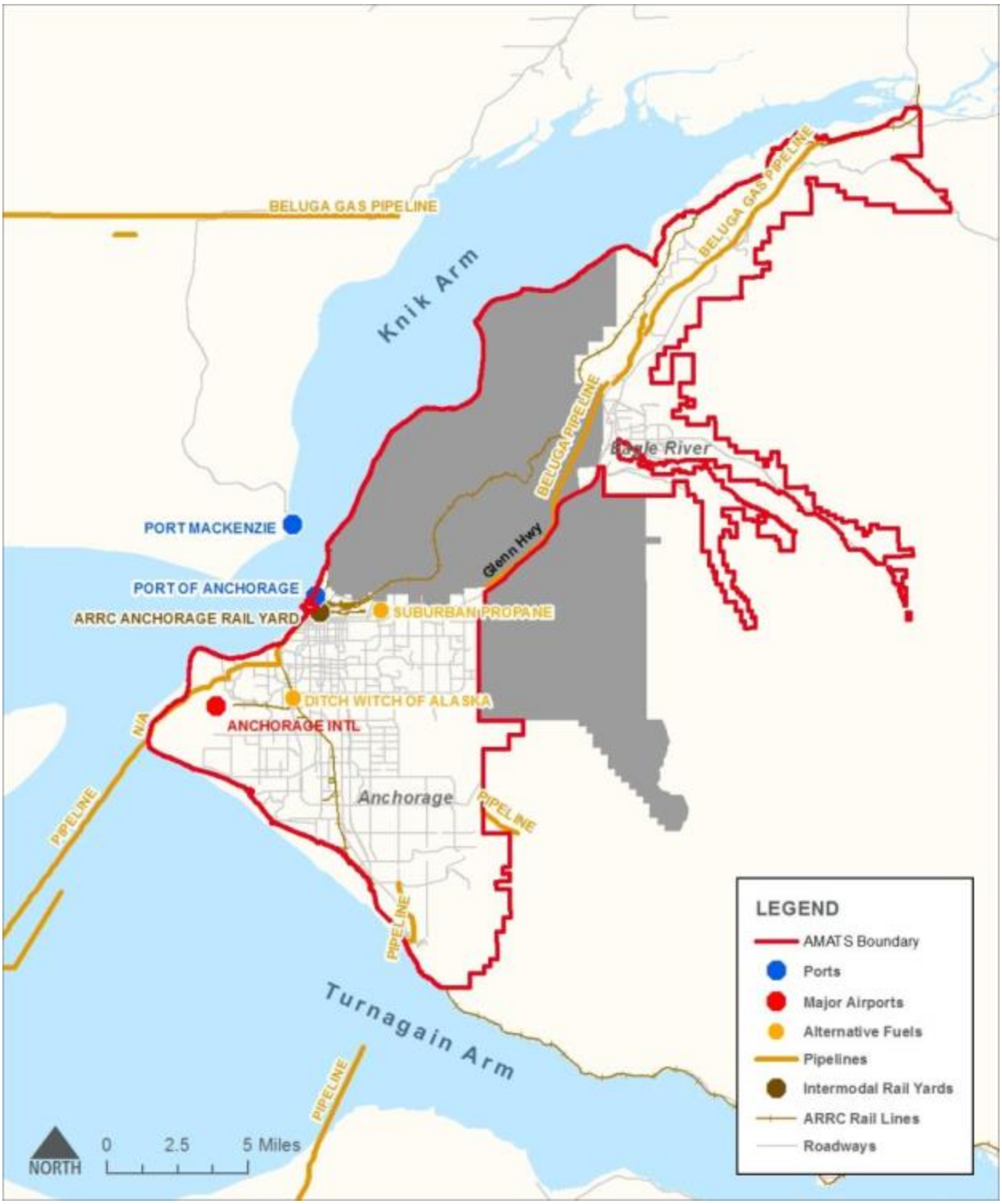
POA's Freight Interchange System

Source: http://www.portofanc.com/wp-content/uploads/sunny_day.jpg

Pipeline

The AMATS study area contains two major pipeline facilities (Figure 5-7). First, the Nikiski Alaska Pipeline carries liquefied natural gas from the ARRC Anchorage Rail Yard to the west. The Beluga Gas Pipeline is the second major pipeline carrying natural gas through JBER to the Knik River, parallel to the Glenn Highway. Other pipelines in the Anchorage area include a Tesoro pipeline that connects Tesoro's Nikiski refinery to TSAIA and POA, a pipeline between the POA and TSAIA, and a JP-8 fuel pipeline between the POA and JBER. No significant pipeline incidents in the past decade (Pipeline and Hazardous Materials Safety Administration [PHMSA], 2016) are reported. Pipeline infrastructure in the AMATS FMS study area is currently sufficient, and there are no major capacity or safety concerns anticipated over the next two decades.

Figure 5-7. AMATS Study Area Pipeline Facilities

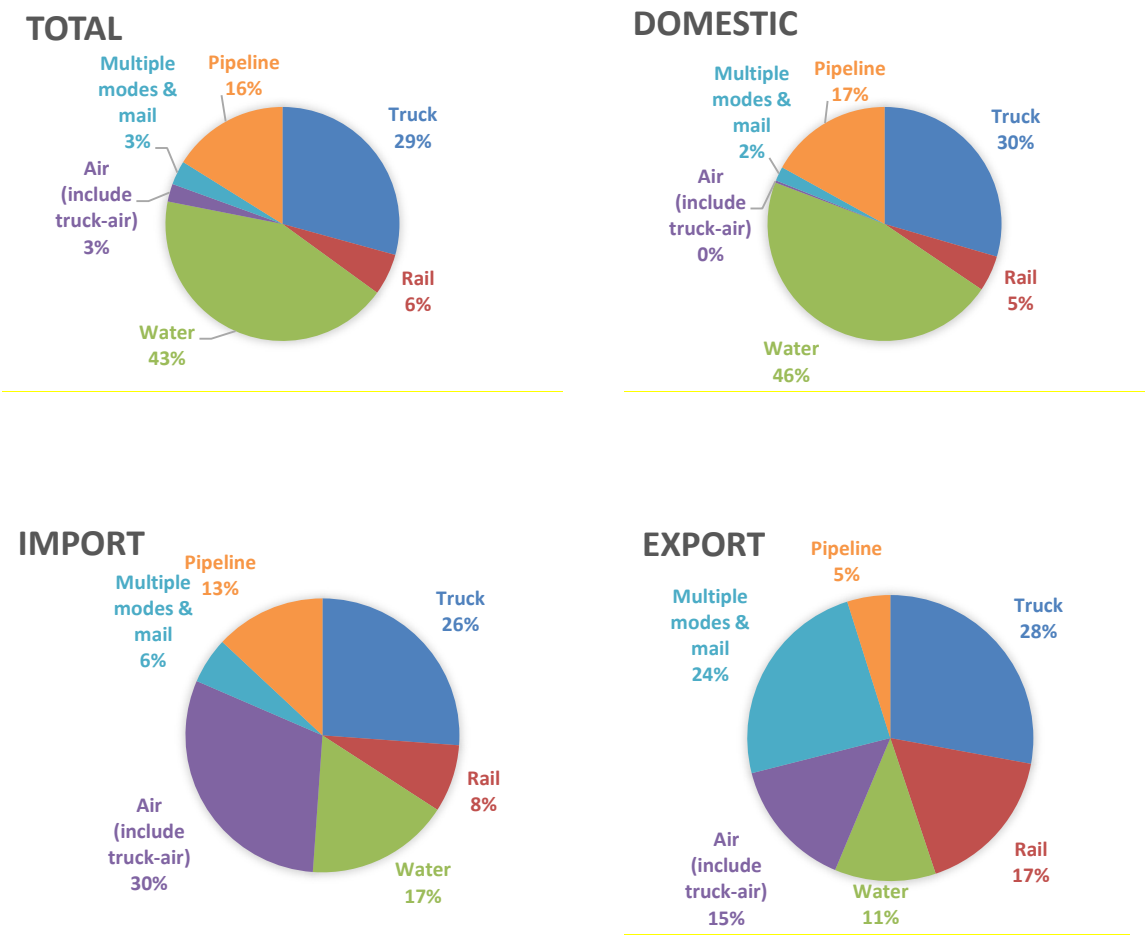


6. Freight Flows

Freight or commodity flows are used to examine the level of demand upon various multimodal freight transportation network elements. Freight flows provide insights about key trade and market relationships for a state or region. One primary source of freight flow information for this analysis is the Federal Highway Administration's (FHWA) Freight Analysis Framework, version 4 (FAF-4). This data is derived from the Commodity Flow Survey conducted every 5 years by the U.S. Census Bureau and Federal Bureau of Transportation Statistics.

Freight is currently shipped to and from Anchorage via water, air, highway, rail, and pipeline. In total, transport by water dominates the freight movements to and from Anchorage as well as to and from the State of Alaska. As shown in Figure 6-1, nearly half of the total goods (by weight) traveling to and from the state are transported by water (43 percent), with other total goods movements include 29 percent by truck, 16 percent by pipeline, 6 percent by rail, 3 percent by air, and 3 percent by multiple modes/mail.

Figure 6-1. Alaska's 2012 Statewide Commodity Flows (Weight) by Mode – Domestic/Import/Export



For the import of goods, the goods movements by mode include 30 percent by air, 26 percent by truck, 17 percent by water, 13 percent by pipeline, 8 percent by rail, and 6 percent by multiple modes/mail. Exported goods moved include 28 percent by truck, 24 percent by multiple modes/mail, 17 percent by rail, 15 percent by air, 11 percent by water, and 5 percent by pipeline. Most goods are imported via air-truck combination (30 percent) or truck (26 percent), while state exports largely rely on truck and multiple modes to get goods out of Alaska. Air comprises the highest share of total imports (30 percent), while trucking provides the highest percentage of total exports. Table 6-1 shows the specific commodity flows by mode and tonnage. These total, import, and export movements of goods are similar to the movements into and out of the AMATS region. For example, the POA handles the majority of water freight for the state before this freight is transferred using other transportation methods to reach the freight's final destination.

Table 6-1. 2012 Alaska Statewide Commodity Flows by Mode (Thousands of Tons)

Trade	Mode	Within AK	From AK	To AK	Total	Mode Share
Domestic	Truck	18,154	231	123	18,508	29.5%
	Rail	3,099	3	--	3,102	4.9%
	Water	310	26,555	2,181	29,046	46.3%
	Air (include truck-air)	108	15	68	191	0.3%
	Multiple modes & mail	111	133	991	1,235	2.0%
	Pipeline	8,731	--	1,907	10,638	17.0%
	Total	**30,513**	**26,937**	**5,270**	**62,720**	**100%**
International Imports	Truck	800	25	13	838	26.2%
	Rail	236	1	19	256	8.0%
	Water	488	1	55	544	17.0%
	Air (include truck-air)	349	603	21	973	30.4%
	Multiple modes & mail	9	6	160	175	5.5%
	Pipeline	418	--	--	418	13.0%
	Total	**2,300**	**636**	**268**	**3,204**	**100%**
International Exports	Truck	1,022	12	14	1,048	27.9%
	Rail	636	1	1	638	17.0%
	Water	226	71	133	430	11.4%
	Air (include truck-air)	126	29	399	554	14.7%
	Multiple modes & mail	3	84	818	905	24.1%
	Pipeline	183	--	--	183	4.9%
	Total	**2,196**	**197**	**1,365**	**3,758**	**100%**

Note: Import/Export freight flows do not represent the ultimate origin/destination of the goods. For example, goods may originate outside the US (ultimate origin), imported into Alaska, and then transported to another state (ultimate destination). For example, freight from Japan that was transported to Alaska and then shipped to Washington State would be shown as an International Import From AK."

Most bulk goods require an intermodal freight network to go from its origin to destination point. The majority of consumer goods arrive in Anchorage via the POA. Subsequently, goods are transported from water modes to air, truck, or rail. A strong intermodal freight network in Anchorage promotes efficient freight movement while also lowering costs for moving goods for both the public and private sectors. The intermodal freight network is critical for the AMATS region and Alaska, since there is not an extensive road system. Goods are often moved from one transport mode to another because existing infrastructure constraints may make using other transport methods (e.g., water or air) more efficient.

The adaptability, capacity, and capability of the freight network relies heavily on the successful "lifts" (the transfer of goods from one mode to another) between various transportation modes. The goal of carriers is to reduce the number of "lifts" required for goods delivery. As more "lifts" incur more costs. Often, cargo is sent to other surrounding communities and may require transfer from one cargo carrier to another via water, or other, modes. Goods transported between the POA and TSAIA via truck or are transferred to railroad. Transfers should be fast and efficient. To help with the movement of freighted goods, shipping containers may have specific dimensional guidelines so the containers can be easily moved from barging to rail or trucking equipment. Intermodal efficiency saves cargo companies money in the long term, reduces energy costs, and increases profitability for various freight forwarders and their clients.

7. Local and Regional Freight Issues and Trends

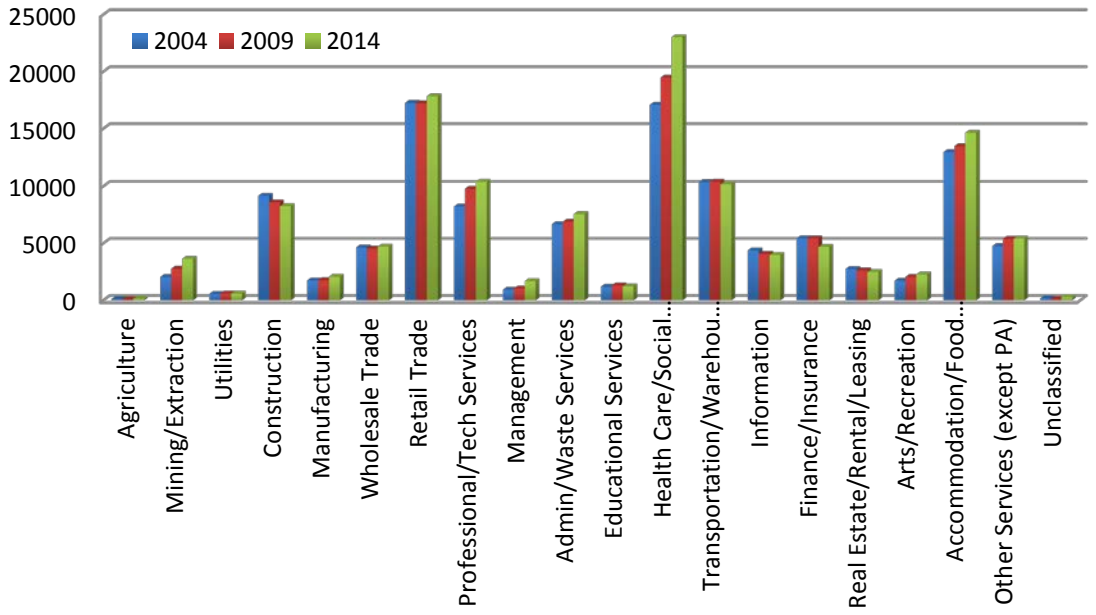
Local and regional freight issues and trends are presented in this section, summarizing local industries, employment, and land uses. Issues and forecasts for the transportation network related to bottlenecks, levels of service (LOS), capacity and well as safety and security for each transportation mode are also described in this section.

Local Industries and Employment

Freight movement is directly tied to the economic well-being of a given region, and the AMATS region is no exception. Local industries drive the freight market with considerable impacts on commodity movements within, to, from, and through the AMATS region. According to the 2010 Census, Anchorage includes over 291,000 inhabitants and over 107,000 households; it is the largest municipality in Alaska and is a strong economic driver for the entire state (U.S. Census Bureau, 2016). Major industries in Anchorage between 2004 and 2014 included mining, quarrying, oil/gas extraction as well as transportation and warehousing.

Anchorage employment levels have increased for many industries; such as health care/social assistance, accommodation/food services, and retail trade between 2004 and 2014 (Figure 7-1). Table 7-1 shows the steady boost in growth (an expected 21 percent increase in employment regionally) of these employment sectors expected from 2013 to 2040, which will impact the needs of the future multimodal freight transportation system in the AMATS region. For example, retail trade requires facilities and establishments with the ability to handle and receive large commodity shipments for distribution.

Figure 7-1. Anchorage Employment Levels for 2004, 2009, and 2014



Source: Bureau of Labor Statistics Quarterly Census of Employment and Wages, n.d.

Table 7-1. AMATS Region Employment Growth Estimates by Industry, 2013-2040

Employment Category	2013	2040	%Change
Natural Resources Employment (NAICS 11, 21)	4,651	5,182	11%
Wholesale Trade, Manufacturing and Utilities Employment (NAICS 22,31,32,33,42)	8,415	10,434	24%
Construction Employment (NAICS 23)	13,306	14,723	11%
Retail Trade Employment (NAICS 44, 45)	23,315	28,372	22%
Transportation & Warehousing Employment (NAICS 48, 49)	12,983	15,146	17%
FIRE, Professional Services and Other Employment (NAICS 51-56, 81)	61,014	72,562	19%
Educational Services Employment (NAICS 61)	2,784	4,121	48%
Health Care & Social Assistance Employment (NAICS 62)	25,928	36,402	40%
Accommodation, Food Services, & Entertainment Employment (NAICS 71, 72)	20,063	26,648	33%
Government Employment (NAICS 92)	25,599	25,890	1%
Total Employment	**198,058**	**239,541**	**21%**

Source: Bureau of Labor Statistics Quarterly Census of Employment and Wages, n.d.

As shown in Table 7-1, employment sectors with the highest anticipated growth rates to 2040 include education; health care; and accommodations, food services, and entertainment. The overall regional growth rate is expected to rise approximately 21 percent. Further, even moderate growth in each of

these sectors will markedly affect the future of freight movement and demand in the region, necessitating a need for freight infrastructure and appropriate facilities.

Land Uses

The AMATS FMS study area contains multiple land uses that consequently determine freight movements and transportation system accessibility. Freight-generating land uses are typically found in parts of the city zoned as industrial or commercial. Figure 7-2 and Figure 7-3 illustrate land uses in the Anchorage Bowl and Chugiak-Eagle River, respectively. The far northeast region in the Anchorage Bowl shows industrial areas located within vacant parcels (Figure 7-2). Other industrial facilities are located adjacent to the Old Glenn Highway. The Anchorage Regional Landfill encompasses an extensive industrial parcel in the southern portion of the Chugiak-Eagle River area near JBER (Figure 7-3). This facility is the only major landfill in the AMATS region and can potentially attract significant truckloads of scrap and waste. There are currently significant levels of industrial activity along the ARRC rail line as well as adjacent to TSAIA. Figure 7-4 illustrates the Anchorage Bowl Comprehensive Plan's Land Use Policy Map[2].

In the future, clustering industrial land uses will potentially allow Anchorage to maximize the efficiency of the freight transportation network. The close proximity of TSAIA, POA, and ARRC facilities to each other improves freight performance, productivity and helps to facilitate efficient shipping and receiving times for freight-oriented businesses. Ancillary benefits include lower vehicle miles of travel on roadways between facilities and distribution centers. Industrial land uses also provide direct employment as well as indirect employment driven by the economic activity of the jobs.

[2] The Municipality of Anchorage is currently developing the Anchorage 2040 Land Use Plan Map. The map is a supplement to the **Anchorage 2020: Anchorage Bowl Comprehensive Plan** that helps achieve its goals over the next 20 years.

Figure 7-2. Land Use in the Anchorage Bowl

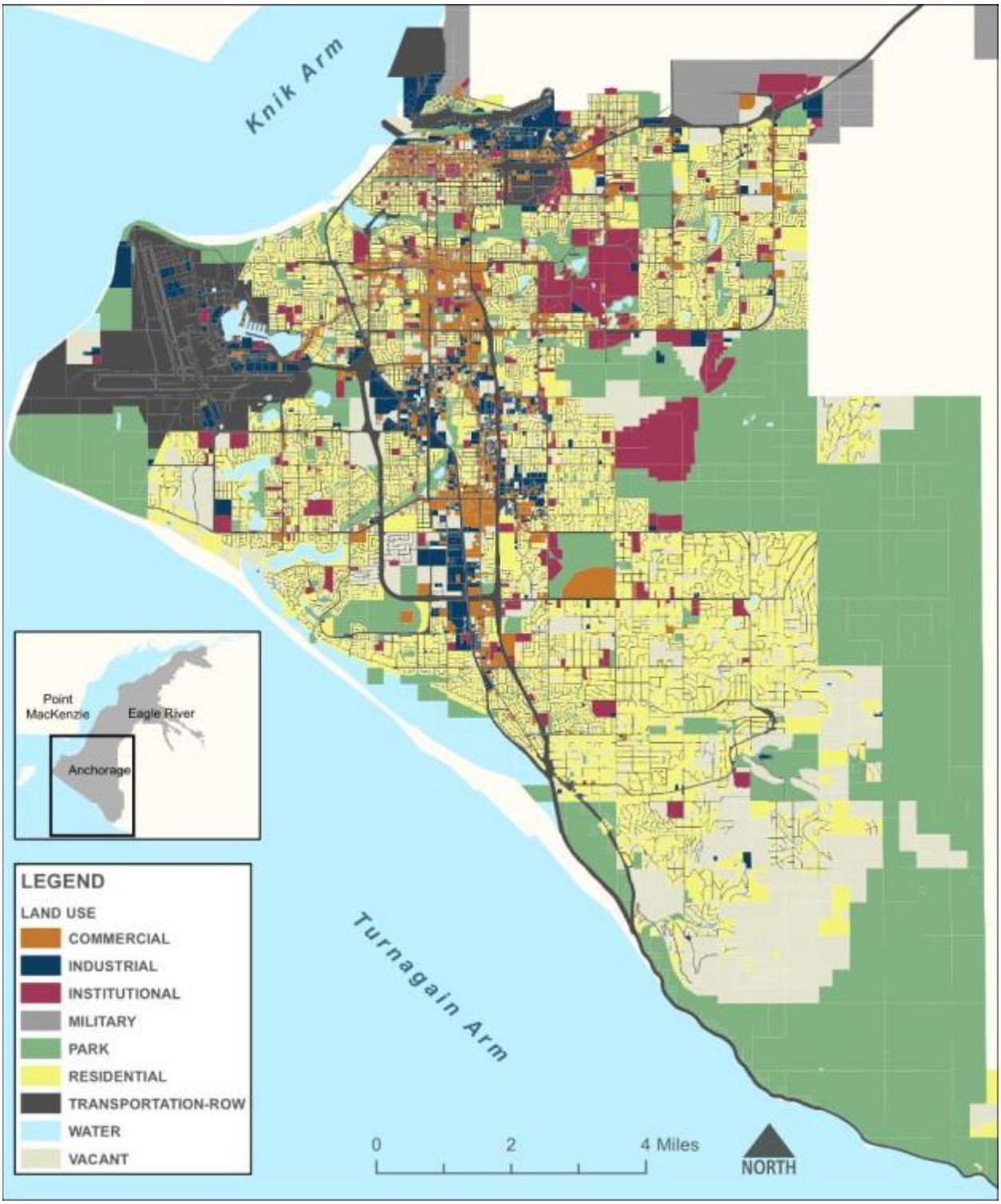


Figure 7-3. Land Use in Chugiak-Eagle River

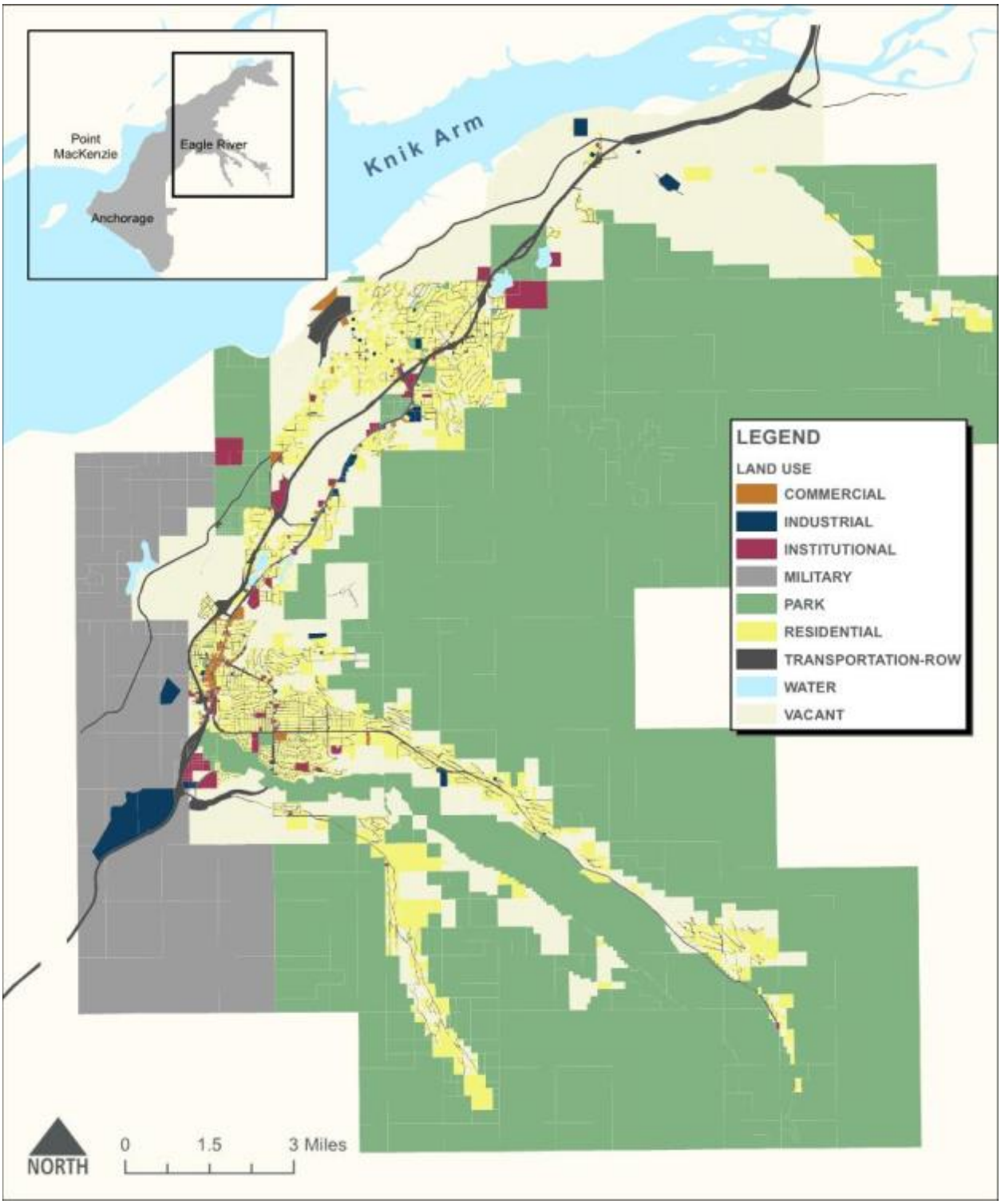
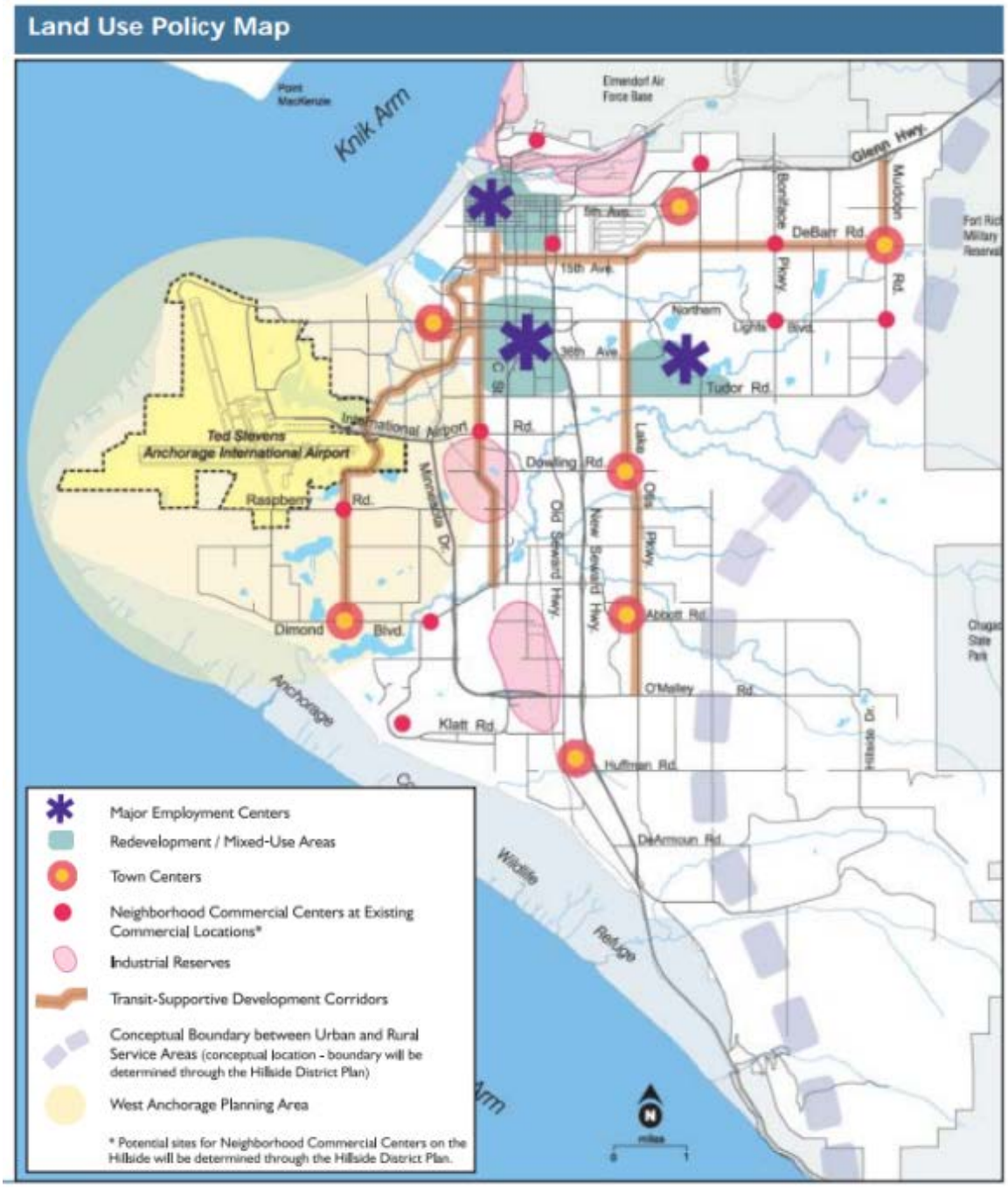


Figure 7-4. Land Use Policy Map, Anchorage 2020: Anchorage Bowl Comprehensive Plan



Source: MOA, 2001:50

Bottlenecks, Level of Service, and Capacity

Bottlenecks can occur anywhere on the freight system, including congestion choke points along heavily-traveled corridors, intermodal transfer locations, or last-mile of delivery. Bottlenecks may be the result of limited transportation capacity on the freight system and may also stem from operational issues unrelated to infrastructure. Because bottlenecks constrain on-time delivery, any type of bottlenecks

present major threats to the efficiency and resiliency of the multimodal freight transportation system. At the POA, for example, current bottlenecks result from infrastructure-related deficiencies. The ongoing APMP will address various infrastructure needs and provide solutions to existing problems. Present and potential future bottleneck and capacity issues are shown below for each transportation mode in the AMATS region.

Water

Although the POA plays a critical role in providing goods for Anchorage and the rest of the state, it needs a number of critical future projects to ensure resiliency, reduce bottlenecks, and to advance operations to current industry standards and efficiencies. Ongoing bottlenecks and capacity issues within the POA are a result of existing infrastructure-related deficiencies. Severely corroding wharf piles over 40 years old continue to serve the POA. To address a need for additional storage, the POA recently expanded their petroleum storage capacity to 3.4 million barrels. Approximately one-third of all refined petroleum products used in Alaska come through the POA's valve yard and over the dock (McDowell Group, 2016:9). Since it opened in 1961, the majority of the POA's marine terminal infrastructure lacks improvements and updates. This weakness in the freight transportation system can have significant repercussions should an emergency (i.e., earthquakes, or extreme weather changes) impact these facilities.

Most of the infrastructure age and maintenance issues that can cause freight delays and bottlenecks will be addressed through the APMP. This modernization effort will help improve resiliency of port operations in the event of threatening hazards and will optimize the facilities so that the POA can accommodate future growth and market needs for the entire state. The APMP will also reinforce safety and reliability, and ensure cost-effective operations with energy-savings technology. The modernization effort will support larger container vessels with new ship-to-shore cranes. Improvements will include increased intermodal access that will also help to prevent delays moving freight into and out of the POA.

Air

TSAIA is undergoing a variety of upgrades to address current bottlenecks and operational issues. These include utility repairs, improved access to hangers, airfield taxi area widening, airfield pavement reconstruction, and parking area reconstruction. Improvements made to airfield taxi and runway pavements are being designed to address dimensional concerns and to meet Aircraft Design group VI Standards. In terms of intermodal movements at TSAIA, the *Air Cargo Related Economic Development Opportunity Assessment* (GLDPartners, 2014) identified limited direct cargo movements between air and rail modes within Alaska. This report cited air connectivity to other modes as of great concern for future freight movements in the state and the AMATS region, as increased connectivity would allow for more efficient freight movement (GLDPartners, 2014).

Highway

During the freight stakeholder interview process conducted in support of the AMATS FMS, stakeholders raised a number of important issues, including roadway bottlenecks, poor signal timing, challenging intersection geometry, undersized loading areas, insufficient visibility at intersections due to vegetation growth or changes in roadway elevation, and narrow travel lanes. Through the stakeholder engagement

process, stakeholders identified potential improvements for regional roadway and intersection locations to potentially increase the efficiency for freight movements, improve safety, and reduce congestion on the transportation system. These improvement areas/issues are discussed below.

Traffic Signal/Intersection Geometry Issues

- Raspberry Road and Airpark Place;
- C Street and International Airport Road;
- Hoyt Street (Costco access) and Debarr Road;
- Boundary Avenue to Glenn Highway;
- C Street and Ocean Dock Road; and
- King Street and Dimond Boulevard.

Grade-Separated Road/Rail Crossing Issues

- C Street and 68th Street Rail Crossing[3].

Port Access Issues

- C Street and POA – 3rd and 4th Avenues.

General Issues

Freight stakeholders also identified the following potential improvement projects for consideration:

- Develop infrastructure that can accommodate a 53-foot-long trailer. Existing road infrastructure in the AMATS region is constructed and built to accommodate 40-foot-long trucks, and designing and implementing future roads for larger vehicles should be considered for prospective projects.
- Work toward resolving existing and potential land use issues such as noise compatibility near industrial areas.
- Consider designing specifically-used freight corridors and work with freight stakeholders to determine whether to implement certain street-scape methods that are designed to improve safety and efficiency of freight movements (e.g., less trees that block truck traffic views, larger road right-of-ways, and placement of traffic-calming techniques).
- Roadway medians can limit a truck's ability to turn, especially during the winter months.
- The potential construction of the Knik Arm Crossing would support efficient freight mobility on the highway system by providing alternative road and bridge access to the Matanuska-Susitna Borough and potentially reduce truck traffic movements on the Glenn Highway, the only existing route between the MOA and communities north of Anchorage.

In addition to the list of stakeholder issues identified above, the MOA pinpointed a series of "problem locations" for freight movement in the Anchorage Bowl in 2009. Of these locations, 19 of the 27 problem locations identified (Figure 7-5) still need to be resolved, including:

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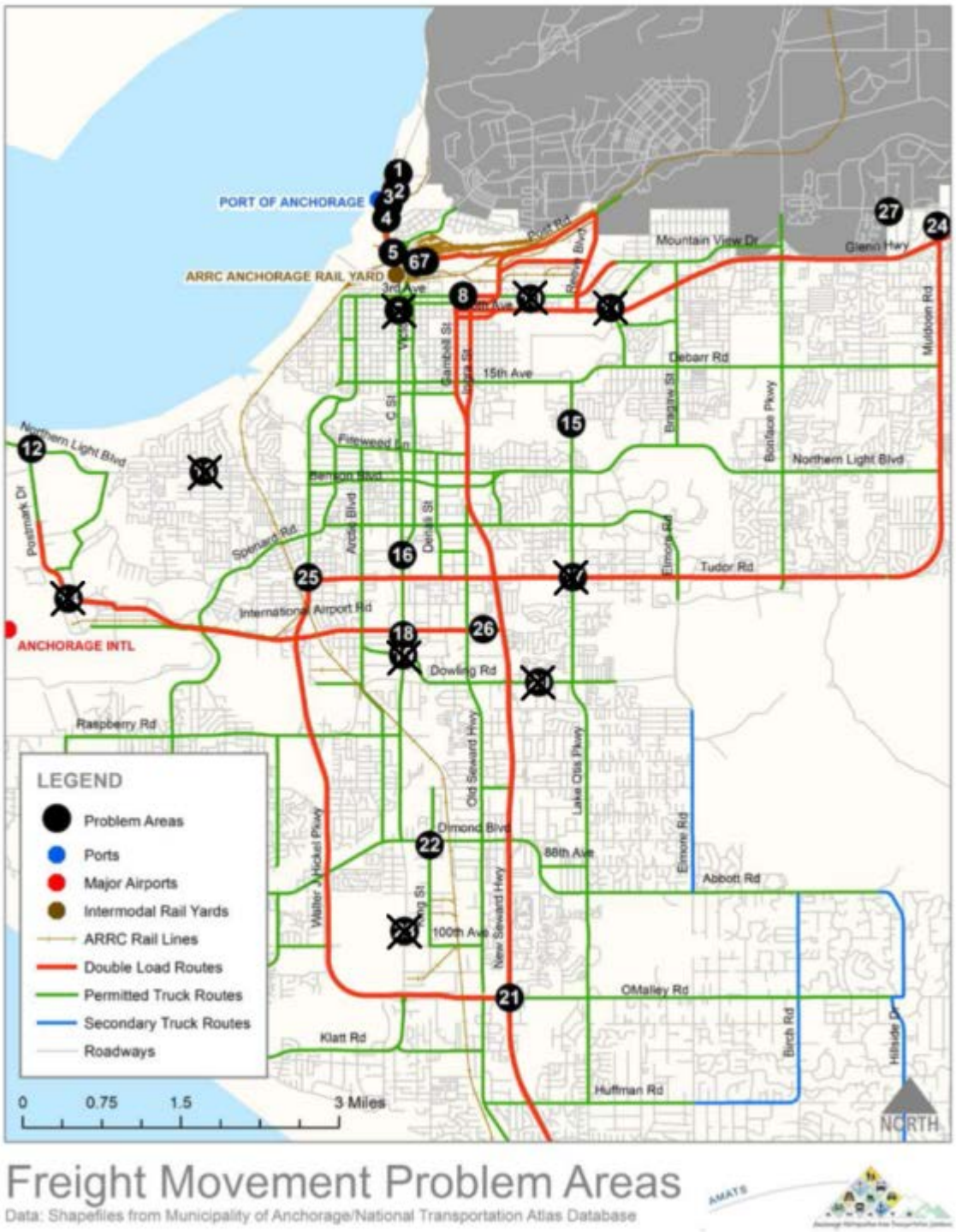
[3] This crossing causes delays to roadway traffic due the crossing being blocked for several minutes to accommodate unloading of gravel cars. DOT&PF identified this location as needing capacity improvements for several years.

1. Ocean Dock Road access and crossing from POA to Terminal Road;
2. Ocean Dock Road and Terminal Road intersection;
3. Ocean Dock Road alignment near POA entrance;
4. North C Street and Ocean Dock Road intersection (multiple railroad crossings);
5. Whitney Road (size, turning movements, no shoulders, trail/pedestrian/fishing concerns);
6. School bus storage area (use not ideally suited, some compatibility concerns);
7. 3rd Avenue and Ingra/Gambell improvements (connects to the Ship Creek/POA area);
8. Industrial area circulation and access concerns;
12. Postmark Drive and Point Woronzof Road/West Northern Lights Boulevard intersection (stop signs, tight intersections, left and right turns);
15. Lake Otis Pkwy: Debarr Road to Northern Lights Boulevard (capacity concerns/4-lane transition to 3 lanes at Chester Creek);
16. C Street: Tudor Road to 36th Avenue, northbound (capacity concerns);
18. C Street at International Airport Road intersection (turning movements);
21. New Seward Highway at O'Malley Road interchange;
22. King Street at Dimond Boulevard intersection (turning movements);
24. Access off the Glenn Highway from Muldoon Road (capacity development for freight);
25. Tudor Road and Minnesota Drive intersection;
26. International Airport Road extension to the New Seward Highway; and
27. Tikhatnu Commons (Best Buy/Kohl's/Lowes) and Muldoon Post Gate (access improvements).

Figure 7-5. AMATS Freight Movement Problem Areas



Note: Problem areas with an X over the number indicate the problem is resolved since 2009.

Rail

Rail cargo bottlenecks may be operational or infrastructural. Operational concerns exist at the POA and other intermodal centers in the region, where cargo movement relies on tight schedules. For example, the ARRC tracks function as the loading area when freight exits the POA via rail. This loading process creates delays based on scheduling and loading crew member availability. Additionally, ARRC noted that the most significant delays to their operations are related to truck traffic through downtown Anchorage during the commuter rush hour. Currently, delays in truck arrival time affect loading and departure times and are expected to continue into the future. Railroad project improvements and expansions may also impede other freight movements. For example, there are a number of at-grade crossings in the AMATS region that not only affect the safety of the overall transportation system, but also constrain the efficiency of freight rail operations. Additional bottlenecks include a lack of mainline crossovers north of the Anchorage yard, the size and location of the existing intermodal facility, the C-street crossing at the south end of the Anchorage Yard, and East of the Depot.

Pipeline

There is no current or expected future bottleneck, level of service, and/or capacity issue in the pipeline network.

Safety and Security Issues

Safety and security issues are becoming more prominent in regional freight mobility. Freight involves large-scale shipments using various modes of the region's transportation system. Safety is paramount to ensure that large containers or vessels of costly and/or potentially hazardous materials arrive at their destinations on time and intact. Security is also a major concern as these shipments cross international and state borders, each with different regulations and protocols. Safety and security issues are presented by transportation mode below.

Water

Current security measures at the POA are in full compliance with 2014 Maritime Transportation Security Act standards. The POA implemented a port-wide security plan shortly after 9/11 that remains in place today. The POA security screening facility provides security training for all staff. Additionally, any person entering the POA must present a government photo identification card to enter. Staff members are also required to have a "proximity access card" and "Transportation Worker Identification Card (TWIC)." These access precautions serve to protect the POA on a daily basis.

In addition, the POA contracted with a local corporation to perform all security services, which averages 20 armed officers. The Department of Homeland Security identified the POA as a regionally significant facility, and designated it as a second tier port facility (POA, 2016). This designation enhances the POA's chances of success when applying for federal security grants.

Air

TSAIA maintains compliance with Transportation Security Administration (TSA) standards and includes a U.S. Customs security on site. TSAIA also keeps Aircraft Rescue and Fire Fighting (ARFF) services on site per FAA requirements. In the recent past, no major facility or security related incidents are recorded at the TSAIA. Also, TSAIA recently contracted with an energy firm to implement an Electrical Preventative Maintenance (EPM) and National Fire Protection Association (NFPA) 70E Compliance Program. This program includes a review of TSAIA's electrical distribution systems, incident energy analysis, arc flash hazard assessments, schedule maintenance, airport staff training, and energy-related incidents to enhance safety measures at the airport (Lantz, 2015). In the event of a major emergency, JBER's air facilities offer an alternative to TSAIA. For example, during the 1964 earthquake, Elmendorf Airfield continued to move freight while TSAIA could not move cargo.

Highway

DOT&PF conducts inspections on commercial vehicles for safety, size, and weight. These inspections occur at weigh stations, selected roadside locations, terminals, and when vehicles are stopped. To keep records of these inspections, the commercial vehicle enforcement officers utilize Aspen inspection reporting software. In addition to inspections, DOT&PF supports a cooperative industry and public education awareness program to ensure that both drivers and other road users understand risks and responsibilities associated with commercial vehicle navigation (DOT&PF, 2013). In terms of vehicle security, systems and technology vary by carrier.

Furthermore, the Fatality Analysis Reporting System (FARS) summarizes motor vehicle crashes resulting in fatal injury data by year. Additionally, the National Highway Traffic Safety Administration (NHTSA)'s Alaska Crash Map shows the geographic locations of these incidents in the region with a user-friendly online interface. This online map is used as the basis for obtaining and linking case numbers to the vehicle type information for this analysis. In 2012 and 2013 respectively, there is one fatality by each year involving trucks. Table 7-2 shows the crash history on the MOA's transportation system from 2009 to 2014 for all commercial vehicles. Source: DOT&PF, 2016.

Figure 7-6 shows all of the commercial vehicle crashes on one map to illustrate consistent areas of crash incidents. Non-federally reportable crashes are the least impactful and generally occur on lower speed roadways. Crashes that result in towing, injuries, or fatalities generally occur on higher speed facilities. Crashes are more prevalent in denser areas. Research indicates car drivers are at-fault for approximately 75% of the fatal car-truck crashes. As crash severity decreases, the fault is more equally split between car and truck drivers (ATA, 2013).

Table 7-2. DOT&PF Reportable and Non-Reportable Commercial Vehicle Crash Data Summaries for the MOA, 2009-2014

Crash Type	2009	2010	2011	2012	2013	2014
Non-federally Reported	119	111	126	37	23	77
Resulted in Tow	14	18	9	7	26	25
Resulting in Injury	8	13	10	4	5	6
Resulting in Fatality	0	0	0	1	1	2
Total	141	142	145	49	55	110

Source: DOT&PF, 2016.

Figure 7-6 Commercial Vehicle Crashes, 2009-2014

Source: DOT&PF, 2016.

Rail

The Rail Safety Improvement Act of 2008 improves railroad safety. Provisions of the Act include the implementation of positive train control, authorization of appropriations for safety grants to be administered by the US Department of Transportation, and amending the hours of service for employees.

ARRC reports that their annual movement of materials such as petroleum, gravel, and coal via railcar removes over 300,000 dump and tank trucks from the road each year in Alaska, with an estimated reduction of vehicle miles traveled of 34.7 million miles. The movement of these goods from truck to rail helps to provide a more secure environment on the region's fixed rail guideway.

The 2035 AMATS MTP identified crossings of concern due to higher traffic volumes in the following locations:

- C Street;
- Arctic Boulevard/Dowling Road[4]; and
- International Airport Road/Jewel Lake Road.

To increase awareness of the importance of right-of-way for rail-side protection, ARRC used six-foot-tall blue posts in 200-foot increments to delineate the right-of-way boundary through Anchorage. ARRC installed the markers in 2011, and they run from Potter north to Elmendorf. ARRC is considering expanding the area these markers cover, noting that right-of-way is a common problem where property owners build too close to the track.

Pipeline

Pipelines require extensive maintenance and security due to the volatile nature of the contents carried. The Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates national pipeline safety and security. PHMSA supports the enforcement of the Pipeline Safety Act of 2011 and the HAZMAT Safety Improvement Act of 2012. PHMSA reports no significant pipeline incidents in the past decade within the Anchorage region (PHSMA, 2016). No extraordinary safety or security concerns related to pipeline infrastructure exist in Anchorage.

[4] The Arctic Boulevard/Dowling Road crossing was improved as part of the West Dowling Road Extension project and should no longer be considered an at-grade crossing of concern.

Autonomous Vehicles

New and emerging technology related to autonomous vehicles can potentially improve safety. Technology allows vehicles to identify situations such as approaching a slower moving vehicle, land departures, etc. and react faster than a human driver can. Application of this technology may reduce severe accidents. However, it is estimated to cost around $25,000 per truck to outfit it with this type of technology. The actual costs vary depending on the technology installed. As use of this technology becomes more wide-spread, it is likely that the costs would then decrease.

The use of autonomous vehicles could have many freight mobility benefits (ATRI, 2016). They could help address driver shortage issues. Using autonomous vehicles for long distance trips would allow the industry to keep drivers for the more complex local pick up and deliveries. Autonomous vehicles may also reduce the cost of freight; while a truck sits idle during mandatory rest periods, autonomous vehicles could continue to operate reducing the time it takes to transport goods. This could also have land use impacts; if trucks are able to operate more hours, then the need for truck parking is changed. Other potential benefits include reduced congestion and fuel consumption as vehicles operate more efficiently than human drivers, and less crashes.

E-Commerce

The growth of e-commerce significantly impacts freight mobility. E-commerce dramatically changed the way people shop and how retailers transport their goods to their customers. In general, distribution centers have moved closer to their customers which allow goods to get to customers quicker and reduces trip length. Due to Anchorage's location and relatively small customer base, the number of distribution centers is likely to remain the same or have little increase. However, the amount of e-commerce related freight is rising and to expected to continue. Due to TSAIA's strategic location, it is anticipated to act as the primary hub for freight moving by air between North America and Asia.

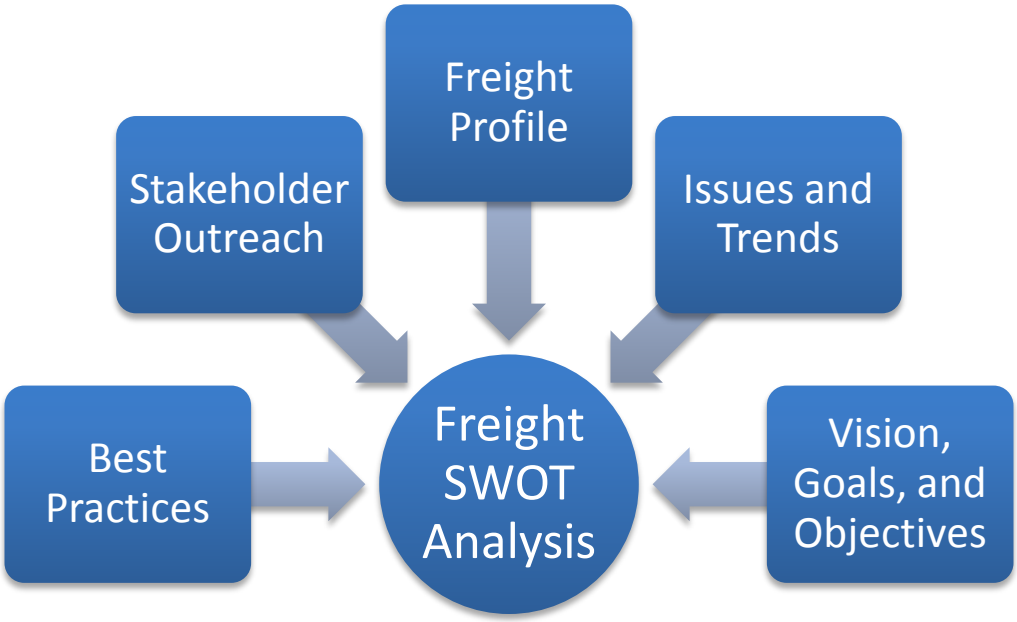
The bigger impact is likely to be associated with the number of parcel trucks on road to transport packages to the consumer. As e-commerce expands, people's shopping patterns will continue to change and adapt. People will shop less in traditional brick and mortar stores and do more shopping online, relying on companies like UPS, FedEx, and the United States Postal Service to deliver their goods. As the number of packages increase, companies need to increase the number of delivery trucks to handle the demand. E-commerce is also altering freight mobility patterns. Historically, freight is delivered to traditional stores and the consumer is responsible for transporting goods between the store and their home or business. With less shopping occurring in stores, the amount of freight mobility to traditional retail may decline. With e-commerce, FedEx, UPS, etc., now see more activity in residential areas instead of the traditional commercial areas such as downtown.

8. Freight System Strengths, Weaknesses, Opportunities, and Threats (SWOT)

A SWOT analysis is used to help develop the freight analysis framework best able to meet the vision, goals, and objectives of the AMATS FMS. The SWOT analysis provides for more effective future freight programming and planning in the region.

To complete the SWOT analysis, AMATS conducted a comprehensive series of tasks shown in Figure 8-1. The SWOT analysis incorporated the analysis and findings of work discussed in previous chapters of this study. This analysis fed directly into the SWOT to determine Anchorage's freight-related strengths, weaknesses, opportunities, and threats moving forward into the future. The results of this analysis are used to determine the potential future freight projects and policies to be prioritized in the AMATS FMS for the immediate, mid-, and long-terms (see Chapter 10).

Figure 8-1. Anchorage Freight Mobility SWOT Analysis Elements



The SWOT analysis recognized a number of important factors in identifying the potential future projects and policies recommended for implementation in the AMATS FMS. Due to its unique geographic location, Anchorage is a trans-shipment center that will continue to play a very important role in the region's economic future. Although Anchorage is delineated by natural growth boundaries of the Cook Inlet and the Chugach Mountains, there is still an abundance of industrially-zoned land use areas located near TSAIA, along Anchorage's central corridor, and in South Anchorage, with lesser amounts available in the Ship Creek and Eagle River/Chugiak areas.

The freight market and multimodal transportation system in Anchorage is heavily dependent on resource-rich commodities, which can consequentially be perceived as both an economic strength and weakness. Also, with a growing urban population (21 percent growth by 2040), this provides an

opportunity to define freight improvement strategies. As more employment and industry growth results from the expected population increases, this, in turn, drives up the demand for various goods in the local economy and thereby creates more freight activity.

More importantly, a potential threat to the AMATS multimodal freight network is the lack of multiple access points and redundancies for specific modes in the region. For example, the POA is suffering from a number of capacity issues and is in the process of "modernizing" its facilities (APMP). Having emergency or backup operations for delivering goods beyond one route will be important into the future, especially when Anchorage and the rest of the state remain remote from other immediate markets. Regular deliveries for fuel, food, and other consumer goods could potentially deteriorate if a major natural disaster occurs in the region.

The key themes and issues identified in the SWOT analysis are highlighted in Table 8-1.

Table 8-1. AMATS Region's Key Freight-Related Strengths, Weaknesses, Opportunities, and Threats

Strengths	Weaknesses
• Energy-resource driven economy • Workable intermodal freight network between the POA, TSAIA and ARRC • Freight network provided for local, regional, state, and international level for the trans-shipment of goods • Actively-involved FAC	• Lack of efficient freight-connecting routes between the Port and TSAIA • Poor connections between Glenn Highway and Seward Highway which causes bottlenecks • Volatility and changing trends in energy markets • Natural growth boundaries for Anchorage Bowl
Opportunities	**Threats**
• Freight stakeholder involvement in the long-range freight planning process • Increased role of TSAIA in international trans-shipment markets • Outreach and education to increase public awareness of transportation and industrial-related jobs and businesses to the economy • Growing urban population with diverse need for commodities • POA Modernization efforts can increase freight intake • Abundance of industrially-zone land uses	• Oil and gas boom/bust economy • Land use conflicts between industrial right-of-way and neighboring uses. • Encroachment of ARRC ROW • Lack of redundancy in intermodal freight networks which can be threatened by potential natural hazards (i.e., POA and TSAIA, singular road access in and out of Anchorage) • Lack of funding to complete APMP before either an actual disaster event occurs, or age drives infrastructure out of service.

9. Performance Management Framework and Measures

Transportation planning, policy, and programming decision-making processes involve several steps, one of which is defining performance analysis frameworks to assess future planned changes or activities of any given system. This analysis, often referred to as Performance-based planning or Performance measurement, will become an integral part of state and metropolitan transportation system planning over the past two decades or more. For many years, AMATS actively engaged these types of processes in support of the MTP and the recently completed CMP and Status of the System Report. AMATS' previous efforts to design and apply performance measures and analysis processes further informed the framework developed for the FMS, with the AMATS FMS Vision, Goals, and Objectives used as the framework's foundation.

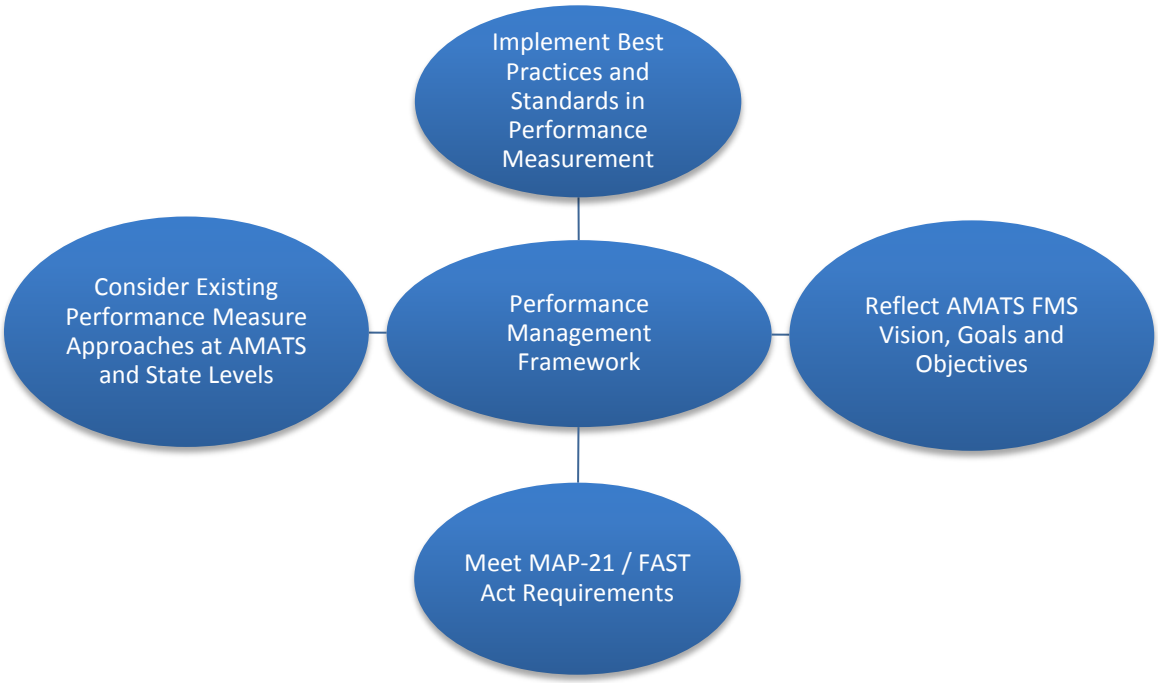
In support of the FMS, AMATS developed this framework to monitor the performance of FMS freight-related goals and objectives that also closely align with the Interim 2035 MTP's freight-related goals and objectives. The framework also meets federal guidance set forth in MAP-21 and the FAST Act. Additionally, a key feature of MAP-21 is the establishment of performance and outcome-based programs, with the objective being for regions to invest in projects that collectively make progress toward national goals. The FAST Act, established in December 2015, suggests that fundamental sections pertaining to performance measurement have not materially changed from MAP-21. Among other system elements, the final performance measure Notice of Proposed Rulemaking (NPRM; published April 22, 2016) also recommends a series of specific measures for the performance of freight movements on the Interstate system.

Moreover, the establishment of this process will help determine whether freight projects and policies developed as a result of the AMATS FMS will be successful once implemented. AMATS could then quantify the success of any given freight project on the overall transportation system. Measures built into the framework are intended to monitor and identify improved transportation system performance resulting from implemented projects and document the level of accomplishment to the goals and objectives established for the FMS. This process permits and creates accountability for projects and aids in understanding and identifying the necessary components of a successful project. By developing a proper framework and measures, the AMATS FAC and other AMATS committees and groups will be able to detect whether freight policies or programs need additional modifications and improvements once they are implemented and operating. Continuous follow-up by AMATS and the FAC will be important to this program's implementation success.

Performance Management Framework

The framework assesses performance and implementation of the recommendations of the FMS to reflect and take into consideration the factors shown in Figure 9-1, each of which is presented below.

Figure 9-1. Components of FMS Performance Management Framework



Implement Best Practices and Standards in Performance Measurement

A number of best practices identified and used by AMATS to support the design of the performance framework and associated measures, included:

- **Do not re-invent the wheel.** AMATS, and its FAC, built the FMS process using already available performance frameworks, measures, and associated data sets.
- **SMART and KISS Principles.** AMATS chose performance measures that are Specific, Measurable, Attainable, Realistic, and Timely (SMART) to provide meaningful assessments with data that could be collected regularly over time. Performance measures are developed to be in the spirit of Keeping It Short and Simple (KISS).
- **Focus Performance Measures on Relevant Topics.** AMATS developed measures illustrative of the performance specific to the freight industry and reflect areas that AMATS and its partners could influence over time.
- **Understand the role and distinguish between Freight Indicators and Freight Performance Measures.** Freight indicators provide an indication of economic activity in the AMATS freight sector (e.g., truck movements) and do not measure the system's performance. AMATS developed measures to inform decision-making and adjust investments related to transportation system performance.
- **Harness and Use Big Data, Carefully**. The use of big data sources, while not used in the development of the measures presented later in this section, will be considered by AMATS to support this process as data comes on-line and becomes available to the agency.
- **Consider Reporting Requirements and Benefits of Publishing Performance Measurement Results to Stakeholders.** AMATS will consider the use of future reporting processes (e.g.,

Dashboards) as they have with the Congestion Management Plan and other plans to present FMS performance measures for display to agency decision-makers and stakeholders.

Reflect AMATS FMS Vision, Goals and, Objectives

The vision, goals, and objectives for the AMATS FMS are the starting point for developing the freight-specific performance measures and freight elements of the updated MTP.

Consider Existing Performance Measure Approaches at AMATS and State Levels

The AMATS FMS performance framework takes into consideration key AMATS and statewide processes already in-place or underway. These included relevant measures established in the AMATS 2035 MTP, the Anchorage CMP, and DOT&PF's *Let's Keep Alaska Moving Plan 2036* (anticipated for release later in 2016).

Meet MAP-21 / FAST Act Requirements

The AMATS FMS performance framework considered the performance measurement requirements of MAP-21 and the FAST Act, including relevant measures identified for the Highway Safety Improvement Program, National Highway Performance Program (e.g., for pavement and bridge), System Performance Analysis, National Freight Movements, and Congestion Mitigation and Air Quality Program. For example, these measures include safety, injury/fatality, and truck reliability index.

Performance Measures

This section presents the recommended set of performance measures, data, and approaches for measuring, monitoring, and reporting performance of freight-focused activities for the AMATS FMS. The measures described in Table 9-1 reflect the goals and objectives defined for the FMS, MAP-21, Anchorage CMP, and DOT&PF approaches. The measures can also be practically measured, updated, and tracked on an on-going basis. Equally, the measures can be designed to provide insight about the performance of the freight system specifically, as opposed to the transportation system generally. Brief descriptions of each measure are shown below.

Safety Measure

Truck safety is a common concern because of the size, weight, and reduced handling characteristics of trucks compared to automobiles and other vehicles on the road. This safety measure links with the FMS Objective: minimize conflicts between freight and passenger vehicles and non-motorized travelers.

Truck Crash Injury/Fatality Index: Fatality and Serious Injury Crash Rate per 100 Million Vehicle Miles Traveled (VMT)

The recommended performance measures calculates the number of vehicle crashes (fatalities, injuries) involving trucks per 100 million vehicle VMT.[5]

[5] This performance measure uses VMT for *all* vehicles types in its calculation. The project team is not aware of a VMT measurement available exclusively for commercial VMT, which would be a preferable choice.

Table 9-1. AMATS FMS Performance Measures

FMS Objective(s)	Performance Area	Relevant MAP-21 Goal Area(s)	Proposed Performance Measure(s)
Minimize conflicts between freight, transit, and passenger vehicles and non-motorized travelers	Safety	Safety	• Truck Crash Injury/Fatality Index: Fatality and Serious Injury Crash Rate of incidents involving Commercial Vehicles per 100 million truck VMT
Optimize the transportation system to meet the needs of the Port of Anchorage, Ted Stevens Anchorage International Airport, the Alaska Railroad, the military bases, employment centers, and industrial and commercial areas	Freight System Optimization	Infrastructure Condition, Congestion Reduction, System Reliability, Freight Movement and Economic Vitality	• Truck Travel Time Index • Truck Travel Reliability Index (RI_{95}) • Annual hours of truck delay • Increase in centerline[6] miles of NHS roads • Percent of the Interstate System Mileage providing for Reliable Truck Travel Time • Percent of the Interstate System mileage uncongested
Reduce energy consumption and air pollution	Environment	Environmental Sustainability	• Annual Hours of Truck Delay

Freight System Optimization Measures

Freight system optimization measures how the overall system is performing, including linkages to major facilities, land uses, and logistics. The optimization measures link to the FMS Objective: Optimize the transportation system to meet the needs of the POA, TSAIA, ARRC, JBER, employment centers, and industrial and commercial areas. In addition, linkages to land uses that affect cost, travel time, and variability of goods movement in the freight network are captured in these measures. Freight system optimization considers the performance of the supply chain as a whole related to travel time and reliability for freight related vehicles. These measures are discussed below.

Truck Mobility (Truck Travel Time Index)

Truck mobility and accessibility improvements will be evaluated using *Truck Travel Time Index (*TTTI), which measures truck related delays primarily due to peak period congestion. TTTI evaluates the difference in travel time between 'free flow' (traffic-free) and congested flow conditions. The TTTI is calculated by dividing Free Flow Tuck Speed by Observed Average Truck Speed during the Peak Period.

[6] Centerline miles refer to miles of roadway regardless of the number of lanes.

Truck Travel Time Reliability (Truck Travel Time Reliability Index)

Truck travel time reliability measures the consistency or dependability in travel times between two points. Unreliable freight transportation requires added supply chain redundancy and additional cost for businesses. Reliability of freight influences logistics decisions, such as the number and location of manufacturing plants and distribution centers that affect local, regional, and state economics. Reliability is measured using non-recurring delay, which refers to unexpected delays caused by closures or restrictions resulting from inclement weather, crashes, and construction activities. Non-recurring delay is measured by Truck Travel Time Reliability Index (RI_{95}). The RI_{95} illustrates the extra "buffer" time needed for on-time delivery while accounting for non-recurring delay. It measures the ratio of total truck travel time needed to ensure on-time delivery 95 percent of the time.

Annual Hours of Truck Delay

Annual hours of truck delay measures the economic cost of congestion on the freight industry. Traffic congestion and delay are characterized by slower speeds, longer trip times, and increased queuing; these factors can significantly affect truck mobility. Annual hours of truck delay captures all of these details and is a primary measure of freight performance. Truck delay is also a good proxy for environmental impact in terms of energy consumption and air pollution, since increased truck delay is associated with additional idling and fuel consumption. As such, this performance measure can also be used to track progress against the FMS Objective: Reduce energy consumption and air pollution. This measure is calculated by Congested Travel Time minus Free Flow Travel Time multiplied by Daily Truck Volumes.

Increase in Centerline Miles of NHS Roads (meeting department standards)

Poor pavement conditions can cause damage to trucks and cargo as well as impede traffic flow, contributing to congestion and unreliability. The increase in centerline miles of NHS roadways measure to assess infrastructure conditions is already tracked and reported for NHS facilities by the DOT &PF and will be include in the FMS.

Percent of the Interstate System Mileage providing for Reliable Truck Travel Time and Percent of the Interstate System Mileage Uncongested

The Truck Travel Time Index, Truck Travel Time Reliability, and Annual Hours of Truck Delay is used to calculate both the percentages of interstate system mileage providing reliable truck travel times and uncongested conditions.

Environmental Measures

Data sources are not currently available to provide fuel consumption and/or air pollution levels for truck travel in the AMATS region. Environmental measures links to the FMS Objective: Reduce energy consumption and air pollution.

Annual Hours of Truck Delay

Due to data availability issues, it is recommended that the Annual Hours of Truck Delay be used as a proxy for energy consumption and air pollution. As noted above, truck delays result in higher fuel consumption and associated pollution as a result of idling and unnecessary time on the road, all else being equal.

10. Recommendations

This section presents the freight infrastructure projects and policies recommended for implementation in the AMATS FMS. Based on the analysis and primary inputs prepared as part of the FMS, freight projects and policies are identified, screened and assessed, and recommended for future implementation. This analysis is not fiscally constrained. Rather, it encourages the identification of the freight infrastructure projects and policies that provide the AMATS region with the highest level of increased transportation system performance regardless of cost. This process is also intended to identify the freight projects and policies for screening in the upcoming AMATS MTP, which will be developed using financially constrained methods. It relied on the FMS' literature review of plans, studies, and databases; assessment of local and regional freight issues and trends; and stakeholder interviews; and development of the overall freight profile for the AMATS region, including vision, goals, and objectives; freight system inventories; and SWOT analysis.

With AMATS and the FAC working together to create a collaborative screening process (see Figure 10-1), the future potential project and policy recommendations that support the FMS became apparent through this selection effort. Recommendations for immediate, mid-term, and long-term projects and policies are determined based on the goals developed, SWOT analysis, and other freight trends and technical studies.

Figure 10-1. Screening Process

Project and Policy Screening Criteria and Scoring

Various sources provided the freight project and policy descriptions during the AMATS FMS planning process, which included identified projects and policies contained in the AMATS 2035 MTP, AMATS TIP, other regional and local plans, and new freight projects and policies recognized by the FAC and stakeholders. AMATS and the FAC developed the following screening criteria to assess each project and policy implementation potential by immediate (0-10 years), mid-term (11- 15 years), and long-term (16+ years) timing/need.

- Project Readiness – Evaluates the existing project status and how close it is to being implemented. Lower scores are awarded to projects that have yet to be evaluated (e.g., feasibility/planning, environmental, program phases) while higher scores are awarded to projects that are farther along in the environmental clearance and project programming processes.
- Timing of Need – Considers the timing for project/policy completion, depending on whether it is a near, medium or long-term need. Timing would be assessed if a project is needed to meet existing or future needs. Lower scores are awarded to projects or policies that will be completed to meet medium or long-term needs (11-20 years), while higher scores are awarded to projects that will be completed to meet more immediate needs (within the next 2 to 10 years).
- New or Existing Project/Revision of Existing or New Policy – Measures if the project or policy is new, documented in other plans, or is a refinement of an existing policy or project under development. Lower scores are awarded to projects or policies that are new ideas or concepts that have yet to be fully evaluated, while higher scores are awarded to projects or policies that are actively being implemented.
- Regional Significance – Identifies geographic areas impacted by the project or policy. Lower scores reflect projects or policies that are narrow or localized with limited regional impact, while higher scores are awarded to projects or policies that provide significant regional impact in Southcentral Alaska.
- Number of Freight Modes – Identifies the number of freight modes that would be benefitted by the project or policy. Lower scores are awarded to projects or policies that address the mobility needs of one (or less) freight mode, while higher scores are awarded to projects or policies that address the mobility needs of three or more freight modes.
- Safety – Measures if the project or policy is needed to address a documented safety concern. Lower scores represent projects or policies that are not being implemented to address documented safety needs, while higher score represent projects or policies that are being developed to address documented safety needs.
- Residential Neighborhood Impact – Evaluates the potential of a project or policy to create unwanted neighborhood impacts such as increased noise or traffic levels, etc. Lower scores are awarded to projects or policies that do not reduce or address neighborhood impacts, while the higher scores represent projects or policies that do not cause any impacts or reduce existing impacts.
- Goal 1 - Evaluates if the project/policy is consistent with Goal 1: Provide a freight transportation system that moves goods safely and securely throughout the community; improves access; provides mobility; and supports a thriving, sustainable, broad-based economy.
- Goal 2 - Evaluates if the project/policy is consistent with Goal 2: Develop an efficient freight transportation network that considers the cost of building, operating, and maintaining the system; the equity of all users; public health impacts; community values; and social justice.
- Goal 3 - Evaluates if the project/policy is consistent with Goal 3: Incorporate technology and best management practices that allow for improved freight movement in the Anchorage region.

- Goal 4 - Evaluates if the project/policy is consistent with Goal 4:- Integrate freight needs and financing into transportation project prioritization processes for the region.
- Goal 5 - Evaluates if the project/policy is consistent with Goal 5: Develop a multimodal freight system that includes effective public and stakeholder partnerships to leverage opportunities and resources.

Table 10-1 shows the project and policy screening criteria and scoring process used in the AMATS FMS. The logic used to assess both freight projects and policies contained in the screening process included:

- ○ =1 pts;
- ◒ = 3 pts; and
- ● = 5 pts.

The lowest possible score for projects is 12 and the highest possible score is 60, while policies scored between 11 (lowest) and 55 (highest) because the Project Readiness criterion is not evaluated.

Table 10-1. AMATS FMS Project and Policy Screening Criteria and Values

Criteria	Rational	Potential Benefit		
		Low	Moderate	High
Project Readiness **(Project only)**	Existing status of project	○ (No work started)	◒ (Some work completed)	● (Substantial work completed)
Timing of Need (project needs to be completed in this time frame)	When project is needed to improve the freight mobility system	○ (Long-term need (16+ years))	◒ (Medium-term need [11-15 years])	● (Immediate-term need [within 0-10 years])
New or Existing Project/Revision of Existing or New Policy	Ease of integration	○ (New idea/concept)	◒ (In existing plans or revision of existing policy)	● (Implementation of project or policy actively being worked on)
Regional Significance	Geographic area impacted	○ (Localized improvement such as an intersection improvement)	◒ (AMATS area)	● (Southcentral Alaska and greater)

Criteria	Rational	Potential Benefit		
		Low	Moderate	High
Number of Freight Modes (road, rail, aviation, port, pipeline)	Number of modes benefited	○ (1 mode)	◒ (2 modes)	● (3 or more modes)
Safety	Potential to address documented safety need	○ (No safety need Identified)	◒ (Safety need documented, but project does not address it)	● (Project addresses documented safety need)
Residential Neighborhood Impact	Potential to create unwanted neighborhood impact (noise, traffic, visual, etc.)	○ (Adversely affects neighborhood[s])	◒ (Includes some adverse impacts to neighborhood[s])	● (No/reduced adverse impacts to neighborhood[s])
Goal 1	Consistency with Goal 1	○ (Low consistency)	◒ (Moderate consistency)	● (High consistency)
Goal 2	Consistency with Goal 2	○ (Low consistency)	◒ (Moderate consistency)	● (High consistency)
Goal 3	Consistency with Goal 3	○ (Low consistency)	◒ (Moderate consistency)	● (High consistency)
Goal 4	Consistency with Goal 4	○ (Low consistency)	◒ (Moderate consistency)	● (High consistency)
Goal 5	Consistency with Goal 5	○ (Low consistency)	◒ (Moderate consistency)	● (High consistency)

Recommendations for Immediate, Mid-Term, and Long-Term Implementation

Freight Projects

Applying the criteria and scoring process described above, freight projects have assigned scores from high to low based on implementation needs to support the FMS and enhance the AMATS freight transportation network. The distinction between high, medium, and low priority projects for implementation is based on the total scores computed for each project after screening. In this analysis, the total points possible for each project ranged from 12 to 60, with scores of 34 or less considered low priority projects, 35 to 38 considered medium priority projects, and 39 and above considered high priority projects. Using these scores by implementation priority, the freight projects are allocated by immediate (0-10 years), mid-term (11-15 years), and long-term (16+ years) implementation schedules based on the "Timing of Need" criteria in the screening process. Table 10-2, Table 10-3, and Table 10-4 present the Immediate, Mid-Term, and Long-Term Freight Projects for Implementation by low, medium, and high priority.

Table 10-2. Immediate (0-10 Years) Freight Projects Identified for Implementation

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Immediate Freight Projects with High Implementation Needs				
Anchorage Port Modernization Project	Complete the APMP (http://www.portofanc.com/modernization-project/)		High	Phase I - Permitting
Improved TSAIA Access – North	Improve freight access from TSAIA's North Airpark to Minnesota Drive.		High	
Improved TSAIA Access – South	Improve freight access from TSAIA's South Airpark to Minnesota Drive; includes intersection improvements at Raspberry Drive and Sand Lake Road.		High	
Seward Highway - O'Malley Road to Dimond Boulevard	Reconstruct and widen from 4 to 6 lanes; includes reconstruction of Dimond Boulevard interchange.	107	High	Design
Seward Highway Improvements (Midtown Congestion Relief-Seward Highway to Glenn Highway Connection Phase II)	Reconstruct the Seward Highway as a depressed freeway; includes interchanges at Northern Lights and Benson Boulevards and the reconstruction of the Old Seward Highway from 33rd to 20th Avenue.	114	High	

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Old Glenn Highway (Artillery Road) Northbound Off-ramp to Eagle River Road (Eagle River)	Eliminates existing weaving section between the existing Old Glenn Highway (Artillery Road) interchange northbound ramp terminal and the Eagle River Road intersection on the Old Glenn Highway; provides additional capacity to a heavy demand movement.	127	High	
Improved Access from the POA	Additional/improved connections to the Ship Creek and POA area.		High	
Tudor Road/ Minnesota Drive Intersection	Intersection reconstruction to address pavement condition and rutting.		High	
Muldoon Road Interchange	Reconstruct interchange to include ramps and Muldoon Road bridge and improve access to Tikahtnu Commons.	106	High	Under Construction
Whitney Road Upgrade	Upgrade to address size, turning movements, lack of shoulders, and trail and pedestrian concerns. Address safety concerns associated with the Whitney and Post road intersection (intersection geometry and conflicts with pedestrians).		Low	
Immediate Freight Projects with Medium Implementation Needs				
C Street at International Airport Road Intersection	Intersection improvements to address turning movement concerns.		Med	
King Street at Dimond Boulevard Intersection	Intersection improvements to address turning movement concerns. Consider developing alternative access to reduce the use of this intersection by freight traffic.		Med	
Spenard Road/ Minnesota Drive Intersection	Intersection improvements to address turning movement concerns.			
Postmark Drive and Point Woronzof/ West Northern Lights Boulevard Intersection	Improvements to address stop signs, tight intersections, and left and right turns.		Med	
Signal Timing Modifications	Adjust signal timing on primary freight corridors to better allow the free flow of freight traffic; consider adjusting timing on a daily basis or just on POA days (Sunday and Tuesday).		Med	

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Trailer on Flat Car (TOFC) Yard	Develop a TOFC at the POA.		Med	
Northern Lights Boulevard – Postmark Drive to Nathaniel Court	Rehabilitate pavement and add shoulders where needed; wetland impacts are anticipated.	119	Med	
3rd Avenue Improvements	Reconstruct 3rd Avenue to better accommodate 53-foot-long trailers.		Med	
Midtown Subarea Transportation Plan	Finish the study by identifying needs and multimodal/land use solutions.	138	Med	
Seward Highway/ O'Malley Road Interchanges Study	Reconnaissance study to identify operations, functional design, and phasing of the freeway-to-freeway interchange at Seward Highway and O'Malley Road/Minnesota Drive and an interchange at Old Seward Highway and O'Malley Road.	139	Med	
36th Avenue/Seward Highway Interchange (Seward Highway to Glenn Highway Connection Phase I)	Add new facility – interchange at 36th Avenue and Seward Highway, including braided ramps connecting to the Tudor Road interchange.	104	Med	Design
Immediate Freight Projects with Low Implementation Needs				
Eagle River Central Business District (CBD) – Phase II, Study (Eagle River)	Study to identify the recommended long-term solution for the CBD transportation system.	215	Low	
Ingra/Gambell Streets Improvements	Reconstruct Ingra/Gambell Streets to better accommodate 53-foot-long trailers.		Low	
Ocean Dock Road Access and Crossing from POA to Terminal Road	Improve Ocean Dock Road access and crossing from the POA to Terminal Road.		Low	
Ocean Dock Road and Terminal Road Intersection	Improve the Ocean Dock Road and Terminal Road intersection.		Low	

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Tudor Road Access Management - Seward Highway to Arctic Boulevard and Seward Highway to Patterson Street	Add access management and turn restrictions; modify local connections to make adjacent property access to other roads; east-west or north-south access in lieu of direct access from Tudor Road wherever practical.	301	Low	
Tudor Road Access Management - Seward Highway to Patterson Street	Add access management and turn restrictions; modify local connections to make adjacent property access to other roads; east-west or north-south access in lieu of direct access from Tudor Road wherever practical.	302	Low	
North Eagle River Interchange Capacity Modifications Study (Eagle River)	Study the need for improvements at ramp terminals.	203	Low	
C Street/Ocean Dock Road Access Ramp	Reconstruct the ramp at Ship Creek.	212	Low	Study
3rd Avenue, 6th Avenue Couplet/E Street Conversion Reconnaissance Study	Evaluate converting the 5th/6th Avenue couplet to a 3rd/6th Avenue couplet to develop 5th Avenue as a two-way street.	136	Low	
Seward Highway – O'Malley Road to Rabbit Creek Road	Construct Americans with Disabilities Act (ADA) ramps for existing pedestrian crossings and extend pedestrian facilities from Rabbit Creek Road to O'Malley Road.	116	Low	

[1] Number applies only to projects currently in the AMATS MTP.

Table 10-3. Mid-Term (11-15 Years) Freight Projects Identified for Implementation

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Mid-Term Freight Projects with High Implementation Needs				
Glenn Highway - Hiland Road to Old Glenn Highway (Artillery Road, Eagle River)	Make necessary improvements at Hiland Road and Old Glenn Highway (Artillery Road) interchanges and add a 3rd lane northbound and southbound between Hiland Road and Old Glenn Highway (Artillery Road); bridge improvements at Eagle River interchange, Hiland Road interchange, and 2 Eagle River bridges.	105	High	North bound lane is constructed. South bound land is partially designed.
Mid-Term Freight Projects with Medium Implementation Needs				
Jewel Lake/ International Airport Road Grade Separation	Construct interchange at International Airport Road and Jewel Lake Road incorporating a grade separation of the railroad; construct a grade separation of International Airport Road near Northwood Street with realignment of the railroad to the south side of International Airport Road.	304	Med	
Minnesota Drive/ Tudor Road Interchange	Extend controlled access from International Airport Road through a grade separated interchange at Tudor Road; consider widening the arterial to 8 lanes north of Tudor Road to Northern Lights Boulevard.	309	Med	
Ocean Dock Road Alignment near POA Entrance	Realign Ocean Dock Road near the POA entrance		Med	
Seward Highway/92nd Avenue Grade Separation	Add new facility - grade separation and extension of 92nd Avenue from Homer Drive to Brayton Drive; current project includes west side on- and off-ramps from Seward Highway at 92nd Avenue connecting via a newly constructed 92nd Avenue to the Old Seward Highway; new traffic signal at 92nd Avenue and Old Seward Highway; pedestrian, storm drain, and lighting improvements; recommend including bicycle lanes.	117	Med	1st phase under construction
Glenn Highway Operations Analysis – Muldoon Road to Eklutna	Include future interchanges - Old Glenn Highway, Eklutna Village Road, Thunderbird Falls, Mirror Lake, North Peters Creek/Settlers Drive, South Peters Creek/Ski Road, Birchwood Loop Road North, and Birchwood Loop Road South.	137	Med	

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Mid-Term Freight Projects with Low Implementation Needs				
Ingra-Gambell Couplet Extension - 3rd Avenue to Whitney Road	Extend Ingra/Gambell Streets to Ship Creek Avenue and Whitney Road.	213	Low	
Yield Signs at Highway On-ramps	Add yield signs at on-ramps on the Glenn and Seward Highways.		Low	
Seward Highway/ O'Malley Road Interchange	Add a freeway style interchange at Seward Highway and O'Malley Road/Minnesota Drive that provides unimpeded traffic flow between Seward Highway and Minnesota Drive.	211	Low	
Glenn Highway/Farm Avenue Partial Interchange	Partial interchange to Farm Avenue off the Glenn Highway (could include an overcrossing to a north-south collector on the west side of the Glenn Highway); includes improvements to Farm Avenue between Glenn Highway and Business Boulevard; recommend including pedestrian facilities.	126	Low	
Seward Highway/ O'Malley Road Interchange	Complete freeway system interchange at Seward Highway and O'Malley Road/Minnesota Drive and an interchange at Old Seward Highway and O'Malley Road.	322	Low	
Overpass on Minnesota Drive	Replace/modify the Minnesota Drive at Hillcrest Drive overpass to allow for additional clearance.		Low	
C Street - Tudor Road to 36th Avenue Northbound	To address capacity concerns.		Low	
Lake Otis Parkway - Debarr Road to Northern Lights Boulevard	Capacity concerns/4-lane transition to 3 lanes at Chester Creek.		Low	

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Glenn Hwy High Occupancy Vehicle (HOV) Lane - Old Glenn Highway (Artillery Road) interchange to Peters Creek interchange (Voyles Road, Eagle River)	Widen Glenn Highway to add an additional non-HOV lane in each direction; include interchange upgrades at Peters Creek bridge.	204	Low	
Glenn Highway HOV Lane – Boniface Parkway to Old Glenn Highway (Artillery Road) Interchange	Widen with lanes to the outside with 1 lane each direction designated non-HOV, include Ship Creek bridge improvements.	205	Low	
School Bus Storage Area	Address congestion near the school bus storage area.		Low	
[1] Number applies only to projects currently in the AMATS MTP.				

Table 10-4. Long-Term (16+ Years) Freight Projects Identified for Implementation

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Long-Term Freight Projects with High Implementation Needs				
None Identified				
Long-Term Freight Projects with Medium Implementation Needs				
Knik Arm Crossing – Phase II	Add new connection from Government Hill tunnel to Ingra-Gambell Couplet over Ship Creek.	218	Med	On hold
Knik Arm Crossing – Phase I	Add new bridge facility access across Knik Arm with associated roads connecting to the Anchorage roadway network.	143	Med	On hold
Postmark Drive/ International Airport Road Grade Separation	Add grade separation of International Airport Road over Postmark Drive.	305	Med	
C Street/68th Avenue At-grade Rail Crossing	Grade separate the C Street/68th Avenue railroad crossing.		Med	

Potential Project	Description	2035 MTP Project Number[1]	Level of Priority	Project Status
Long-Term Freight Projects with Low Implementation Needs				
Seward Highway to Glenn Highway Connection – Phase III	Construct freeway connection between Seward Highway/20th Avenue and Glenn Highway/Airport Heights Road; includes an interchange at Airport Heights Road freeway access and egress ramps elsewhere along the alignment, depressed sections of freeway that include the construction of bridges and decking above the freeway for cross streets, community amenities, and redevelopment over highway airspace.	201	Low	
Electric Truck Tugs	Replace existing trucks at the POA with electric trucks to improve air quality.		Low	
Industrial Area improvements	To address circulation and access concerns		Low	
Glenn Highway Alternative Facility	To provide a parallel or redundant highway facility to the Glenn Highway.		Low	

[1] Number applies only to projects currently in the AMATS MTP.

Freight Policies

The freight policies assessed in the AMATS FMS followed the same screening criteria as with the projects, except the project readiness criterion is not included in the analysis. The policy scores ranged from 11 to 55, with low priority policies scoring 43 or less, medium priority policies scoring between 44-48, and high priority policies scoring 49 or higher. Based on implementation priority, policies are allocated by immediate (0-10 years), mid- term (11-15 years), and long-term (16+ years) implementation schedules and the immediate, mid-term, and long-term policy schedules are established on the "Timing of Need" criteria in the screening process. Table 10-5, Table 10-6, and Table 10-7 present the Immediate, Mid-Term, and Long-Term Freight Policies for Implementation by low, medium, and high priority.

Table 10-5. Immediate (0-10 Years) Freight Policies Identified for Implementation

Potential Project	Description	Level of Priority
Immediate Freight Policies with High Implementation Needs		
Ongoing FAC Facilitation and Integration into Freight Planning Activities	Continue the FAC; involve the FAC during the planning/project development process.	High
Formalized FAC Review of Site Plans	Formalize FAC review of site plans/design review.	High
Conduct Periodic Freight Stakeholder Surveys	Obtain input from the freight community through periodic surveys (every 2-3 years) regarding their needs and concerns to help guide AMATS activities.	High
Truck Route Signage	Implement a comprehensive truck route signage program.	High
Public Education	Expand educational efforts to advise motorists and pedestrians regarding safety issues associated with freight movement.	High
Freight Corridor Designation and Design Standards	Standards may include pavement conditions, signage, turning radii, corridor signalization, weight restrictions, trailer access, interaction with bicycle/pedestrian facilities, maintenance (wear and tear), lighting, etc.; create maps of the designated routes.	High
Update Anchorage Municipal Code Title 9.46	Update Anchorage Municipal Code 9.46 – Vehicle Size, Weight, and Load to be compatible to the greatest extent possible with the State's size and weight rules (Alaska Administrative Code, Title 17).	High
Policy Regarding Use of Traffic Calming Measures on Freight Routes	Develop a policy to ensure traffic calming measures on freight routes are compatible with freight movement. Issues to be considered include potential review of traffic calming measures by the FAC, use of traffic calming measures (roundabout, speed bumps, medians, and developing regularly scheduled meetings between AMATS and DOT to develop standards.	High
Ranking of crash sites	AMATS should work with DOT&PF, Measurement Standards SCVE and Commercial Vehicle Enforcement, Federal Motor Carrier Safety Administration, and MOA Traffic to rank crash sites based on crashes associated with freight vehicles. This ranking should be updated annually and the results of the list incorporated into planning and project development.	High

Potential Project	Description	Level of Priority
Facilitated Coordination of Land Use and Freight Planning	Collaborate with municipalities regarding non-commercial/ industrial land in Ship Creek Valley, designate industrial reserves, protect rail corridors, and avoid noise sensitive land uses near airports; suggest avenues for cross agency/department collaboration to support industrial clusters and freight infrastructure in specific reserves; consider use of ARRC, JBER, and POA (on-port facilities) land for industry areas.	High
Immediate Freight Policies with Medium Implementation Needs		
Data Collection	Enhance data collection of truck counts, truck weights, truck speeds, commercial vehicle credentials checking/screening.	Mid
Dedicated Intersection Improvement Program	Develop a program to fund freight related intersection improvements similar to the Highway Safety Improvement Program (HSIP).	Mid
Commercial Vehicle Enforcement Efforts	Support commercial vehicle enforcement. Efforts can include assisting with educating law enforcement on how to identify unsafe vehicles; communicating to trucking companies about applicable rules, regulations, and reporting requirements; providing tools, equipment and/or staff as needed by CVE; and communicating to state leadership about the importance of enforcement activities.	Mid
Government-Private Sector Connections	Identify opportunities to strengthen connections between government and the private sector. These connections can be formalized through cooperative or interagency agreements. Potential opportunities include working together on educational programs, policy development, and infrastructure improvements.	Mid
Immediate Freight Policies with Low Implementation Needs		
Support Workforce Development Programs	Support programs that encourage employment in freight related industries (e.g., new driver training and career fairs)	Low
Create Database of Public/Private Stakeholders	Update the electronic database of public and private stakeholders. Use the Annual Freight Forum database as a starting point.	Low
Promote/Incentivize Lower Emission Freight Modes and Technologies	Encourage lower emission modes and technologies to improve air quality.	Low

Table 10-6. Mid-Term (11-15 Years) Freight Policies Identified for Implementation

Potential Project	Description	Level of Priority
Mid-term Freight Policies with High Implementation Needs		
None Identified		
Mid-term Freight Policies with Medium Implementation Needs		
None Identified		
Mid-term Freight Policies with Low Implementation Needs		
Dedicated POA Fund Using Private and Public Funds	Develop a fund that can be used to finance POA improvement.	Low
Policy Regarding Loading Zones	Develop a policy to ensure loading zones can accommodate 53-foot-long trailer.	Low
Identify locations with conflicts between freight, transit, and pedestrians/ bicyclists	Identify potential truck conflict locations with transit, bicycles and pedestrians and use engineering, maintenance, scheduling, enforcement, and education strategies to minimize these conflicts.	Low
Evaluate removal of weight restrictions during project development	Evaluate potential for removing seasonal weight restrictions when freight routes are reconstructed.	Low

Table 10-7. Long-Term (16+ Years) Freight Policies Identified for Implementation

Potential Project	Description	Level of Priority
Long-term Freight Policies with High Implementation Needs		
None Identified		
Long-term Freight Policies with Medium Implementation Needs		
None Identified		
Long-term Freight Policies with Low Implementation Needs		
Traffic Operations Center (TOC)	A TOC is needed in Anchorage to support Information Technology Systems.	Low

11. Implementation Strategy

This section presents short- and long-term implementation and funding strategies designed to address the freight needs identified in the FMS. Full implementation of the FMS will take many years given the expected levels of available funding. This implementation section reflects the following elements:

- Funding;
- Education; and
- Planning.

Each element is discussed below.

Funding

This section is organized into four areas: federal, state, local, and other funding.

Federal

At the federal level, the primary source of transportation funding is the Federal Gasoline Tax. Revenue from this tax goes to the Highway Trust Fund, which is a dedicated funding source for the Federal-Aid Highway Program. Other sources include the Federal Vehicle Taxes, Federal Diesel Tax, air passenger excise taxes, aviation fuel taxes, and appropriation from the General Fund. Under various FHWA programs, this revenue is then given back to states and other jurisdictions.

In December 2015, a new federal transportation funding bill, the FAST Act, became law. The FAST Act recognizes and creates funds for freight improvements. Freight funding under the FAST Act is primarily granted through two programs:

- **National Highway Freight Program (NHFP):** The FAST Act provides $6.3 billion in formula funds to States over a 5-year period. Eligible projects are those that contribute to efficient freight movements on the National Highway Freight Network and are identified in a freight improvement plan included in a state's freight plan (FHWA, 2016).[7] States can use a maximum of 10 percent of its NHFP apportionment for intermodal or rail freight projects. Alaska enjoys 1,222.23 miles in the National Highway Freight Network, including the Glenn and Seward Highways in Anchorage. As a result, Alaska is expected to receive $80 million in funding through this program (Martinson, 2015).
- **Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies (FASTLANE) Grant Program:** This new competitive grant program will provide $4.5 billion of funding to nationally and regionally significant freight and highway projects over the next 5 years. FASTLANE grant funding is allocated "*to complete projects that improve safety and hold the greatest promise to eliminate freight bottlenecks and improve critical freight movements*"(U.S. Department of Transportation [DOT], n.d.). FASTLANE grants can be used for a maximum of 60 percent of total eligible project costs. However, 10 percent of FASTLANE grants are reserved for small projects, with a minimum grant amount of $5 million. In

[7] Required in FY 2018 and beyond.

addition, state Departments of Transportation need to spend at least 25 percent of each fiscal year's FASTLANE grants for project in rural areas (DOT, 2016).[8] States, Metropolitan Planning Organizations (MPOs), local governments, and tribal governments are among those organizations eligible to apply for a grant. Special purpose districts and public authorities (including port authorities), and other parties are also eligible to apply for funding to complete projects that improve safety and hold the greatest promise to eliminate freight bottlenecks and improve critical freight movements.

State

The State of Alaska funds transportation improvements through money appropriated by the Alaska Legislature. Historically, State funding is based on revenue from oil tax. In late 2014, crude oil prices dropped radically, resulting in a significant impact on the state's budget. As of August 2016, very little state money is being spent on transportation improvements and this is likely to be the case for several years. In the future, the state is expected to resume making investments in transportation infrastructure, but funding levels remains uncertain.

In addition, Anchorage also receives a share of the statewide general obligation (GO) bonds. While GO bonds are likely to be issued in the future, it is unknown when the next one will be issued or how funding would be provided to Anchorage.

Local

The MOA issues voter approved bonds to fund transportation improvement and to provide matching funds for federally funded projects within the Anchorage Roads and Drainage Service Area (ARDSA).

Other

Public-Private Partnership

In recent years, there is heightened interest in having public agencies and private entities work together to construct and operate critical transportation facilities and services. For example, ARRC, POA, and TSAIA could team with private entities to identify and implement public-private partnership (P3) solutions, as could DOT&PF or AMATS. While not all projects are suitable for P3, AMATS should consider this option for projects when it is practical and mutually beneficial.

Non-Freight Related Improvements

Non-freight related transportation improvements could also benefit freight movement in the AMATS region. AMATS uses an integrated approach to develop projects that address the needs of multiple user groups such as transit, bicycles, pedestrians, and roadways as well as freight. With this strategy, AMATS can develop and program projects that primarily benefit other user groups but also have a positive impact on freight, potentially allowing AMATS to develop more efficient and cost effective projects. It may also reduce overall impacts to neighborhoods from transportation improvements.

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[8] According to FHWA, a rural area is an area outside a U.S. Census Bureau designated urbanized area with a population over 200,000.

Education

Education is an important element of freight mobility, especially in terms of workforce and community education. This section presents continuing education programs that could be used to support FMS implementation over time.

Workforce Education Program

Participants in the FMS process have indicated that one of the biggest challenges facing freight mobility in Anchorage is the ability to attract and retain a skilled workforce. Addressing this potential shortage in new truck drivers is critical for the future of freight mobility in Anchorage. Several areas to potentially promote include:

- Career Awareness: Students often make career decisions before they learn about transportation, so they do not consider or prepare for employment in the freight industry.
- Changing demographics: Younger workers have different expectations for work-life balance and flexible work situations. Employers may need to adjust their management approach to retain younger workers in this field.
- Changing technologies: Advances in technology dramatically changed how freight companies operate. The increased use of technology transformed the skills that people need to fill positions. For example, companies may use computerized logistics systems for route planning rather than traditional methods.

AMATS should continue to work with its partners, such as the ATA, to pursue opportunities to support workforce education. For example, AMATS could invite ATA to the annual Transportation Fair to educate attendees about potential careers in the trucking industry, AMATS could with its partners could produce educational material on becoming a truck driver, and AMATS could promote driver training through its social media channels. Also, AMATS and the FAC should highlight these efforts at their annual Freight Forum.

Potential sources of financial aid for driver training include:

- Alaska Education Loans (www.acpe.alaska.gov)
- Department of Veterans Affairs (www.gibill.va.gov)
- Alaska Job Center Network (http://jobs.alaska.gov/)

Community Education

AMATS should collaborate and cooperate with partners to provide broad education about the importance of freight and related activities to the Anchorage economy and quality of life. Many people do not understand how the goods they purchase are transported. By better understanding the freight system, people will gain additional knowledge and hopefully support projects and policies designed to make the overall freight system operate more efficiently and safely.

Equally, another component of community education is to educate drivers on how to better share the road with commercial vehicles. Many people do not realize the differences between how a car and large trucks operate. For example, trucks and buses have larger blind spots, need longer stopping distances, need longer time to stop, and may need to swing left to make a right hand turn. Driver education can increase the safety for everyone using the road system. In addition, AMATS could take this opportunity

to fully take advantage of advanced technology to make distracted driving less tempting. Examples of programs AMATS could use as part of this effort include the Federal Motor Carrier Safety Administration's Our Roads, Our Responsibility program (https://www.fmcsa.dot.gov/ourroads), and the American Trucking Association's Share the Road Program (http://www.trucking.org/Share_the_Road.aspx) or new safety and distracted driving smartphone applications such as Verify developed by Cellepathy (http://www.cellepathy.com/).

Figure 11-1. Infographic used by the City of Seattle to educate residents about freight

Source: City of Seattle

Agency Education

AMATS' FAC, must be actively involved in the implementation of this FMS, and, more importantly, the ongoing education of the MOA, DOT&PF, and other regional public and private stakeholders in the Anchorage freight planning process. The FAC, while formalized for many years within AMATS, should be invited to actively participate in the development of the upcoming MTP Update and to promote the identification, assessment, and potential programming of freight-oriented projects during the MTP planning process. The FAC could be used as a continued forum for freight planning activities and to help identify and educate these stakeholders about the viability and benefits of how improved freight transportation infrastructure will help the agency and its constituents meet the needs for a growing and healthy economy.

Industry Education

The FAC should encourage trucking companies and others in the freight industry to review the MOA's freight routes and applicable code (Title 9) on an annual basis and encourage the use of these routes when possible. AMATS can support this effort by ensuring the most up-to-date information is available online. Further, AMATS and the FAC could produce a truck route map similar to the one produced by the

New York City Department of Transportation which contains information about truck routes, weight limits, clearances and other freight related resources. To see the New York City map, please visit http://www.nyc.gov/html/dot/downloads/pdf/2015-06-08-truck-map-combined.pdf

Planning

Incorporate FMS into MTP

AMATS uses a Comprehensive, Cooperative, and Continuing (3C) planning process to help meet existing and future transportation needs in Anchorage. As part of the planning process, AMATS will prepare an MTP, starting the update in fall 2016. FMS recommendations should be incorporated into this updated MTP as shown in Figure 11-2.

Figure 11-2. Planning framework

The most simplistic approach to incorporating freight projects is to build on to or modify the process of selecting multimodal projects. AMATS should be mindful during these processes to evaluate the degree to which they already may include freight considerations. Upon this review, specific sections of the project selection process could be refined to include specific freight project definitions, data, and analysis sections, as well as performance measures to assess the impacts of all project types (including freight oriented projects) that benefit economic growth in the AMATS region.

Based on the review of existing evaluation processes, AMATS should identify and clarify specific data collection activities. For example, if there are evaluation criteria that use annual average daily traffic

(AADT), then this could also include annual average daily truck traffic (AADTT). Once the modifications are developed, it is critical that the necessary data be collected to support the changes. The recommended revisions and new data requirements should be merged into AMATS' procedures.

On-going Identification of Freight-Specific Projects and Policies

FMS determined needed freight projects covering a 20-year period, from 2016 to 2036. As needs and conditions shift, there likely are other basic projects and policies that are essential to improve freight mobility. AMATS, and its FAC, should be aware of these circumstances and pinpoint crucial projects and policies. In addition, when new transportation projects are initiated, their potential impact on freight mobility and the region's economy should be considered.

To keep the FMS relevant, AMATS should update the project list every two years while other elements get updated as needed to reflect changing conditions. This process, in addition to assessing freight projects - to the call for projects of the MTP every five years, should keep freight oriented projects at the forefront in the AMATS planning and programming processes.

Commitment to Continuing Coordination with Key Freight Modes

Clearly, the FMS benefited substantially from the detailed input received from the FAC. With broad outreach in the planning process, the FAC actively engages the private sector, multiple modes, and end users of the freight system. AMATS should continue to employ the FAC to provide dynamic insight on future goods movement, identify freight needs when developing projects, analyze freight concerns with site plans, contribute prudent input into land use plans, offer ongoing involvement with AMATS efforts, and public participation.

Implement Recommended Short-Term Freight Policies

To implement the FMS, several attainable policies recommended in the Section 10 should be carried out over the short term to support this FMS, and to further reach AMATS overall goals and objectives. These include:

Implement Designated Regional Truck Route: A regional truck route network should be assessed, signed, and enforced in the AMATS region as a means to concentrate heavy duty truck movements on selected roadways and corridors. While trucks use all system roadways, heavy duty truck movements need to be focused on key regional freight routes to protect communities, increase safety, reduce neighborhood impacts, and alleviate bottlenecks. Figure 11-3 shows the proposed key freight routes suggested as designated regional truck routes, including:

- A/C Streets;
- Seward Highway;
- Glenn Highway;
- Tudor/Muldoon Roads;
- 3rd/ Commercial Drive/Mountain View Drive
- Minnesota Drive; and
- International Airport Road.

AMATS and the FAC will work together along with other agency and community partners to finalize the proposed regional truck route network and to have the network adopted by the appropriate entities.

Freight Corridor Designation and Design Standards: As part of the Designated Regional Truck Routes implementation strategy, freight corridor designation and design standards should be developed and implemented. Designated regional truck routes should not just accommodate trucks; they should be designed for trucks.

These standards will include pavement condition ratings, signage and wayfinding, turning radii, corridor signalization, utility and signal pole location, landscaping, weight restrictions, trailer access, interaction with bicycle/pedestrian facilities, maintenance (wear and tear), and lighting, among others. Detailed design criteria for streets on the freight network should be included in the MOA's Design Criteria Manual and DOT&PF's *Alaska Highway Preconstruction Manual*.

Designing for truck movements will often require balancing the needs of other, and sometimes competing, transportation modes. For example, lanes have to be wide enough to accommodate a truck without encroaching on adjacent lanes, but wider roadways are usually less pedestrian friendly. Like trucking, the Anchorage transit system uses primarily major arterials attracting pedestrians and cyclists to bus stops. As each roadway segment is surrounded by a different setting or land use (e.g., dense urban, industrial, etc.) and characteristics, designs should be developed on a case-by-case basis.

Figure 11-3. Proposed Regional Truck Route Network

Update Anchorage Municipal Code Title 9.46: To support freight mobility, Anchorage Municipal Code Title 9.46 – Vehicle Size, Weight, and Load should be reviewed and revised to be compatible to the greatest extent possible with the State's size and weight rules (Alaska Administrative Code, Title 17). AMATS should work with the DOT&PF and MOA to identify and adopt changes to AMC 9.46.

Truck Route Signage: To help enforce heavy duty truck usage of designed regional truck routes and educate truck drivers on using these specific corridors to access and egress the AMATS region, AMATS should work with the DOT&PF and MOA to implement a comprehensive truck route signage program. While many drivers are familiar with the Anchorage area, signage is particularly helpful to drivers who make infrequent trips here.

Ongoing FAC Facilitation and Integration into Freight Planning Activities: The FAC should continue as a standing permanent committee within the AMATS planning process. This will facilitate freight planning activities and the development of the freight program in the AMATS region, as well as support and promote freight infrastructure project assessment and implementation in the overall transportation planning process in the AMATS region.

Formalized FAC Review of Site Plans: In cooperation with DOT&PF and MOA, AMATS should formalize the FAC's review of site plans and design reviews specifically related to a site's potential increase in truck movements, truck access and egress routes, use of alternative modes, impact to local neighborhoods and communities, and economic impact.

Due to the volunteer nature of the FAC, undertaking review of all site plans may prove difficult for committee members. While site plans that have substantial freight involvement (e.g., a new retail development) should remain a singular focus, the FAC can work with the MOA to educate planners of immediate freight concerns to be aware of during the site plan review process for other projects. For example, a freight mobility and access checklist for appropriate site plans could be created by the FAC to assist planners.

Conduct Periodic Freight Stakeholder Surveys: In cooperation with the FAC, AMATS should draft periodic surveys (every 2-3 years) to obtain valued input from the freight community regarding their exact needs and concerns. Accurate information and data such as these survey tools, can then encourage and support the development of specific freight-oriented projects and policies. More importantly, by gathering these comments, definitive actions can result in achievable, successful projects - implemented to help guide the AMATS transportation planning process.

Public Education: Educational efforts to advise motorists and pedestrians regarding safety issues associated with freight movement should be bolstered. Currently, AMATS and the FAC produced public safety messages regarding safely sharing the road. Yet additional work could highlight the existing Operation Lifesaver program spearheaded by ARRC. AMATS and the FAC could collaborate with the ARRC to identify ways to expand the reach of the Operation Lifesaver program.

Policy Regarding Use of Traffic Calming Measures on Freight Routes: Traffic calming measures are designed to slow traffic down. However, some traffic calming measures make freight movement

challenging and potentially create inadvertent hazards. For example, a curb extension reduces the crossing distance of a road and increases the ability for a pedestrian and vehicle to see the crossing in areas where a parking lane would block visibility. However, larger trucks sometimes drive over the curb when making a right turn, creating a potential conflict with pedestrians.

AMATS should craft a policy to ensure traffic calming measures on freight routes are compatible with truck movements. While there are no standard solutions to address freight conflicts with other modes of transportation, there are potential solutions. For example, on truck routes, instead of using curb extensions for pedestrians, they could be given longer crossing times.

12. Conclusion

The AMATS FMS inventories and identifies existing conditions and future freight needs in the Anchorage area. Completion of this plan is an important milestone for freight planning in Anchorage. However, it is not the end of the process. AMATS will build upon the recommendations of the plan and carry them forward into the MTP and other implementation actions.

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Task 4 Background and Content – Best Practices White Paper

AMATS Freight Mobility Study

Prepared for

AMATS

Prepared by

HDR

In association with

CPCS

Anchorage, AK

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Contents

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Appendix

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1 Introduction

In support of the Task 4: Background and Content analysis of the Anchorage Metropolitan Area Transportation Solutions (AMATS) Freight Mobility Study (FMS), a Best Practices White Paper was prepared. This White Paper presents the following:

- Section 2 presents a summary of best practices for metropolitan freight transportation plans, policies, and in some case, freight elements of broader transportation plans and processes, developed in the United States and Canada;
- Section 3 describes key freight elements that have been applied by regions and how they may be relevant to support the development of the Anchorage FMS
- Section 4 identifies draft performance measures used in other regional freight plans that may be potentially useful to support the FMS; and
- Section 5 presents regional freight planning Case Studies, which include many of these best practices and elements, which may be useful in preparing the Anchorage FMS.

2 Best Practices in Regional Freight Planning

Both a brief summary of freight planning best practices and a detailed description of each of the primary best practices elements in regional freight planning are presented below.

2.1 Summary of Best Practices

Transportation planning and policy (metropolitan or otherwise) efforts in the U.S. have increasingly included freight in the planning process, and have been used to identify strategies and policies designed to move freight as efficiently as possible to help realize the potential economic benefits of this activity. When freight delivery is delayed or unreliable or inefficient, the result often correlates to reduced economic output and higher production costs of freight transport. Freight activity also causes negative externalities such as increased pollution, congestion, noise, and infrastructure damage. These externalities are particularly felt in urban (metropolitan) areas where population density is higher and have been a primary agency focus of many freight planning processes.

> *"The challenge in terms of policy is to minimize shipper and freight costs while also minimizing the external impacts due to freight transportation (infrastructure damage, air quality impacts, congestion, etc)."*[1]

To address these realities, metropolitan planning organizations (MPOs) such as AMATS are increasingly and explicitly integrating freight planning into their long-range transportation policy and programming processes. In recent years, urban goods movement / metropolitan freight planning strategies and stand-alone plans have been developed in several urban areas across the United States, Canada, and overseas. Goods movement initiatives in a number of relevant regions were reviewed in support of the FMS to help identify potential lessons for Anchorage to understand in their planning process.

In support of the Anchorage FMS, we have identified and documented a series of general "best practices" in metropolitan freight planning (MFP), including:

1. Integrating "Mainstream" Goods Movement into the Overall Transportation Planning Process;
2. Implementing Innovative Stakeholder Engagement;
3. Engaging the Private Sector (a subset of stakeholder engagement);
4. Defining (limiting) Freight Issues/ Challenges;
5. Identifying the Root Causes of Freight Issues;
6. Managing and Addressing Land Use & Integration Compatibilities;
7. Using Pilot Schemes to Test Solutions;
8. Including Transportation Demand Management (TDM) in Freight Planning Process; and

[1] Page 51, http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf

9. Using Performance Measures.

Table 1 presents a brief description of the 16 metropolitan freight plans reviewed in support the Anchorage FMS, and the specific examples of best practice elements used in their planning processes. This Table identifies the region, summarizes the population characteristics and freight operations of the region, and presents both the key points and best practices elements identified above that were emphasized in each region's freight planning process. These regions have been cited in many federal and regional planning studies for best practices in freight planning. Several of these regions are highlighted in Section 5 Case Studies presented later in this White Paper.

Table 1: Examples of Best Practices in Regional Freight Planning

Freight Plan /Program	Regional Characteristics	Key Freight Plan/Program Processes	Best Practices Areas
1. Seattle-Washington FAST Corridor	• 2015 population: 3,898,720 • 2 major interstate highway routes, UP and BNSF railroads, short line carriers, NHS intermodal connectors	• Prioritize projects to proactively enhance regional freight mobility instead of waiting to address them when freight volumes increase. • Establish long-term freight quality partnerships to solve freight mobility problems and identify infrastructure improvements. • Use ITS to expedite freight movement.	#8
2. Chicago CREATE	• 2011 population: 9,730,000 • 7 major interstate highways, third-largest intermodal port in the world	• Use a collaborative process to identify transportation system improvements. More active involvement from the private sector is needed to address the region's growth issues. • Create project-specific tools to measure freight mobility and performance over time.	#9
3. Roberts Bank Rail Corridor, Vancouver	• Port/road/rail interface passing through an urban center	• Maintain close collaboration among public and private stakeholders to identify and prioritize optimal locations for investments in road/rail projects.	#2

Freight Plan /Program	Regional Characteristics	Key Freight Plan/Program Processes	Best Practices Areas
4. Peel Region, Toronto	• 2011 population: 1,297,000 • Two intermodal rail facilities, truck route network, home to Canada's largest airport	• Develop an economic case for a freight village/identify suitable land for logistics parks. Raise awareness of land-use for goods movement and incorporate it into the planning process. • Establish freight-specific performance measures	#6, #9
5. Orlando Metropolitan Area	• 2010 population: 2,134,411 • Majority of the region's freight is moved by truck	• Manage goods movement growth in a manner that both supports the regional economy and protects residential and business quality of life in a developing region • Freight villages • Active outreach to key public and private stakeholders	#6
6. Atlanta, Georgia	• 2013 population: 447,841 • Complex Interstate and local road networks, railroads • Most freight activity occurs via trucks and air • Airport serves as a major generator for time-sensitive freight	• Establish temporary off-hour delivery program (OHD) • Private sector incorporation in the planning process is key to developing innovative freight mobility solutions • Implementation of "truck friendly lane" strategies to improve regional freight mobility	#3, #7, #8
7. Kansas City Region	• 2013 population: 2,071,133 • 10 railroads, 4 Interstate highways, ports on the Missouri River, 4 airports • Serves as a major junction point (west coast to east coast) due to its geographic location in the center of the nation • Inland city	• Kansas City SmartPort: non-profit economic development organization that is focused on coordinating and expanding the transportation/logistics industry • Public-private partnerships • Willingness to prioritize and fund freight-focused infrastructure improvements	#2

Freight Plan /Program	Regional Characteristics	Key Freight Plan/Program Processes	Best Practices Areas
8. Los Angeles Metropolitan Area	• 2014 population: 18.55 million (includes Los Angeles and Orange County) • Distribution center hub, international maritime and air cargo gateway	• Identify and relieve major rail/street conflict points through public and private sector coordination • Work with public and private stakeholder early on in order to guide the freight planning process.	#4
9. Toledo, Ohio	• 2010 population: 651,429 • Major freight junction for highway, rail, and maritime freight	• Tie transportation projects to economic development • Do not apply a "freight versus passenger" mindset. The MPO should be identifying issues and coming up with solutions for all of the regions transportation issues and not pit constituencies against one another.	#1
10. Lancaster County, Pennsylvania	• 2013 population: 529,600 • Accessible by Pennsylvania Turnpike (tolled highway) and several U.S. and state highways, Class I rail and short-line rail service • Most cargo transported by truck	• Conduct freight study to develop good understanding of the movement of freight in the region. This can clarify trends and correct public misperceptions. • Many projects benefit both freight and passengers. Continue selling projects based on the passenger benefits, but begin integrating freight benefits as a bonus to introduce the public to freight issues	#5
11. Delaware Valley (Greater Philadelphia/Camden region)	• 2010 population: 7.1 million • Large freshwater port, airport with expanding international cargo services, extensive rail and highway network	• Freight Forward Improvement Program: encourages private sector stakeholders in the region to propose quick-fix improvement projects that can result in immediate benefits to the area's freight movements • Treat freight transportation with the same level of emphasis as passenger transportation	#3

Freight Plan /Program	Regional Characteristics	Key Freight Plan/Program Processes	Best Practices Areas

12. Detroit, Michigan (Detroit Intermodal Freight Terminal)	• 2013 population: 688,701
	• Six railroads providing intermodal service to the region
		• Early involvement of the private-sector freight community helps develop advocates for the project
		• Develop partnerships and balance public and private requirements and needs
		• Memorandum of understanding (MOU)
		  o Provides a framework for cost-sharing of intermodal improvements
		  o Establishes a process for continued dialogue among stakeholders
		• Use planning studies to drive projects
			#2

13. Portland, Oregon	• Freight system consists of rail, water, air, pipeline, and truck transportation networks	• Emphasize freight's connection to economic development • Freight-sensitive land use planning • Increase freight efficiency with TDM and operations and maintenance-focused projects	#8
14. Houston-Galveston region, Texas	• 2010 population: 5.9 million • Trucking, rail, marine, and air freight • Majority of goods movement occurs by truck	• Formally define and designate the freight-significant network • Work with partners to identify hotspots and mitigate existing system design deficiencies • Develop a freight-specific ITS program • Develop project evaluation criteria that give more recognition of and emphasis to freight projects, and develop a freight performance measures program	#4, #5

Freight Plan /Program	Regional Characteristics	Key Freight Plan/Program Processes	Best Practices Areas
15. Metropolitan Transportation Commission (MTC), San Francisco Bay Area	• 2010 population: 7 million • Majority of the goods movement in the region involves trucking • Trucking, rail, maritime, air cargo	• Stakeholders drive the agenda and are crucial in defining goods movement issues • Tie goods movement issues to other transportation issues • Incorporate industrial land use preservation into smart growth program • Look at projects that already are being proposed and find a goods movement "angle". This has the advantage of bringing local decision-makers into thinking about goods movement gradually	#1
16. New York, New York	• 2013 Population: 8.4 million • Majority of goods movement occurs by truck • Goods movement system includes truck, barge, rail, and pipeline traffic	• Traffic and parking congestion led to the need for an improved freight delivery system including the implementation of freight parking and loading zones • Implementation of a voluntary clean trucks program that provided an incentive for truck owners to replace older trucks with lower-emission vehicles (Hunts Point)	#5, #7

2.2 Description of Key Best Practices in Freight Planning

Each of the nine best practice elements is presented in detail below.

#1 - "Mainstream" Goods Movement into the Overall Transportation Planning Process

Goods/freight movement is an often-neglected, but critical element of smart growth and associated efforts to create compact, transit-oriented, and walkable land uses. It is not uncommon for otherwise highly touted and aesthetically pleasing new neighborhoods and mixed-use developments to have only minimal or no reasonable accommodation for truck deliveries, pickups, or staging locations. In these situations, not only are truckers and shippers/receivers inconvenienced, but there can also be significant direct and indirect economic cost, mobility, congestion, and safety impacts on residents, business owners, and the greater community. Regional planning and operating agencies can facilitate the accommodation of necessary goods movement into land use and transportation system planning and implementation with positive benefits for all stakeholders.

For example, the Metropolitan Transportation Commission (MTC) in the San Francisco Bay Area has developed strategies to link goods movement issues into their

transportation and land use planning processes. In conducting a regional goods movement study, MTC recognized the need to address the issue of land-use pressures driving the goods movement business within and out of the region. This process provided MTC with the opportunity to initiate a discussion about, and ultimately, a planning process to incorporate industrial land use preservation into existing smart growth programs. The Toledo Metropolitan Area Council of Governments in Toledo, Ohio has also successfully incorporated freight into its transportation planning activities by not having a "freight versus passenger" mindset, rather, by identifying integrated transportation issues and determining solutions for the region as a whole.

#2 - Stakeholder Engagement

By forming partnerships with goods movement stakeholders in the private and public sectors and involving them in the metropolitan planning process, planners are proactively working toward addressing goods movement issues. Many of these partnerships have been defined to cross different levels of governments and include neighboring jurisdictions. This includes partnerships among governments – Municipal, Regional, State and Federal – and Inter-organizational partnerships that work toward common and agreed-upon goals that are essential to making progress and achieving planning and implementation goals.

Two key factors when engaging stakeholders are critical to success:

- Multiple stakeholders—private, public, and community—are impacted by freight issues and/ or could potentially play a role in developing their solutions; and
- No single stakeholder is capable of completely solving the most acute freight issues affecting metropolitan areas.

As such, the most effective processes of engagement are cooperative, including all of the above stakeholders working together to identify appropriate solutions to problems. "Some key stakeholders to bring to the table include large and prominent shippers, carriers, and receivers; the corresponding trade groups that represent key freight agents (local trucking associations, warehouse associations, retail sector groups, restaurant associations, and the like); the local Chamber of Commerce; public agencies with jurisdiction in the areas that impact the freight system; civic or neighborhood groups; researchers who could play a role in both research and outreach; as well as any other companies with the potential to contribute to the solution."[2]

Best practices include the importance of developing a consensus with stakeholders and gaining support (buy-in) from the same at the outset of metropolitan freight planning initiatives. This not only makes freight planning more sustainable and practical, but also reduces conflict in the future. For example, if freight stakeholders are negatively impacted or inconvenienced by the freight planning process, then early engagement can help them understand the purpose and benefits to their operations (e.g., if they understand how goals and the vision for the freight plan were developed and why).

Key points / best practice for stakeholder engagement:

[2] TRB NCFRP Report 33 "Improving Freight System Performance in Metropolitan Areas" (May 2015), page 7. http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_033.pdf

- Designate a “freight person” at the regional agency to become the focal point of communications between the public and private sectors;
- Establish a “Freight Advisory Committee” (FAC) to become a forum for discussion of freight issues, with membership from the public and private sector;
- Establish a “Technical Advisory Committee” (TAC) for public-sector staff from various regional agencies (and jurisdictions) to discuss subjects that impact freight activity and to contribute to more harmonized policy development that considers freight issues; and
- Educate elected officials about freight, so that they can, in turn, integrate freight into broad transportation planning processes, as well as explain the importance of freight in the messaging to the public.

Examples of best practices include inviting elected officials to site visits of key freight facilities to see how important the freight system is to the urban area and their constituents. Kansas City’s SmartPort and Detroit’s Intermodal Freight Terminal (DIFT) are good examples of best practices in stakeholder engagement. The Kansas City SmartPort is an economic-development organization supported by both the public and private sectors with the purpose of improving the region’s freight access and mobility and enhancing the region’s position as a leading logistics hub. For Detroit, in planning for the DIFT, the early active involvement of the private-sector freight industry was crucial in developing advocates for the project and moving the project forward. The Roberts Bank Rail Corridor in Vancouver also provides a good example of best practices in stakeholder engagement, where strong collaboration between local, regional, and federal governments and private industry helped identify and fund the ideal locations for road and rail improvements.

#3 - Engage Private Sector

The objectives of the private sector (e.g., shippers and receivers) involved in metropolitan freight planning are different from the public sector. Private companies are interested in maximizing profits, while public agencies are interested in increasing economic benefits for society as a whole (and their regions) and reducing negative externalities. Private sector players are not typically involved in public transportation policy development, but best practice suggests they should be for a number of reasons:

- Private companies are equipped to identify the infrastructure bottlenecks and other (e.g., policy/regulatory) impediments to improving the efficiency of freight flows on transportation systems, given they are actively involved in moving and receiving freight on a day to day basis;
- Private companies may have innovative ideas and solutions to offer with respect to freight delivery approaches (e.g., exactly how and when off-peak delivery can work), as well as able to identify what regulations would have a very detrimental impact on their operations (with downstream economic impacts);
- The general public (and therefore policy makers) will benefit from improved efficiencies in freight flows through trickle-down improvements in economic activity; and

- Engaging the private sector in freight planning will likely include consideration of all types of businesses (e.g., small, medium, large) as well as a range of vehicle classes (e.g., delivery vans, small trucks, large trucks) and all freight modes (e.g., truck, air, rail).

Both the Delaware Valley (Philadelphia) region and Atlanta regions provide good examples of best practices in engaging the private sector. The Delaware Valley Regional Planning Commission's Freight Forward Improvement Program encourages private sector stakeholders to propose quick-fix improvement projects such as grade-crossing resurfacing and traffic signal timing adjustments, which can result in immediate benefits to the region's freight efficiency. For Atlanta, in developing the Atlanta Strategic Truck Route Master Plan, incorporation of the private sector in the planning process was key to understand the freight issues on the existing roadway network, and to identify the innovative solutions that could be implemented to develop a more logical regional truck route network and improve overall freight operations in the region.

More info on stakeholder engagement from: FHWA document "Engaging the Private Sector in Freight Planning" (Wilbur Smith Associates and S. R. Kale Consulting 2009).

#4 - Define (limit) Freight Issues/ Challenges

At the outset, the region should define the priority freight issues from a long-list of potential issues. There will be many competing issues and too broad a focus in the freight planning process will result in overly complicated planning and potentially spreading resources too thin. Too narrow a focus and some important issues could be left out.

> "One benefit of engaging stakeholders is that doing so encourages identification and examination of problems from multiple vantage points. The initial engagement of stakeholders and consensus-building efforts help ensure that each problem is carefully vetted, clearly defined, and agreed on so that all parties understand what the process will—and will not—address."[3]

To define freight issues and challenges, the Southern California Association of Governments (SCAG) in the Los Angeles region worked with other public and private stakeholders to develop a freight action plan, which helped increase the visibility of freight issues in the region and guided the direction of freight planning early in the process. Similarly, the Houston-Galveston Area Council's goods movement study notes the importance of designating a "Freight Significant Network" used to identify which portions of the freight system are most critical to freight mobility and the region's economic competitiveness.

#5 - Identification of Root Causes of Freight Issues

Identifying and understanding the reason for freight issues and problems and addressing the root causes of these problems is a critical factor in the development of freight plans. For example, truck idling frequently is the result of the inability or unwillingness of

[3] TRB NCFRP Report 33 "Improving Freight System Performance in Metropolitan Areas" (May 2015), page 7.

businesses (receivers) to accept deliveries. This type of truck idling issue in the vicinity of large buildings is frequently aggravated by delivery-time restrictions that shorten the period of time when deliveries can be made."[4] These constraints and restrictions result in roadway bottlenecks, delays, and congestion, as well as increased emissions. So understanding the freight impacts of congestion on roadways that could be traced to truck delivery idling (as the root cause) is a key policy discussion in the freight planning process. This example, among many others, will need to be assessed and understood to help agencies define freight issues and the potential mitigation strategies to address those issues. More information on identifying "root causes" of freight problems available from *NCFRP Report 14: Guidebook for Understanding Urban Goods Movement (2012).*

Again, consultation with stakeholders has been used by regional agencies as an effective strategy to identify why the problem is happening in the first place (e.g., the root cause). Key tasks involved in this process include:

- Stakeholder outreach and agency coordination; and
- Data collection, assessment and analysis.

The Lancaster County (Pennsylvania) Transportation Coordinating Committee's (LCTCC) Transportation Improvement Plan and the Houston-Galveston Area Council's goods movement study provide good examples of best practices in identifying the root causes of freight issues. The LCTCC recommended developing a thorough understanding of the freight movements in their area in order to make better, more informed decisions about potential freight improvement projects and solutions. The Houston-Galveston Area Council identified the need to work with partners to identify freight hotspots and mitigate existing system design deficiencies on the regional freight system.

#6 - Manage and Address Land Use Compatibilities

Because of their typically large physical sizes ("footprint") and need for reliable, high-capacity transportation networks, logistics-oriented facilities or land uses seek to locate where land is relatively inexpensive and access to highways and/or intermodal facilities is excellent. As urbanized areas become more densely developed and highway congestion grows, logistics-oriented firms often relocate some operations into "greenfield" areas that affect formerly rural lands and communities. Some agencies in the U.S. and Canada have developed land use and development regulations and guidance that support appropriate buffer zones between logistics-intensive land uses and other, incompatible land uses such as residential or commercial mixed-use. These agencies also have facilitated the clustering of logistics-oriented businesses in a manner that optimizes the use of appropriate transportation facilities.

Both the Peel Region (Toronto) and Orlando metropolitan area provide good examples of best practices in managing and addressing land use compatibilities in combination with the freight network. An innovative strategy from the Peel Region involved developing an economic case for a freight village, which consolidated all freight activity in a defined area, thus reducing truck volumes on some roadways. The Orlando metropolitan area

[4] TRB NCFRP Report 33 "Improving Freight System Performance in Metropolitan Areas" (May 2015), page 7

also provided lessons on integrating freight planning and land use planning by managing goods movement growth so that incompatible land uses are kept apart from each other, thus facilitating safer and more efficient freight transportation mobility and access.

#7 - Use Pilot Schemes to Test Solutions

The implementation of a public-sector change that affects freight activity should ideally only proceed with some certainty that the overall benefits outweigh any negative costs. Implementing a pilot to help assess the extent of this balance can be evaluated. Pilot schemes can be used by regions to enable the public agency to adjust (or cancel) the initiative at the end of the pilot scheme, based on feedback from stakeholders that are impacted and other data analysis. In addition, pilot testing can demonstrate to the private sector that public agencies are interested in proceeding carefully with the implementation of new ideas, and implementing only those that pass the pilot tests.

Atlanta and New York City provide examples of using pilot schemes to test potential freight solutions. During the 1996 Summer Olympics, Atlanta implemented a temporary off-hour truck delivery program to help mitigate projected traffic congestion levels. By working with the private sector freight industry, Atlanta was able to plan and implement its daytime delivery ban. However, it proved too challenging to continue the off-hour delivery program in the long–term, and truck deliveries mostly returned to daytime trips after the Olympics. The Hunts Point community in New York City implemented a “clean trucks” program that provided a monetary incentive to truck owners for switching to cleaner freight vehicles. The purpose of this program was to encourage the use of freight vehicles that produce fewer emissions.

#8 - Include Transportation Demand Management (TDM) in Freight Planning Process

Transportation Demand Management (TDM) is typically associated with addressing policy objectives such as energy conservation, environmental protection, shift to alternative modes, and passenger travel congestion reduction. TDM policies historically have focused on personal travel, including “smarter” or “more efficient” transportation system projects specific to commuter ridesharing, telecommuting, and trip reductions. Increasingly, however, public agencies at the federal, state and local level are trying to apply TDM to goods movement and freight policy.

“TDM can play a vital role in mitigating the interaction between trucks and cars by both managing the demand for goods movement during peak congested periods and by reducing overall personal vehicle demand when and where goods movement is a priority.” [5]

Some examples of the steps public agencies can take to advance TDM for goods movement include the following (direct quote from FHWA report[6]):

- “Seek ways to apply demand management to goods movement, such as real-time information, ecodriving, peak period pricing, mode shift, etc.;

[5] Page 51. FHWA http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf

[6] Page 52. FHWA http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf

- Incorporate the strategies and related objectives of TDM that help address a goods movement policy into the general planning factors in the transportation planning process;
- Ensure that congestion management processes incorporate those TDM strategies that work to improve goods movement so that they work in concert with other strategies to maximize the efficiency potential for the transportation system;
- Incorporate TDM strategies that support goods movement enhancement as potential solutions in Major Investment Studies (MIS) to help address the factors influencing project solutions while efficiently and effectively meeting the needs of the community; and
- Ensure that goods movement TDM strategies are part of the public involvement dialogue to gain the broad support of the community."

TDM strategies include:

- "Improve rail and marine transportation infrastructure and services to make these modes more competitive with trucking;
- Organize regional delivery systems so fewer vehicle trips are needed to distribute goods (e.g., using common carriers that consolidate loads, rather than company fleets);
- Use smaller vehicles and human powered transport, particularly for distribution in urban areas;
- Implement fleet management programs that reduce vehicle mileage, use optimal sized vehicles for each trip, and ensure that fleet vehicles are maintained and operated in ways that reduce external costs (congestion, pollution, crash risk, etc.); and
- Change freight delivery times to reduce congestion.

Create pricing and tax policies that encourage efficient freight transport." (page 51, http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf)

Portland Metro's Metropolitan Transportation Improvement Program and Seattle's FAST Corridor project provide good examples of including TDM in the freight planning process. Portland identified TDM policies and maintenance-and-operations-focused projects as a strategy for increasing the efficiency of the region's freight network. Similarly, the FAST Corridor partnership has recently shifted its focus away from supply-side projects to demand-side projects such as providing real-time traffic information to truck drivers, because it is a more cost-effective way of expediting freight movement.

#9 - Use Performance Measures

Performance measures are becoming part of the standard planning process for states and regions in the U.S., and have been growing in use over the past two decades or more. Measures are developed to gauge the degree to which goals and objectives are achieved, and are linked directly to the vision, goals, and objectives on long-range transportation and freight planning. MAP-21 (and now the Fixing America's Surface

Transportation Act or "FAST" Act) requires undertaking of systematic performance measurements to determine the impacts of the strategies, programs, and funding used to address freight issues in the planning process. Performance measures should be directly related to a single objective; easily quantifiable; and able to gauge the entire range of levels of achievement (e.g., using a scale, not just "achieved" or "not achieved"). Examples of performance measures include safety, parking, use of alternative fuels, or reliability. Performance measures are significant to the freight planning process because they can evaluate how future conditions might affect system performance, and provide early warning signs of freight problems that may need to be addressed and planned for in the future.

More details on best practices for performance measures (including on MAP-21) on pages 10-11 of NCFRP Report 33.[7] See also Chapter 3 of FHWA "Integrating Demand Management into the Transportation Planning Process: A Desk Reference" (2012).

Both the Peel Region's (Toronto) Goods Movement Strategy and Chicago's Regional Environmental and Transportation Efficiency Program, also known as the Chicago CREATE project, provide good examples of best practices in using performance measures for evaluating the efficacy of the freight system. The Peel Region's plan included performance measures such as shipper delay costs and travel time delay, which could be useful in guiding future planning decisions. Although Chicago did not have freight-specific performance measures, the CREATE project developed tools (specific to the CREATE project) for measuring freight mobility and performance over time.

[7] http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_033.pdf

3 Freight Planning Initiatives

A number of public sector initiatives / policies are being used by regional agencies to address freight issues in urban areas. The “initiatives” that agencies can use are “organized as a continuum with supply initiatives at one end, demand-related initiatives at the other, and operational and financial strategies in the middle”. Each of these initiatives and association actions are often considered in more detail in future. These examples (Figure 1) provide planning programs and policies that could be useful to support the Anchorage FMS.

3.1 Infrastructure Management

Infrastructure management strategies involve infrastructure improvements that are designed to enhance freight mobility. This typically includes new and upgraded infrastructure, or more minor improvements such as the removal of geometric constraints at intersections. For example, in addressing freight travel time reliability concerns, the Orlando metropolitan area has planned for the development of freight villages. Freight villages link land use planning to transportation planning by clustering all freight-intensive activity in specific areas. This can be relevant to Anchorage as AMATS looks to relieve traffic congestion and freight routing issues in the region. The Orlando metropolitan area approach to infrastructure management is an example of integrating freight concerns in the transportation and land use planning process as a means of balancing the efficiency of the freight system with environmental and livability concerns.

3.2 Parking /Loading Areas Management

Parking and loading areas management includes initiatives that make better use of space and are implemented to improve the way freight vehicles park, load, and unload (both on-and off-street) in urban areas. New York City provides a good example of successful freight parking and loading management. The city enacted parking regulations and increased the capacity of parking and loading areas on several congested city streets, which allowed for a better balance of goods movement with other street uses. This can be relevant to Anchorage as AMATS looks to find solutions to the region’s lack of adequate freight parking and loading zones in the downtown area.

3.3 Vehicle-related Strategies

Vehicle-related strategies include regulations and technological advancements that seek to reduce the negative externalities produced by freight vehicles upon the environment. This includes initiatives to replace older trucks with cleaner, reduced-emissions vehicles, or initiatives to regulate noise pollution. New York City has used emission standards to help promote the usage of freight vehicles that produce fewer environmental impacts. The Hunts Point community in New York City has a voluntary clean truck program that allows truck owners to receive funding assistance for replacing older trucks with new diesel or alternative-fuel trucks. Although many of the freight vehicles being used in Anchorage are already diesel engines which emit lower levels of carbon monoxide, vehicle-related initiatives such as these can still be used by AMATS to remain in

consistency with the general Anchorage freight planning goal of improved environmental quality.

Figure 1: Urban Freight Initiatives[8]

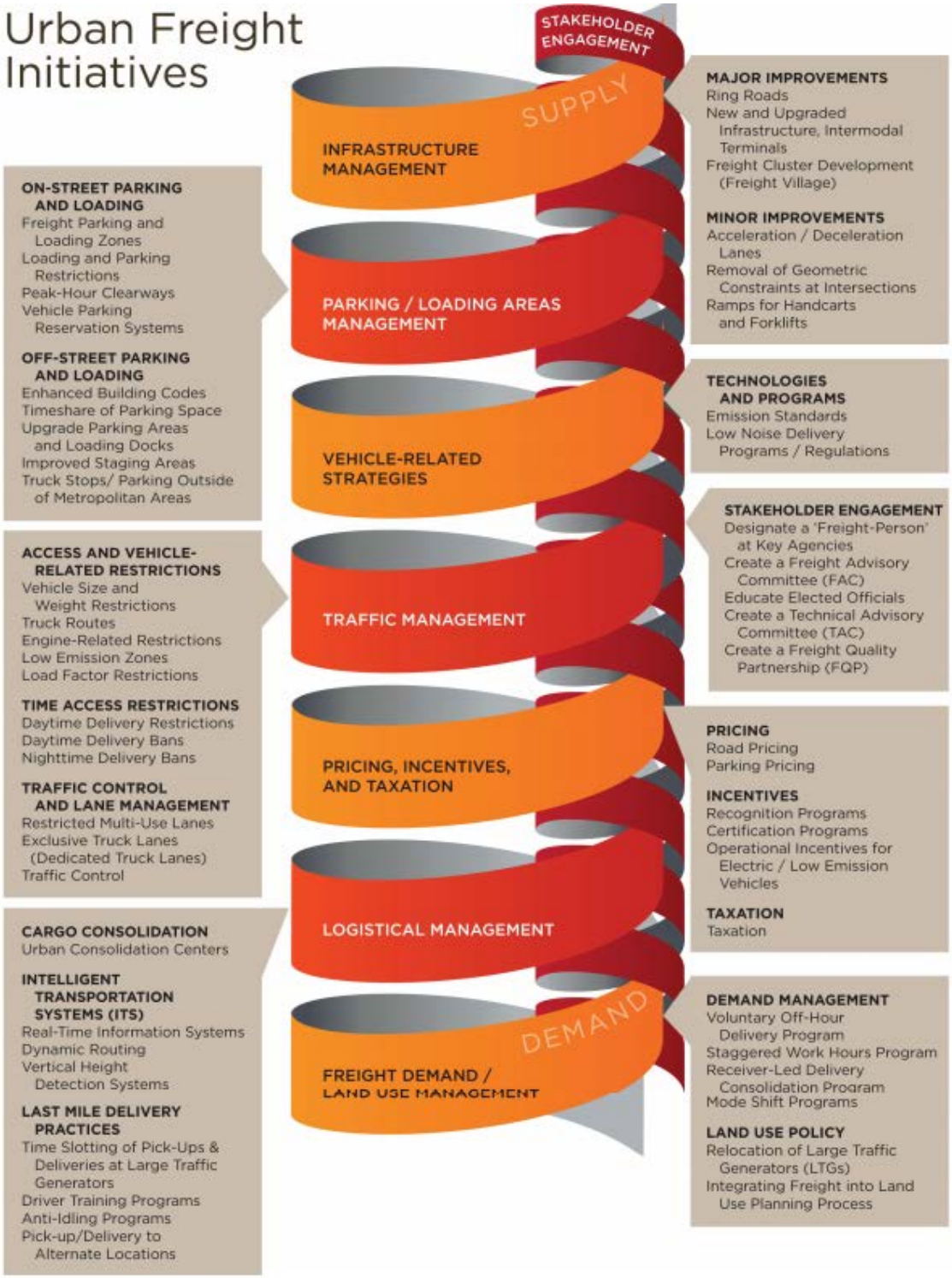

Figure 2. Urban freight initiatives.

[8] Page 18. NCFRP http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_033.pdf

3.4 Traffic Management

Traffic management initiatives are designed to improve freight traffic flow using traffic control and engineering strategies. This can include weight and time access restrictions, or the implementation of dedicated truck lanes. To improve freight traffic flow, the state of Georgia explored the implementation of "truck-friendly" lanes as traffic management strategy. The "truck-friendly" lanes strategy proposes route improvement elements such as widening existing shoulders to accommodate trucks, improving key intersections, and increasing overhead signage along corridors. This type of initiative can be relevant to Anchorage as AMATS plans to address truck movement issues at intersections along its freight routes.

3.5 Pricing, Incentives, and Taxation

Pricing, incentives, and taxation include strategies to manage demand, minimize the negative externalities produced by freight activity, and improve traffic flow using financial mechanisms. These mechanisms include tolling or incentives for using low-emission freight vehicles. In the New York-New Jersey region, a time-of-day toll pricing initiative was enacted in 2001, providing a discount on off-peak tolls on certain facilities as a means of mitigating traffic congestion. This type of strategy can be useful in reducing freight traffic by encouraging better usage of the existing capacity. As freight volumes are expected to increase in Anchorage, more aggressive demand-side initiatives such as road pricing may be considered by AMATS in order to encourage more efficient use of the Anchorage road network.

3.6 Logistical Management

Logistical management initiatives seek to distribute last-mile delivery more efficiently using strategies such as consolidation of freight terminals, or implementation of intelligent transportation systems (ITS). The Houston-Galveston region has established an ITS program that includes real-time congestion and traffic data that could be useful to freight industry stakeholders, and the Houston-Galveston Area Council is planning on developing a concept of operations for a freight-specific ITS program. AMATS can also apply this logistical management strategy as a means of improving the Anchorage area's highway safety and freight mobility through the use of technology.

3.7 Freight Demand/Land Use Management

Freight demand and land use management initiatives focus on shifting the demand for freight deliveries or integrating freight into the land use planning process for purposes of improving freight efficiency. Similar to Orlando, a freight demand/land use management initiative from the Peel Region in Toronto incorporates goods movement issues into the land use planning process by developing freight villages. This facilitates safer and more efficient freight mobility and access while protecting residential and business quality of life. This type of initiative is relevant to AMATS because much of the freight delivery in Anchorage is time sensitive. Strategies such as freight villages can address this issue by ensuring more efficient and cost-effective freight delivery.

3.8 Stakeholder Engagement

Stakeholder engagement initiatives are designed to more effectively identify freight issues and solutions by establishing partnerships between both public and private freight stakeholders. Many different U.S. cities and regions have done a good job of incorporating stakeholder engagement strategies into their freight plans. In particular, Chicago CREATE, Detroit's DIFT, and Kansas City's SmartPort provide examples of successful partnerships between public and private stakeholders that AMATS can look to, to help identify the best possible solutions for Anchorage. Effective methods of stakeholder engagement conducted by the various regions include early interaction with the private sector to identify/develop project advocates, partnering with public and private freight industries to identify freight issues, and creating a freight advisory committee to facilitate continued discussion of freight needs.

4 Draft Performance Measures

Over the long-term, performance measures will be used by AMATS to monitor and gauge the success of the FMS strategies. Below are some sources with freight performance measures that can be used in metropolitan freight planning that we have reviewed and identified potential draft performance measures for implementation in the FMS.

- FHWA "Integrating Demand Management into the Transportation Planning Process: A Desk Reference" (2012). See Chapter 3, and in particular, Section 3.6 – Goods Movement and Freight. http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf
- NCFRP Report 10 – Performance Measures for Freight Transportation (2011). See Appendix A (Summaries of Freight Performance Information for National Report Card Performance). http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_010.pdf NOTE: these are not specific to metropolitan freight.

A number of "best practices" exist with respect to measuring performance and freight-related performance measurements more specifically. The best practices in performance measures development summarized below will be used to support the Freight Performance Management Framework and Measures analysis prepared later in Task 7 of the Anchorage FMS.

- **Don't re-invent the wheel.** Agencies should begin with what is already available in terms of performance measurement frameworks and associated data sets and adapt or build on them as required. For AMATS, using and building on performance measures and approaches of the on-going Municipality Of Anchorage Congestion Management System and AMATS Status of the System Report and the 2035 Metropolitan Transportation Plan. Using information from the Alaska Department of Transportation and Public Facilities (DOT&PF) Statewide Long-Range Transportation Plan and Alaska State Freight Plan (currently underway) should also be considered.
- **SMART and KISS Principles.** Agencies should choose performance measures that are Specific, Measurable, Attainable, Realistic, and Timely (SMART). Performance measures should also be in the spirit of Keeping It Short and Simple (KISS). Practitioners should focus on the vital measurements of relevance to their targeted objectives, and avoid getting buried in measuring metrics. A performance-based, objectives-driven approach to planning for operations is based on the concept that "what gets measured gets managed." However, this needs to be balanced against the complexity and cost of measuring too much.
- **Focus Performance Measures on Relevant Topics.** Agencies should focus on identifying performance measures that match the areas that the agency has some influence over and/or interest in. In the case of the AMATS FMS, performance measures should be illustrative of performance specific to the *freight* industry, not all sectors of the economy. They should be related to areas

that AMATS and its partners can influence, for example, through support to projects that facilitate or regulate freight activities.

- **Understand the role and distinguish between Freight Indicators and Freight Performance Measures.** Freight indicators provide an indication of economic activity in the freight sector (e.g., trucking freight rates, mode share, or tonnage), while Freight indicators assist stakeholders in *understanding* the performance of the freight transportation system, but not necessarily in measuring the system's performance. For example, demand for trucking services (freight indicator) is much more affected by the state of the economy than by improvements in highway infrastructure. In contrast, the percentage of total crashes that involve trucks is a performance measure that can be used directly by agencies to inform decision-making and adjust investments.
- **Harness and Use Big Data, Carefully**. Data on traffic flows can be tracked like never before with the advent of cost-effective electronic tagging and Global Positioning System (GPS). With Big Data there will potentially be a step-change in the availability of freight data, allowing many existing gaps to be plugged and permitting macro-level analysis of freight flows and operations at a higher degree of detail. A wealth of data is currently being collected in most regions by transportation system operators who run systems that keep track of real-time travel information. Intelligent Transportation Systems (ITS) components, in particular, such as toll tag readers and transponders, video detector systems, and traffic management systems used to provide travelers with real-time travel information, are used to measure performance of the transportation system on an ongoing basis.
- **Consider Reporting Requirements and Benefits of Publishing Performance Measurement Results to Stakeholders.** Agencies should consider the future reporting of the performance measures and how information can be provided to stakeholders interested in performance of the transportation system. An example is the use of dashboards or "report cards" that summarize performance with succinct and instantaneous assessment of performance. The data and analysis supporting the succinct measures should also be accessible for users to drill down into details and answer more nuanced questions, or to explore trends in further detail.

A draft set of freight performance measures that will be used as the starting point for the Task 7 analysis is shown below in Table 2.

Table 2: Examples of Freight Performance Measures used in Regional Freight Planning

Freight Performance Measurement Category	Freight Performance Measures / Definition
System Performance - Freight Demand	• Forecasted rate of growth for all modes of freight • Truck freight forecast • Rail freight forecasts

Freight Performance Measurement Category	Freight Performance Measures / Definition
	• Water freight forecasts • Air freight forecasts • Rate of growth in containerized imports/exports • Transportation Services Index (TSI): USDOT Bureau of Transportation Statistics which measures movement of freight and passengers nationally by for-hire transportation (trucking, air, rail, water, pipeline)
System Performance - Freight Efficiency	• National Highway System (NHS) travel speed (urban and rural) • Annual Hours of Truck Delay (AHTD) – travel time above congestion thresholds in units of truck vehicle-hours on Interstate Highway System • Truck Reliability Index (RI_{80}) – Ratio of total truck travel time needed to ensure on-time arrival (e.g. observed or preferred travel time) • Trend line of top 10 highway freight bottlenecks • Composite Class I Railroad speeds • Rail freight market share • Cost of logistics as a % of GDP (from industry surveys/estimates)
System Condition	• NHS pavement conditions: Interstate/non-Interstate pavement in Good, Fair and Poor Condition based on International Roughness Index • NHS bridge conditions: o % of NHS/non-NHS Deck Area on Structurally Deficient Bridges as a % of total bridge deck area o % of National Bridge Inventory (NBI) Bridges by need category (routine or cyclic maintenance, preventative maintenance, rehabilitation & replacement) o % of NBI Bridge Deck Area by need category (% of NBI highway bridge deck area with needs for routine or cyclic maintenance, preventative maintenance, rehabilitation & replacement) • Condition of NHS intermodal connectors
System Safety	• Truck injury and fatal crashes: o Number of serious injuries o Serious injury rate (# of injuries divided by VMT) o Number of fatalities o Fatality rate (# of fatalities divided by VMT) • Highway/rail at-grade crashes
System Environmental Impacts (Air Quality)	• Freight-related greenhouse emissions. Use Annual Hours of Delay (AHD) and Reliability Index (RI80) • Other emissions: VOC, NOX,CO, SOX, PM

Key Sources: NCFRP Report 10: Performance Measures for Freight Transportation, 2011. http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_010.pdf; AASHTO Standing Committee on Performance Management http://scopm.transportation.org/Pages/default.aspx

5 Case Studies of Best Practices

In our assessment of potential metropolitan freight plans relevant to the Anchorage region and the development of the FMS, we reviewed each of the 16 plans we reviewed as part of this White Paper. Rather than focusing on just three case studies, we identified several case studies including freight plans with components likely applicable to Anchorage.

5.1 Seattle-Washington FAST Corridor

The Puget Sound (Seattle) region is a major North American gateway for trade with Pacific Rim countries and is the major economic engine for Washington State. The **F**reight **A**ction **ST**rategy for the Everett-Seattle-Tacoma Corridor (FAST Corridor) public-private partnership was established to move needed goods and support port operations on the highways and rail lines that sustain the maritime international trade corridor through the Puget Sound region. Since 2002, nine FAST Corridor projects, costing a total of $568 million have been completed by the Partnership. In particular, these projects have helped to reconnect neighborhoods across highly-used railroad tracks, have improved safety for resident/drivers, and have improved the efficiency of freight flows between the port and inland points. In addition, the implemented projects support urban centers by reducing conflicts between urban growth and the growth of freight traffic; improve truck mobility to industrial centers by increasing capacity and travel time reliability along these major arterials; and improve emergency response by removing road barriers to fire and medical emergency services.

The FAST Corridor is a partnership of 26 local cities, counties, ports, federal, state and regional transportation agencies, railroads and trucking interests, intent on solving freight mobility problems with coordinated solutions. They have shared information and funding resources —sometimes shifting funds from projects that were delayed to those that were ready to begin — to benefit the program and region as a whole. Because of this approach, projects were built which otherwise might never have been completed.

An important aspect of FAST was that the region developed the strategy to proactively enhance regional freight mobility instead of waiting to address challenges when freight volumes increase and negatively impact the multimodal freight transportations system.

Potential Relevance to Anchorage

FAST provides best practice elements related to Stakeholder Engagement, Engaging the Private Sector, Defining (limiting) Freight Issues/Challenges, Identifying the Root Causes of Freight Issues, and Managing and Addressing Land Use Compatibilities. Anchorage is a port city with rail and highway connections that run through the city. Some of the issues around challenges of at-grade crossings that affected Seattle-Washington area could be of relevance to Anchorage as its population grows. The FAST Corridor approach is an example of maintaining and supporting essential goods movement activities in a manner that minimizes conflicts with other non-freight transportation activities and land uses. Freight economic development corridors are used in FAST as a way to identify and map supply chains, system conditions and capacity issues. Identifying corridors can help determine alternate routes during disruptions and first/last mile connections. Freight

development corridors can be used to help Anchorage identify some solutions to challenges.

Further information:

http://www.psrc.org/transportation/freight/fast

http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_033.pdf

5.2 Chicago CREATE

CREATE is a first-of-its-kind public private partnership (PPP) between U.S. DOT, the State of Illinois, City of Chicago, Metra (regional transit provider), Amtrak, and the nation's freight railroads. CREATE is investing billions in critically needed improvements to increase the efficiency of the region's passenger and freight rail infrastructure and enhance the quality of life for Chicago-area residents. CREATE will reduce train and auto delays throughout the Chicago area by focusing rail traffic on four rail corridors that will be improved to handle passenger and freight traffic more efficiently. The work includes 70 projects which were identified, evaluated, and prioritized by the program for implementation, including:

- 25 new roadway overpasses or underpasses at locations where traffic (auto, pedestrian, bicycle, bus) currently crosses railroad tracks at-grade level;
- new rail overpass or underpass projects to separate passenger and freight train tracks from the roadway system;
- 36 freight rail projects including extensive upgrades of tracks, switches and signal systems;
- A number of viaduct improvement projects to existing structures in Chicago;
- A number of grade crossing safety enhancements including improvements to existing railroad grade crossings throughout the region; and
- Common Operational Picture (COP) – integration of information from dispatch systems of all major railroads in the region into a single display.

Selecting the improvements for CREATE was a collaborative process between the freight railroads, State of Illinois Department of Transportation, City of Chicago Department of Transportation, Metra and Amtrak. Input on grade crossings and traffic congestion was considered from the Illinois Commerce Commission and Chicago Area Transportation Study. For area residents, CREATE means reduced traffic delays, shorter commute times, better air quality, and increased public safety. For workers and businesses, it means more jobs and economic opportunities.

Potential Relevance to Anchorage:

CREATE provides an excellent example of how the partnership between public and private stakeholders with competing interests (e.g., Implementing Innovative Stakeholder Engagement and Engaging the Private Sector) can be used to improve communication and coordination between key public and private stakeholders to enhance the freight transportation system of a region. It focused on rail / road interface projects and methods

to better address passenger and freight rail conflicts using the same rail lines. CREATE provides ways in which to alleviate these conflicts. For example, freight and passenger trains in the Chicago area operate on the same tracks, which often resulted in schedule conflict and delay. Freight railroads deferred the right of way to passenger rail services (e.g., Amtrak and Metra) by protocol in peak hours of the day. In 2013 trains in Amtrak had more than 950 hours of delay in Chicago due to interference from freight, commuter, and other Amtrak trains.

Further information:

http://www.createprogram.org/index.htm

5.3 Roberts Bank Rail Corridor (Vancouver, BC Area)

Completed in 2014, the Roberts Bank Rail Corridor Program in Metro Vancouver (British Columbia) is a comprehensive package of road and rail improvements along a 40-mile corridor, funded by collaboration of twelve partners representing local, regional, provincial, and federal governments as well as private industry. The Program was designed to enhance the quality of life in communities through which freight rail traffic travels to and from Port Metro Vancouver terminals at Roberts Bank in Delta, and to improve the safety and efficiency of both the road and rail networks in these communities.

Potential Relevance to Anchorage:

Similar to CREATE and FAST, this program includes an example of a port, road, and rail interface passing through an urban center, with strong partnership involvement (e.g., Implementing Innovative Stakeholder Engagement and Engaging the Private Sector) as well as a best practices example of Managing and Addressing Land Use Compatibilities.

Further information:

http://www.robertsbankrailcorridor.ca/challenges-solutions

5.4 Peel Region (Toronto) Goods Movement Strategy

The Region of Peel (adjacent to the City of Toronto), recently launched their Goods Movement Strategy, which provides a good example of best practices in planning and investment strategy including the development of standard freight guiding principles for the region policy-makers to follow. The Strategy included the implementation of three tiers of roadway facilities and an accompanying investment and prioritization framework, taking into consideration both benefits to goods movement as well as economic benefits to the community as a whole. The Strategic Goods Movement Network (SGMN) connects all points on the network with each other, especially to major goods-generating activity centers and intermodal terminals. The network supports Peel's goals for economic vitality, mobility for people and goods. The strategy contains a land use typology which was linked to the freight priority network. This approach provided public agencies that control land use planning information on how to direct developments so that that will benefit both freight users and shippers. A network strategy is developed

through a synthesis of best practices, identification of barriers, working with stakeholders, planning for implementation and performance monitoring.

Potential Relevance to Anchorage:

This Plan provides a strong example of combining land use planning and freight planning (e.g., Managing and Addressing Land Use Compatibilities and Integrating "Mainstream" Goods Movement into the Overall Transportation Planning Process). This Plan also provides a good example of Using Performance Measures to develop a planning and project prioritization process designed to prepare a financially responsible goods movement strategy.

Further information:

https://www.peelregion.ca/pw/transportation/goodsmovement/pdf/peel-final-technical-report.pdf

5.5 Orlando Metropolitan Area

Over the past several decades, Central Florida has experienced heavy population growth and significant urban sprawl. As a result, traffic congestion and aging transportation infrastructure are growing regional concerns. The region's Metropolitan Planning Organization (Metroplan Orlando) identified a need to proactively plan for accommodating increasing freight activity in a manner that would protect the "quality of the experience" for tourists (a major driver of the economy), residents, and businesses.

The original Orlando Region Freight, Goods, and Services Mobility Strategy Plan (FG&SMSP), initially completed by Metroplan in 2002, suggested that, with the rapid parallel, and often uncoordinated, development of industry, logistics-intensive land uses, and residential/urban sprawl, the region had an opportunity to proactive plan to effectively segregate and buffer incompatible land uses from each other, thus facilitating more efficient and safe transportation mobility and access. The Plan recommended that local jurisdictions develop a warehousing and logistics (WL) zoning category to ensure appropriate design standards for the development of Freight Villages or similar sites. Intersection signal timing, roadway and intersection geometric design standards, loading dock requirements, and other factors that affect goods movement were also regulated in a WL zone.

One outcome (of potential relevance to Anchorage) of the strategy was that the City of Orlando began implementing new zoning classifications in the region south of the airport. For example, the City developed an "airport support" WL zone as part of its *Southeast Sector Plan*. The airport support zone provides sufficient infrastructure to support activities vital to the operation of the airport and the efficient movement of goods into and out of this area.

The Metroplan goods movement planning process has included active outreach to key stakeholders in the public and private sectors. From the public sector, these included local, county and state-level planners, economic development officials and politicians as well as port, airport, highway operating, and transit authorities. From the private sector, stakeholders include trucking firms, 3rd-party logistics providers (3PL), Class I and

regional railroads, warehousing and distribution companies, tourism and convention industry representatives, and real estate and development firms and officials.

Potential Relevance to Anchorage:

Managing goods movement growth to both support the regional economy and protect residential and business quality of life in a developing region of urban, suburban, and rural areas. This Plan considers the following freight planning best practices elements including the integration of land use planning with freight management planning (e.g., Managing and Addressing Land Use Compatibilities) and active outreach with the public and stakeholders alike (e.g., Implementing Innovative Stakeholder Engagement and Engaging the Private sector).

The Plan also identifies locations of freight carriers, air transportation and courier service clusters within the project area. The Plan goes in depth in identifying various services that may have set schedules such as major truck routes to land fill sites and transfer stations. Identifying regular services which may consist of mail delivery and solid waste corridors that is important for any efficient and healthy community can be used as a strategy for Anchorage in targeting improvements for the local transportation network.

Further information:

http://www.metroplanorlando.com/files/view/freight_goods_and_services_mobility_strategy_plan_june_2002.pdf

5.6 Portland, Oregon Freight Master Plan

Portland, Oregon has historically been one of the nation's main freight hubs on the west coast, with connections to the interstate highway network, rail network, marine terminals, and an international airport. In 2002, it was projected that the demand for freight tonnage into, out of, and within the Portland area would be doubled by 2030. Much of this freight movement would occur via trucks. With the anticipated freight demand increase and the region's significant economic dependence on freight movement, Portland identified the need to make sure that its transportation network could both support increased freight movement/demand and maintain a balance between freight and other transportation modes. In 2006, Portland completed a Freight Master Plan to address these needs among other freight-related mobility issues.

To improve freight mobility and efficiency as well as achieve transportation system balance, the Plan recommended that the city should develop a freight classification system that would specify the function and design of its transportation facilities. The Plan identifies a "freight district" as an industrial zoned area where all streets within the district provide local truck circulation and access. The Plan also identifies "truck access street" routes as streets used for distribution of trucking services to commercial and residential uses. This specific breakdown of the freight classification provides jurisdictions the ability to control and ensure desired traffic conditions and performance levels on the transportation system. Essentially this type of strategy allowed the region and its jurisdictions to efficiently manage freight growth while maintaining regional livability.

Potential Relevance to Anchorage:

Anchorage is a port city with expected future increases in freight volume, which suggests increased truck traffic on the region's roads. Portland's strategy to improve freight mobility by classifying streets and guiding truck movements can be relevant to Anchorage as it seeks to create a land-use-based transportation system that allows for more efficient goods movement without adversely impacting the community (e.g., Integrating "Mainstream" Goods Movement into the Overall Transportation Planning Process, Defining Freight Issues/Challenges, Identifying Root Causes of Freight Flows, and Managing and Addressing Land Use Compatibilities).Specifying freight classifications by activity type breaks down the transportation uses and creates specific goals to address road classifications which may be used as part of Anchorage's freight strategy.

Further information:

https://www.portlandoregon.gov/transportation/article/357098

5.7 San Francisco Bay Area Regional Goods Movement Study

The San Francisco Bay Area region is the third largest freight hub on the west coast. The freight system in the Bay Area consists of several major highways, a rail system, and marine and air terminals. Trucking represents the majority of the Bay Area's goods movement, but air cargo is its fastest-growing freight mode. The greatest freight issues facing the Bay Area include traffic congestion, rail at-grade crossings, and increased truck traffic due to growth in container cargo.

To address these issues among others, the San Francisco Bay Area completed a 2004 Regional Goods Movement Study (with later updates). One planning strategy involved making a connection between land use planning and goods movement by developing freight villages. This approach was designed to cluster freight land uses into a specific designated area in order to more efficiently and cost-effectively move freight. This concept was further evaluated in a separate Freight and Land Use Development Study conducted for the region.

Potential Relevance to Anchorage:

The San Francisco Bay Area is a port city like Anchorage, and also faces similar freight issues such as traffic congestion and at-grade crossing impacts. The strategy to incorporate freight issues into land use planning (e.g., Defining Freight Issues/Challenges and Managing and Addressing Land Use Compatibilities) was intended to enhance freight mobility, and is of potential relevance to Anchorage's interest in central freight distribution centers and intermodal connectivity.

Further information:

http://www.dot.ca.gov/hq/tpp/offices/ogm/regional_level/FR3_SFBAFMS_Final_Report.pdf

5.8 Houston-Galveston Region-Regional Goods Movement Plan

The freight system in the Houston-Galveston region consists of several major highways, a rail network, three major airports, and marine ports at Houston, Freeport, and Galveston. Trucking accounts for nearly half of the region's intercity freight flows. One of the key freight issues facing the region is inadequate intermodal connectors, which leads to freight bottlenecks and increased traffic congestion on freight-significant corridors, including facilities leading into and out of the Port of Houston. Specific concerns included geometric road design deficiencies, safety issues, and insufficient signage.

The 2013 Regional Goods Movement Plan released by the Houston-Galveston Area Council (H-GAC) identified a potential solution to address this issue. First, the Plan proposed to "formally define and designate the freight-significant network", allowing H-GAC to direct investments towards the most critical segments of the region's freight system, and also better educating decision-makers on which portions of the freight system are most crucial to regional mobility and economic competitiveness. After identifying the most critical components of the region's freight system and recognizing hot spots and deficiencies, the Plan recommended partnering with other entities to "mitigate short-term deficiencies". In the Plan, these short-term deficiencies refer specifically to short-distance intermodal connectors. This strategy to identify and target priority intermodal connectors was an efficient way to enhance freight reliability and mobility, minimize adverse impacts on regional livability, and promote a more multimodal freight network.

Potential Relevance to Anchorage:

Similar to the approach taken in Portland, this strategy encouraged partnerships and presented a more efficient method of addressing freight system deficiencies and enhancing freight mobility while maintaining regional quality of life. The Houston-Galveston region's strategy to improve intermodal connectors can be relevant to Anchorage as it looks to improve upon its own freight corridors and last-mile intermodal connectivity. Best practice elements developed in this Plan included Integrating "Mainstream" Goods Movement into the Overall Transportation Planning Process, Defining Freight Issues/Challenges, and Identifying Root Causes of Freight Flows, Managing and Addressing Land Use Compatibilities, and Use of Performance Measures.

Further information:

http://www.hgac.com/taq/Regional%20Goods%20Movement/Reports/Documents/FR1_HGAC_RgnlGoodsMvmnt_FINAL%2006.13.2013_rev12-05-13v2.pdf

Appendix 1: Reference Documents / Websites

Source	Description
FHWA Office of Freight Planning and Freight Management & Operations	Link with various resources / reports on freight planning http://www.fhwa.dot.gov/planning/freight_planning/index.cfm
TRB NCFRP Report 33 "Improving Freight System Performance in Metropolitan Areas" (May 2015)	Full report to download here: http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_033.pdf Guide includes *Initiative Selector tool* (http://coe-sufs.org/wordpress/InitiativeSelector/) to aid in the selection of possible alternatives for various problems, and *Freight Trip Generation (FTG)* software that planners can use to identify main locations where freight is an issue based on freight trips produced and attracted. Both have software links listed in the report.
FHWA document Engaging the Private Sector in Freight Planning (Wilbur Smith Associates and S. R. Kale Consulting 2009)	Strategies and approaches for stakeholder engagement in MFP planning process
NCFRP Report 14: Guidebook for Understanding Urban Goods Movement (2012)	Guidelines for planners to understand movement of different types of goods and how to collect data to evaluate their impacts. Also can support identification of "root causes" of freight problems.
FHWA "Integrating Demand Management into the Transportation Planning Process: A Desk Reference" (2012) http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf	Includes some performance measures (Chapter 3) and discussion of integration Transport Demand Management (TDM) issues with goods movement and freight.
TRB NCFRP 03: Performance Measures for Freight Transportation http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_010.pdf	See Appendix A: Summaries of Freight Performance Information for National Report Card Performance
FHWA Advanced Metropolitan Planning for Operations: An Objectives driven, Performance-based Approach – A Guidebook (FHWA-HOP-10-026). 2010	

Task 4 Background and Content - Freight Mobility Profile

AMATS Freight Mobility Study

Prepared for

AMATS

Prepared by

HDR

In association with

RSG, Solstice, and CPCS

Anchorage, AK

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Contents

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Acronyms and Abbreviations

AEDC	Anchorage Economic Development Corporation
AMATS	Anchorage Metropolitan Area Transportation Solutions
ARRC	Alaska Railroad Corporation
ATRI	American Transportation Research Institute
BLS	Bureau of Labor Statistics
BLS	Bureau of Labor Statistics
BTS	Bureau of Transportation Statistics
CBD	Central Business District
CFS	Commodity Flow Survey
CMV	Commercial Motor Vehicle
CSS/CSD	Context Sensitive Solutions/Context Sensitive Design
CVISN	Commercial Vehicle Intelligent Systems Network
DOT&PF	Alaska Department of Transportation and Public Facilities
EIA	Energy Information Administration
FAF	Freight Analysis Framework
FAI	Fairbanks International Airport
FARS	Fatalities Analysis Reporting Systems
FHWA	Federal Highway Administration
FMS	Freight Mobility Study
GA	General Aviation
HDP	Hillside District Plan
JBER	Joint Base Elmendorf-Richardson
LHD	Lake Hood Seaplane Base
LQs	Location Quotients
LRTP	Long-Range Transportation Plan
MOA	Municipality of Anchorage
MP	Milepost
MS/CVE	Measurement Standards/Commercial Vehicle Enforcement
MSA	Metropolitan Statistical Area
MTP	Metropolitan Transportation Plan
NAICS	North American Industry Classification System
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NOX	Nitrogen Oxide
POA	Port of Anchorage
QCEW	Quarterly Census of Employment and Wages
RWIS	Road Weather Information System
STIP	Statewide Transportation Improvement Program
TAZ	Traffic Analysis Zone
TSAIA	Ted Stevens Anchorage International Airport
USACE	U.S. Army Corps of Engineers
VOC	Volatile Organic Compound
WADP	West Anchorage District Plan
WIM	Weight-in-Motion

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1 Introduction

In support of the Task 4: Background and Content analysis of the Anchorage Metropolitan Area Transportation Solutions (AMATS) Freight Mobility Study (Anchorage FMS), a Freight Mobility Profile was developed. The Profile is based on a detailed Literature Review of relevant local, regional, and state reports, studies, and data related to freight activity, movements, land uses and industries, terminals and facilities, and routes and corridors in Anchorage. Federal freight data sources relevant to the Anchorage region were also reviewed. This Literature Review was conducted to identify freight-related information for potential use in the development of the FMS.

The following sections are documented in this report:

- Section 2 presents a summary of the freight data, reports, and study sources reviewed;
- Section 3 presents summaries of each relevant data source; and
- Section 4 presents summaries of each relevant report and plan source.

2 Sources Reviewed

While all sources identified in this Report were reviewed, not all were summarized. Summaries were not prepared if the report or study did not include relevant freight information for potential use in the Anchorage FMS, and if the data and information represented was either duplicative of information provided in other reports or too dated, or if there was a more recent version of the source (e.g., the 2015 Alaska State Rail Plan was summarized as it replaces the 1985 version). The following presents both the freight data sources and freight reports and studies reviewed in this process.

2.1 Freight Data Sources

The following freight data sources were reviewed and documented separately by socioeconomic, incident, and freight movement (demand and commodity flow) categories.

2.1.1 Socioeconomic Data

- U.S. Bureau of Census Summary File 1;Bureau of Labor Statistics (BLS) Location Quotients;
- Energy Information Administration (EIA) has historic gas/fuel pricing information; and
- Land Use from the Municipality of Anchorage http://www.muni.org/Departments/it/GIS2/Pages/MOAGISData.aspx.

2.1.2 Incident Data

- Alaska Highway Safety Office Fatalities Analysis Reporting Systems (FARS);and
- Alaska Department of Transportation & Public Facilities (DOT&PF) Central Region and Measurement Standards/Commercial Vehicle Enforcement (MS/CVE) Data.

2.1.3 Freight Movement Data

- Waterborne Cargo Information: US Army Corps of Engineers (USACE) Water Movement Data;
- Airborne Cargo Information: T-100 Data;
- Airborne Cargo Information: Ted Stevens Anchorage International Airport (TSAIA) Monthly Cargo Reports;
- Truck Cargo Information: ATRI Data from Summit;
- Commodity Flow: Federal Highway Administration (FHWA) Freight Analysis Framework (FAF);

- Commodity Flow: Alaska Department of Transportation & Public Facilities (DOT&PF) Central Region and Measurement Standards/Commercial Vehicle Enforcement (MS/CVE) Data WIM Truck Station Counts; and
- Commodity Flow: Freight Flow Information from the MTP.

2.2 Freight Reports and Studies

State, regional, and local reports, plans, and studies were reviewed as summarized below. These materials were categorized as either statewide or regional and local by different systems (e.g., multimodal, marine/port, aviation, and pipeline). As mentioned above, while all of these sources were reviewed, the documents most recently conducted and with relevant freight information were summarized in later sections of this report. The summaries sources documented are highlighted in bold below.

2.2.1 Statewide

2.2.1.1 Multimodal Transportation Systems and Programs

- **Let's Get Moving 2030, Alaska Statewide Long-Range Transportation Policy Plan, 2008** (2015 update is in progress);
- Alaska Highway Safety Plan, 2015;
- ***Alaska Statewide Transportation Improvement Program, 2016-2019 (2015 Draft);***
- Alaska Federal Lands Long Range Transportation Plan, 2012;
- Alaska State Rail Plan Update, 1985 (2015 update is in progress);
- Alaska Railroad Corporation Website; and
- Alaska State Freight Plan, 2015 (update in progress).

2.2.1.2 Marine / Port Systems

- 2014 Annual Traffic Volume Report Alaska Marine Highway System, 2014;
- Alaska Marine Trades and Services Business Retention and Expansion Survey Results, 2012;
- ***Alaska Regional Ports Report, 2014;*** *and*
- Alaska Marine Shipping Assessment Report, 2009.

2.2.1.3 Aviation / Air Cargo Systems

- ***Alaska Aviation System Plan, 2013;***
- ***Alaska International Airport System / Air Cargo Related Economic Development Opportunity Assessment, 2014;***
- ***Ted Stevens Anchorage International Airport Final Master Plan Update, 2014;***
- Alaska International Airport System Forecast Technical Report, 2013; and

- Alaska International Airport System Planning Study, 2013.

2.2.1.4 Pipeline / Utility

- Alaska Gas Line Development Corp – ASAP Project Info and LNG Project Information.

2.2.2 Regional and Local

2.2.2.1 Multimodal Transportation Systems and Programs

- ***2035 Metropolitan Transportation Plan, 2012 (2015 Interim MTP Not Reviewed);***
- AMATS Metropolitan Long-Range Transportation Plan, 2012;
- Anchorage Bowl 2025 Long Range Transportation Plan, 2007;
- Anchorage Coastal Management Plan, 2007;
- ***Anchorage Downtown Comprehensive Plan, Transportation and Circulation Chapter, 2007;***
- Anchorage Regional ITS Architecture Update, 2015;
- AMATS 2015 – 2018 Transportation Improvement Program, 2014;
- Anchorage Official Streets and Highways Plan, 2014;
- ***West Anchorage District Plan, 2012;***
- ***Chugiak-Eagle River 2027 Long Range Transportation Plan, 2007;***
- ***Government Hill Neighborhood Plan, 2013;***
- ***Hillside District Plan, 2010;***
- Anchorage Annual Traffic Report, 2012;
- ***Eagle River Central Business District and Residential Core Circulation Study, 2011;***
- Spenard Corridor Technical Report, 2011;
- Ship Creek Intermodal Transit Center Fact Sheet, 2011;
- Alaska Canada Rail Link Phase I Feasibility Study Executive Report, 2007;
- East Anchorage Study of Transportation, 2003;
- Anchorage Freight Mobility Study, 2001;
- Girdwood Commercial Areas and Transportation Master Plan, 2001;
- ***Ship Creek Framework Plan, 2014;***
- Ship Creek Multi-Modal Transportation Study, 2000;
- ***Anchorage Truck Route Maps;***
- Glenn Highway Project Information (Accessed via http://dot.alaska.gov/project_info/index.shtml);

- Seward Highway Project Information (accessed via http://dot.alaska.gov/project_info/index.shtml);
- Girdwood Area Plan, 1995; and
- ***Anchorage Congestion Management System and Status of the System Report, 2015.***

2.2.2.2 Economic Development / Land Use

- Anchorage Economic Development Corporation Forecast, 2015;
- Anchorage Commercial Land Assessment, 2012;
- ***Anchorage Industrial Land Assessment, 2009;***
- ***Chugiak-Eagle River Comprehensive Plan, 2006 Update, completed 2008;***
- ***Turnagain Arm Comprehensive Plan, 2009;***
- Chugiak-Eagle River Site Specific Land Use Plan, 2009;
- ***Anchorage Economic Development Corporation 3-Year Economic Outlook, 2015;***
- ***Anchorage 2020 Anchorage Bowl Comprehensive Plan, 2001; and***
- Ship Creek / Waterfront Land Use Plan, 1991.

2.2.2.3 Marine / Port Systems

- Port of Anchorage Facilities Website, 2015 (accessed via http://www.portofanc.com/operations/facilities/);
- Port of Anchorage Modernization Project Mariner Study and Ship Simulation Modeling, 2015; and
- Port of Anchorage Cargo Distribution Patterns, 2011.

2.2.2.4 Aviation / Air Cargo Systems

- Federal Express Aircraft Maintenance Facility Information.

2.3 Other

- ***National Cooperative Freight Research Program | Performance Measures for Freight Transportation, 2011.***

3 Freight Data Summaries

The source summaries documented below for socioeconomic, incident, and freight movement data include the lead agency(s) name, and summaries of the data and analysis, freight-related elements, and potential relevance in using the data to support the development of the Anchorage FMS.

3.1 Socioeconomic Data

3.1.1 US Census Bureau Summary File 1

Conducted for:

U.S. Federal Government, Decennially (2010).

Summary:

Every 10 years the US Census Bureau collects national-level information on population, households, and other socioeconomic-related conditions. The Summary File 1 contains the information related to population and housing data collected. The project team reviewed the most recent Census in 2010 to obtain information and data about the Municipality of Anchorage (MOA).

Freight-Related Elements:

Population is a driver of the freight economy. The more people and households in a region, the more goods and freight must travel to, from, or within the area to meet the demands of the population. Table 3.1 presents a summary of the population and household data for the MOA and provides a comparison of the 2010 and 2000 information.

Table 3-1: MOA Population and Housing Data Summary

	2010	2000	% Increase 2000-2010
Total Population	291,826	260,283	12.1%
Total Households	107,332	94,822	13.2%
Owner-Occupied Households	64,285	56,953	12.9%
Renter-Occupied Households	43,047	37,869	13.7%
Average Household Size	2.64	2.67	-1.1%

Relevance to the FMS:

These data illustrate a growing region, with a 12 percent increase in population over the most recent recorded decade (from 2000 to 2010) and a 13 percent increase in households. Additionally, the U.S. Census makes available population estimates on an annual basis. Table 3.2 provides a summary the Municipality's modest (3 percent) growth over a 5-year period from 2010 to 2014. These data will be important for use in

identifying potential future freight forecasts, trends, and potential solutions for the freight transportation as part of the Anchorage FMS.

Table 3-2: MOA Population Estimates (as of July 1) for 2010 through 2014

Year	2010	2011	2012	2013	2014
Population	293,337	296,282	298,633	301,629	301,010
Percent Increase Since 2010	N/A	1%	2%	3%	3%

3.1.2 American Community Survey

Conducted for:

U.S. Federal Government, Annually (2012).

Summary:

The U.S. Census Bureau conducts the American Community Survey (ACS) on an ongoing basis. This dataset includes estimates of long-form survey information regarding household characteristics for regions across the United States.

Freight-Related Elements:

Household characteristics are used to help identify the potential impacts on the freight environment, as the number of vehicles may affect deliveries, household income will affect spending, and employment status will affect both spending and economic output. Table 3.3 summarizes these details from the 2012 ACS 5-Year estimates.

Table 3-3: Selected Demographic Data from American Community Survey 2012 5-Year Estimates

		#	%
Vehicle Availability	**0 Vehicles**	6,281	6.0%
	1 Vehicle	35,231	33.4%
	2 Vehicles	42,410	40.2%
	3 Vehicles	15,425	14.6%
	4+ Vehicles	6,170	5.8%
Household Income	**Less Than $25,000**	12,222	11.6%
	$25,000-$49,999	20,548	19.5%
	$50,000-$74,999	18,863	17.9%
	$75,000-$99,999	16,456	15.6%
	$100,000 or more	37,428	35.5%
Employment Status (age 16+)	**Employed, Civilian**	147,297	65.5%
	Unemployed, Civilian	11,548	5.1%
	Armed Forces	8,951	4.0%
	Not in Labor Force	57,066	25.4%
	TOTAL POP, AGE 16+	224,862	100.0%

Relevance to the FMS:

The information shown regarding vehicle availability, income, and employment will potentially help to refine the understanding of the population and freight markets in Anchorage.

3.1.3 Bureau of Labor Statistics

Conducted for:

U.S. Federal Government, Annually (2004, 2009, 2014).

Summary:

The Bureau of Labor Statistics (BLS) conducts a Quarterly Census of Employment and Wages (QCEW) to derive location quotients (LQs) of each industry in the MOA compared to the saturation of the industries in both the U.S. and Alaska. An LQ value of greater than one indicates that the industry is stronger within Anchorage compared to either the U.S. or Alaska. An LQ value lower than one indicates the opposite (e.g., industry not as strong locally as it is in the U.S. or Alaska). BLS reports employment data and resulting LQs by North American Industry Classification System (NAICS) code.

Freight-Related Elements:

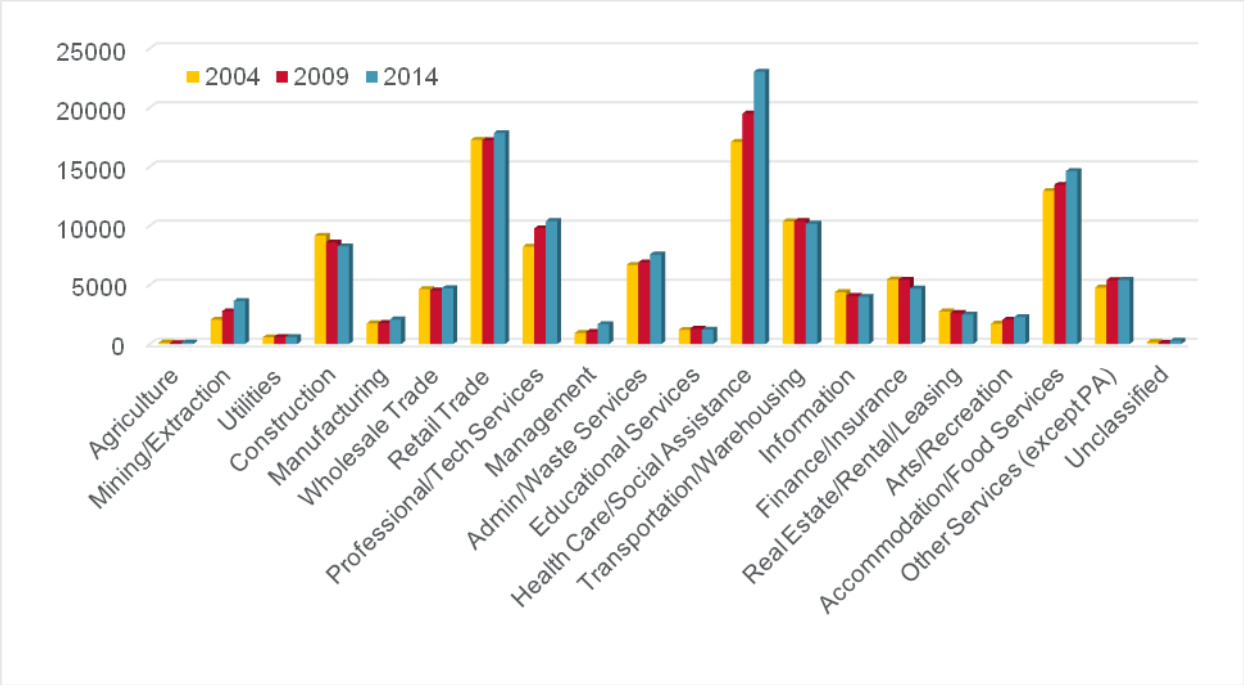
Location quotients provide insight as to the major economic industries of any given region. This understanding of industry dynamics helps identify additional drivers of the freight environment. Table 3.4 shows the LQs by NAICS code in the Anchorage region compared to the U.S. and Alaska. The LQs over 1.0 are highlighted to show the Anchorage region's strongest industry sectors. Figure 3.1 provides the actual employment for each of these major industries in the MOA for 3 years of data (2004, 2009, and 2014).

Table 3-4: MOA Location Quotients 2004, 2009, 2014

Base Area	Anchorage-US			Anchorage-Alaska		
Industry by NAICS Code	**2004**	**2009**	**2014**	**2004**	**2009**	**2014**
NAICS 11 Agriculture, forestry, fishing and hunting	0.10	0.06	0.10	0.21	0.20	0.24
NAICS 21 Mining, quarrying, oil/gas extraction	3.81	3.93	3.99	0.42	0.37	0.42
NAICS 22 Utilities	0.97	0.97	0.99	0.61	0.60	0.57
NAICS 23 Construction	1.28	1.31	1.25	1.02	1.06	0.98
NAICS 31-33 Manufacturing	0.12	0.14	0.16	0.28	0.28	0.29
NAICS 42 Wholesale trade	0.79	0.74	0.75	1.44	1.44	1.47
NAICS 44-45 Retail trade	1.11	1.08	1.07	0.97	0.97	0.98
NAICS 54 Professional and technical services	1.17	1.19	1.15	1.44	1.44	1.43
NAICS 55 Management of companies/enterprises	0.53	0.51	0.72	1.58	1.66	1.14
NAICS 56 Administrative and waste services	0.83	0.88	0.82	1.20	1.21	1.26
NAICS 61 Educational services	0.56	0.49	0.42	1.18	1.26	1.10
NAICS 62 Health care and social assistance	1.18	1.11	1.19	1.03	1.05	1.07
NAICS 48-49 Transportation and warehousing	2.5	2.37	2.14	1.08	1.08	1.07
NAICS 51 Information	1.37	1.32	1.35	1.26	1.23	1.3
NAICS 52 Finance and insurance	0.91	0.88	0.77	1.25	1.24	1.37

Base Area	Anchorage-US			Anchorage-Alaska		
Industry by NAICS Code	2004	2009	2014	2004	2009	2014
NAICS 53 Real estate and rental and leasing	1.28	1.21	1.13	1.13	1.11	1.04
NAICS 71 Arts, entertainment, and recreation	0.90	0.97	1.00	0.87	0.91	0.96
NAICS 72 Accommodation and food services	1.18	1.10	1.08	0.97	1.01	1.01
NAICS 81 Other services, except public admin	1.07	1.12	1.18	1.01	1.07	1.08
NAICS 99 Unclassified	0.7	0.53	1.25	0.73	0.81	0.97

Figure 3-1: MOA Employment Levels for 2004, 2009, and 2014



Relevance to the FMS:

The LQs show that the major industries in the MOA, compared to the U.S., include significant freight / goods movement generating activities:

- Mining;
- Quarrying;
- Oil/gas extraction; and
- Transportation and warehousing.

The Information LQ, while also showing significance over the U.S., does not generate a significant amount of freight movement in the Anchorage. Major industries in the MOA compared to Alaska include:

- Wholesale trade;
- Professional and technical services; and

- Management of companies/enterprises.

Of these industries, wholesale trade generates significant freight movements, while the other two industries are not major freight generators.

The employment data show that Health care/social assistance has the highest number of employees in the MOA and continues to grow. Other steadily growing industries include Mining/extraction and Retail trade, both which significantly affect the freight system. Transportation and warehousing while not a growing industry regionally, is a top five industry for number of employees. These industry sectors will be used as critical inputs in the Anchorage FMS to help define freight corridors and potential solutions.

3.1.4 Energy Information Administration

Conducted for:

US Federal Government, Annually (1984 – 2012).

Summary:

The EIA keeps an on-going record of gasoline prices by state, which is summarized in this report. Information is not kept at the MOA level.

Freight-Related Elements:

Gasoline prices relate to both the economy and transportation patterns. Fuel prices affect the costs of freight movement. Demand for fuel also affects transportation of these commodities, whether through pipelines, rail, or highway modes. Figure 3.2 shows Alaska gasoline price trends through company outlets by all sellers over the past 30 years. Figure 3.3 presents all sales and deliveries of gasoline by prime supplier in Alaska. Figure 3.4 presents stocks at refineries, bulk terminals, and natural gas plants.

Relevance to the FMS:

Gas prices were stable in Alaska from the mid-1980s until the late 2000s. After a dramatic spike in 2008, due to the Great Recession, prices decreased but did not stabilize. Alaska gasoline sales remained stable in the 600 to 800 thousand gallons per day range over the past three decades. All fuel stocks hit a low in the early 2000s, but distillate fuel oil stocks at refineries increased significantly and finished motor gasoline stocks increased moderately in the following 15 years. Distillate fuel oil with over 500 parts per million (ppm sulfur) began to phase out in 2005. These data show that Alaska has relatively stable gas prices and a substantial fuel stock and will support the future forecasts and analysis to be conducted in the Anchorage FMS.

Figure 3-2: Alaska Total Gasoline through Company Outlets Price by All Sellers (Dollars per Gallon)

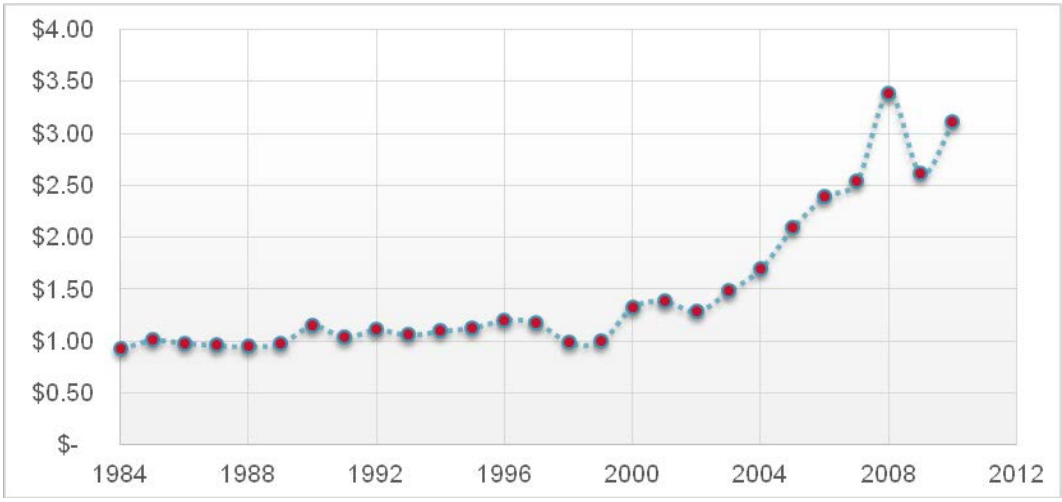


Figure 3-3: Alaska Total Gasoline All Sales/Deliveries by Prime Supplier (Thousand Gallons per Day)

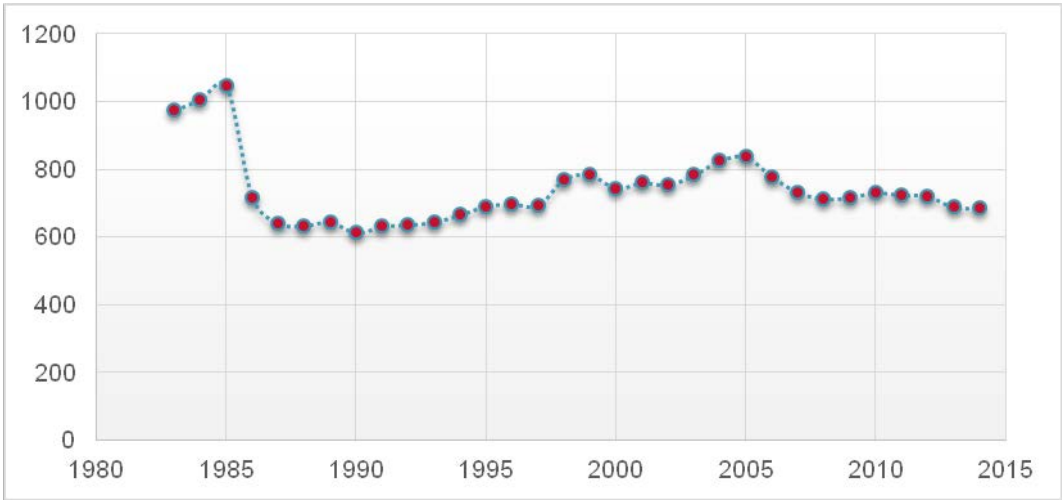
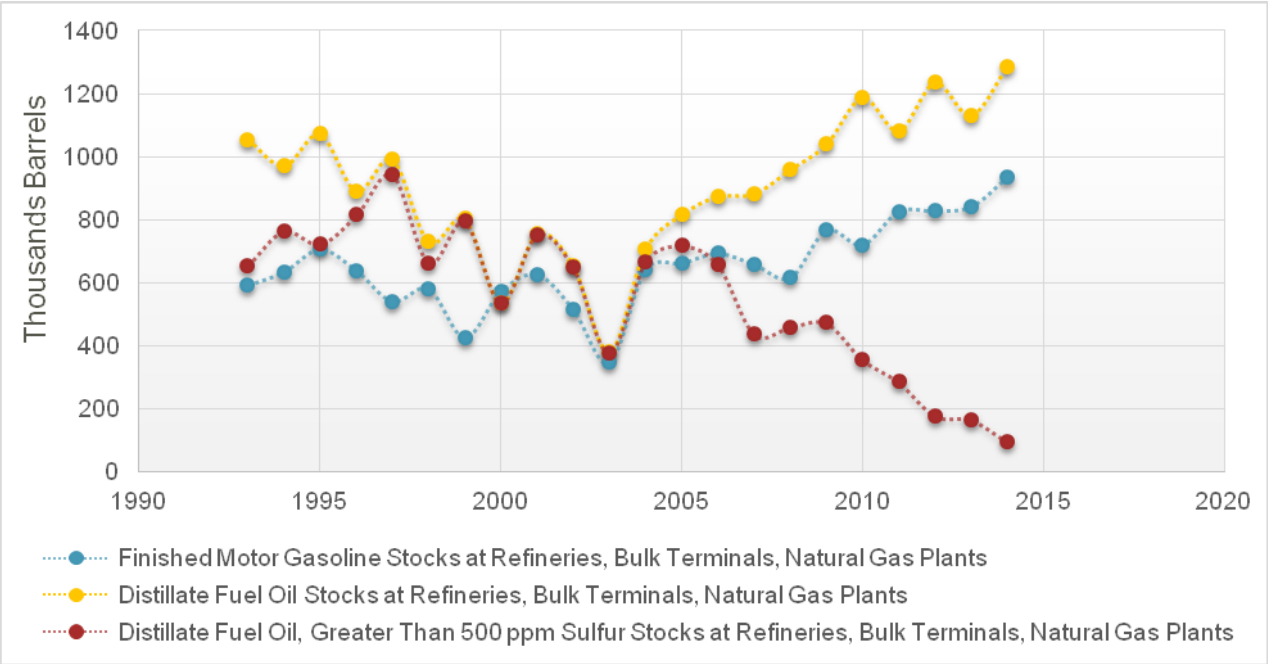


Figure 3-4: Alaska Stocks at Refineries, Bulk Terminals, and Natural Gas Plants



3.1.5 Land Use Data

Conducted for:

Municipality of Anchorage, 2005.

Summary:

The MOA maintains a database of land use by parcel. This information is publicly available on their website.

Freight-Related Elements:

By categorizing land uses related to freight, planners at the local and regional level can better understand the transportation needs and plan more effectively. Planners may also be able to direct freight-related development proposals to the optimum locations/sites to accommodate goods movement needs in the region. Figure 3.5 and Figure 3.6 show the mix of land uses in the northeast and southwest portions of the AMATS region.

Relevance to the FMS:

The land use figures show regional land use clusters and show key freight-generating areas. In the Anchorage Bowl, there is a significant amount of industrial activity along the rail line and around TSAIA. These data will be useful in helping shape land use policy in support of the Anchorage FMS.

Figure 3-5: Land Uses Designated by the Municipality of Anchorage

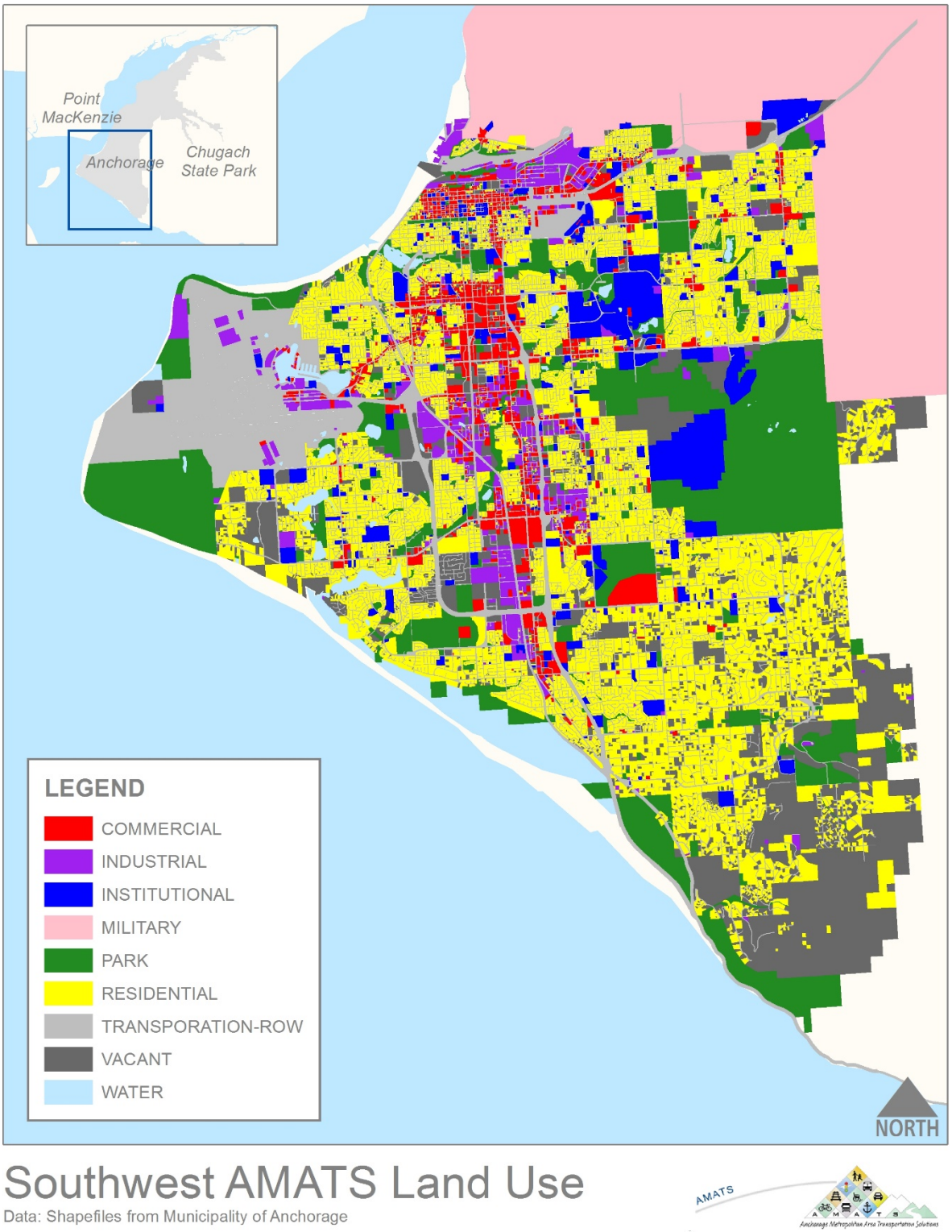
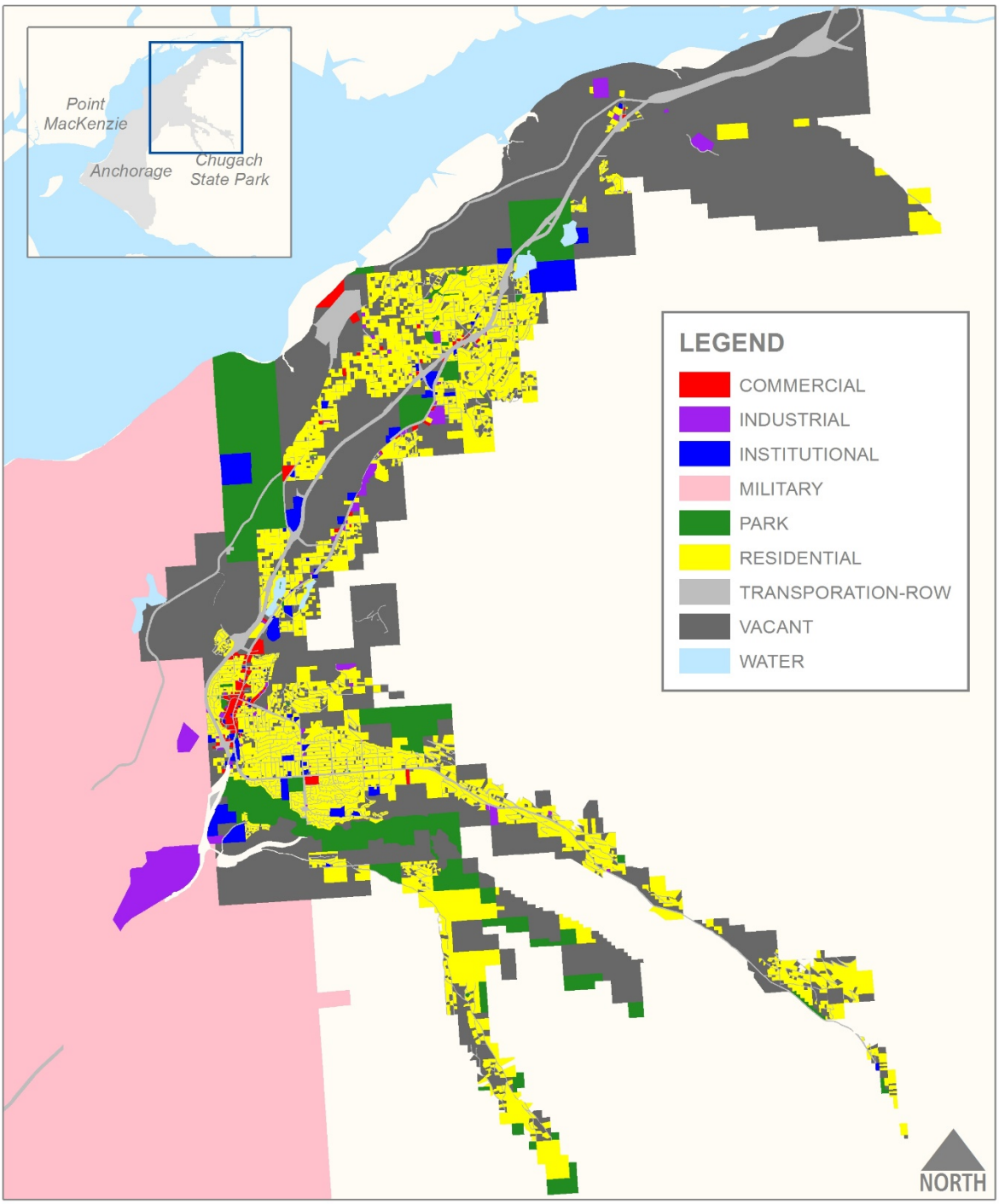


Figure 3-6: Chugiak-Eagle River Land Uses



Northeast AMATS Land Use

Data: Shapefiles from Municipality of Anchorage

3.2 Incident Data

3.2.1 Fatality Analysis Reporting System Data

Conducted for:

National Highway Traffic Safety Administration (NHTSA), Annually (2011—2013).

Summary:

The FARS summarizes motor vehicle crashes in the Anchorage region resulting in fatal injury data by year. Additionally, the NHTSA's Alaska Crash Map shows the geographic locations of these incidents in a user-friendly online interface. This online map was used to obtain case numbers, and linked case numbers to the vehicle type information to support the safety analysis to be conducted for the Anchorage FMS.

Freight-Related Elements:

FARS includes records by vehicle body type, including all different truck types. Table 3.5 summarizes the two fatality-resulting crashes identified in Anchorage that involved a commercial vehicle. Figure 3.7 and Figure 3.8 show the locations of these crashes as identified on the NHTSA Alaska Crash Map.

Table 3-5: 2011-2013 Commercial Vehicles in Incidents Resulting in Fatalities in Anchorage

Case Number	20030	20005
Year	2012	2013
Fatalities	1	1
Month	September	January
Hour	8:00AM	5:00PM
Body Type	Truck/Tractor	Standard Pickup
Jack Knife	Yes	No
Gross Vehicle Weight Rating	26,001 lbs or More	10,001 lbs - 26,000 lbs
Vehicle Configuration	Truck Tractor/Semi-Trailer	Single-Unit Truck (2 axles and GVWR more than 10,000 lbs.)

Figure 3-5: Location of Crash #20030 per the NHTSA Alaska Crash Map

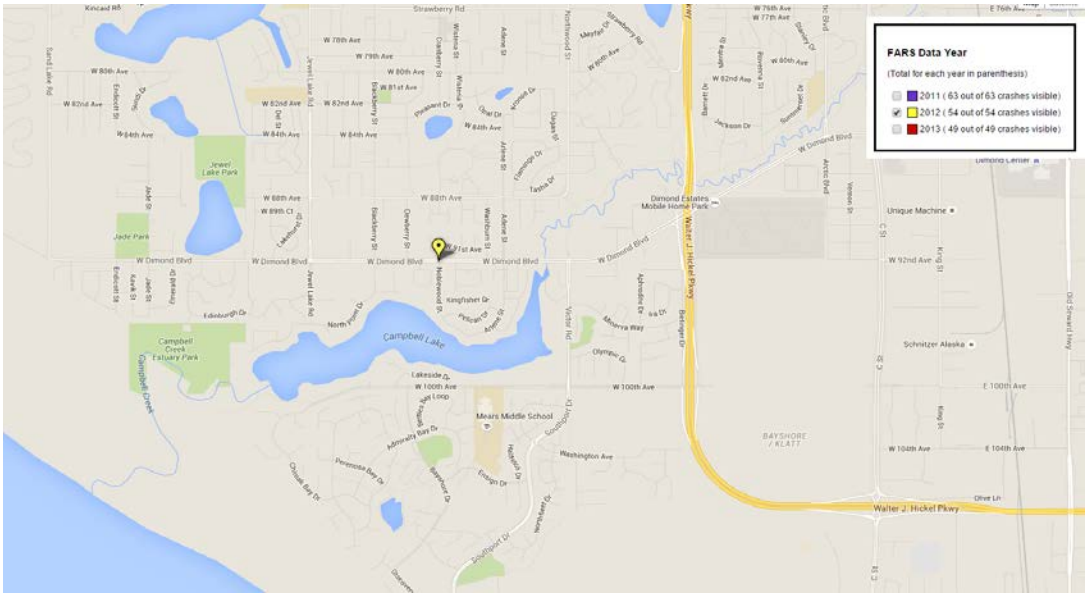
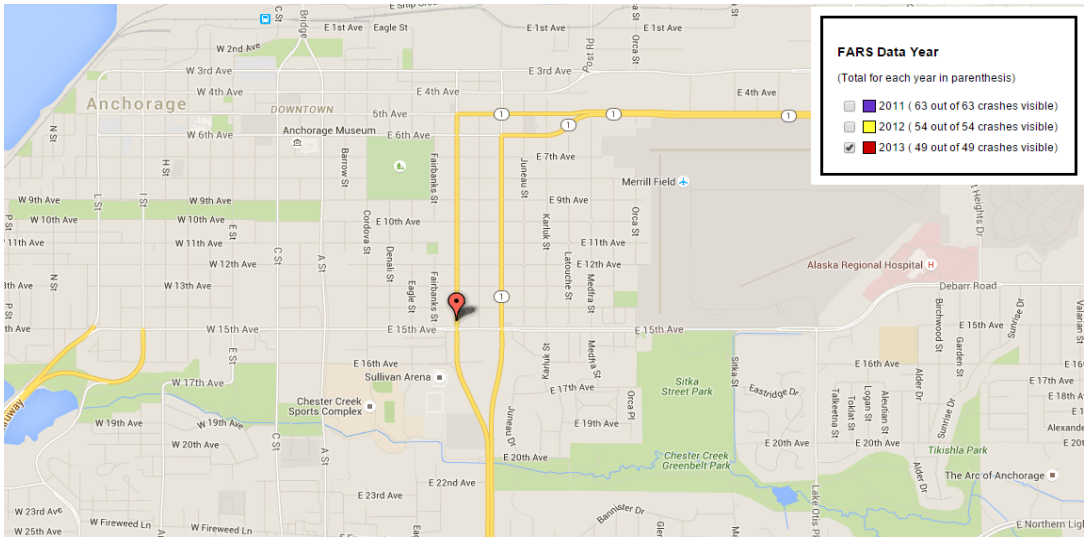


Figure 3-6: Location of Crash #20005 per the NHTSA Alaska Crash Map



Relevance to the FMS:

This information will be helpful to identify incidents that occurred over the past several years and pinpoint any hotspots that require attention to improve safety conditions as part of the Anchorage FMS.

3.2.2 Alaska Department of Transportation & Public Facilities Measurement Standards & Commercial Vehicle Enforcement Data

Conducted for:

Alaska Department of Transportation and Public Facilities, Annually (2010 – 2014).

Summary:

The DOT&PF Measurement Standards and Commercial Vehicle Enforcement Data presents a summary motor vehicle crashes throughout the state.

Freight-Related Elements:

These data pertain directly to Commercial Motor Vehicle (CMV) crashes, and provides details on the characteristics of the crash, the lighting conditions, and the weather type. Table 3.6 presents a summary of crash data from 2010 to 2014 on a statewide basis, including reports of fatalities, injuries, total crashes, reportable crashes, and area types. Table 3.7 reports light conditions for crashes in 2014, and Table 3.8 provides a summary of the weather conditions when the accidents occurred.

Table 3-6: Alaska Statewide CMV Crash Data for 2010 - 2014

Year	Fatalities	Injuries	Total CMV Crashes	% Federally Reportable Crashes	% Rural	% Urban
2010	7	61	412	33%	18%	82%
2011	2	70	439	31%	17%	83%
2012	5	44	276	34%	29%	71%
2013	4	52	147	69%	31%	69%
2014	5	46	300	35%	23%	77%

Table 3-7: Alaska Light Conditions for 2014 CMV Crashes

Light Conditions	% CMV Crashes
Daylight	77%
Dark Lighted	14%
Dark Not Lighted	5%
Dawn	2%
Dusk	1%
Other/Unknown	1%

Table 3-8: Alaska Weather Conditions for 2014 CMV Crashes

Weather Conditions	% CMV Crashes
No Conditions	69%
Rain	10%
Snow	10%
Fog	1%
Dirt/Gravel	1%
Cross Winds	1%
Other/Unknown	8%

The DOT&PF Measurement Standards and Commercial Vehicle Enforcement Data also include locational information within the Anchorage area. The map in Figure 3-7 shows all of the commercial vehicle crashes from 2009 to 2014 on one map to show consistent areas of crash incidents.

The maps in Figure 3-8 illustrate commercial vehicles crashes in Anchorage from 2009 through 2014 by year. These crash locations help to illustrate where CMV crashes are highest in the region.

Table 3-9: DOT&PF Crash Data Summaries, 2009-2014

Crash Type	2009	2010	2011	2012	2013	2014
Non-Federally Reported	119	111	126	37	23	77
Resulted in Tow	14	18	9	7	26	25
Resulting in Injury	8	13	10	4	5	6
Resulting in Fatality	0	0	0	1	1	2
Total	141	142	145	49	55	110

Figure 3-7: 2009 - 2014 Commercial Vehicle Crash Map - All

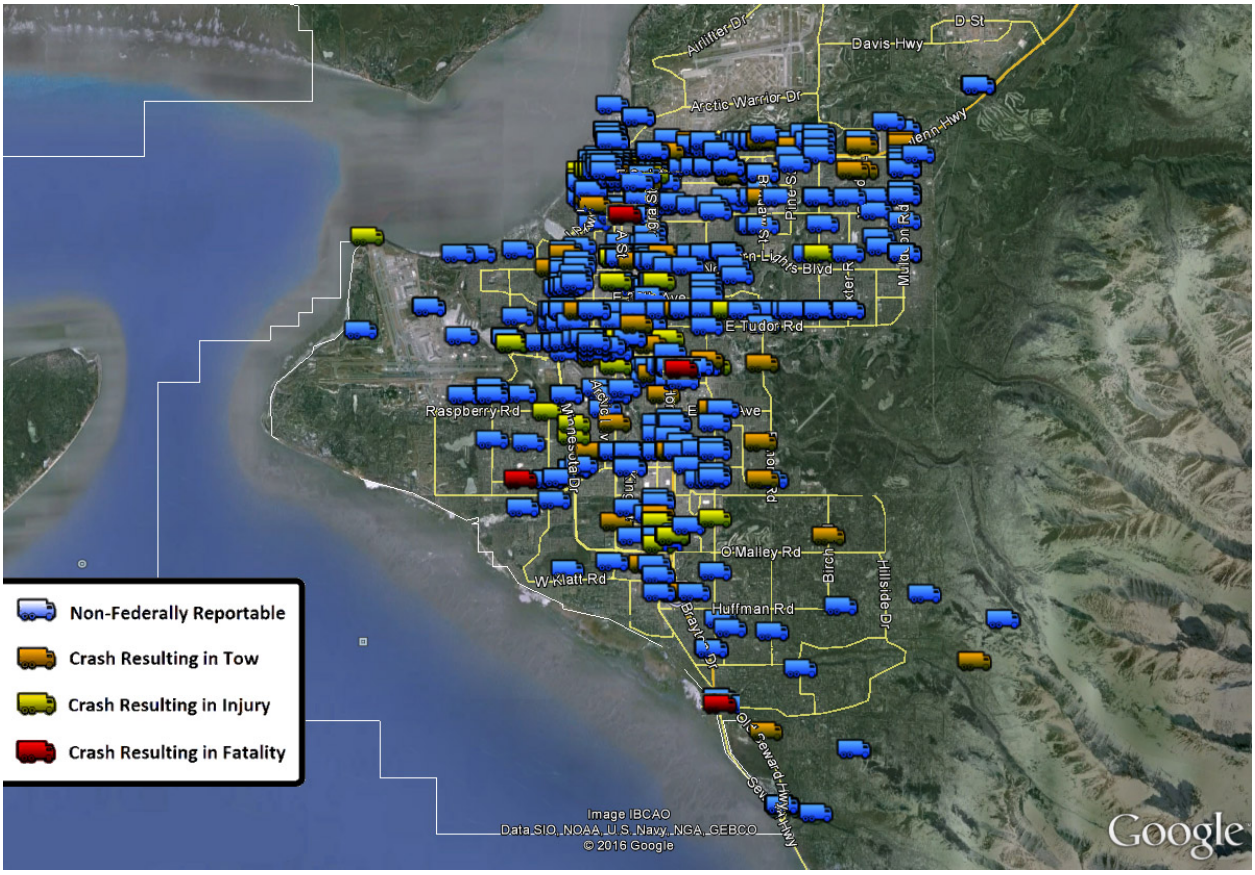


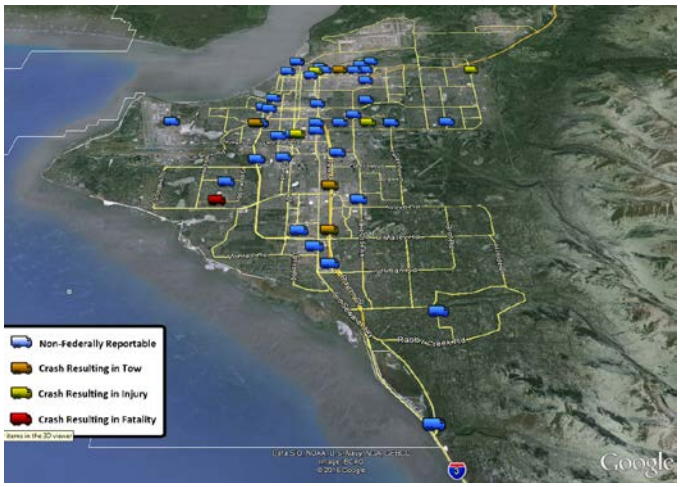
Figure 3-8: 2009 - 2014 Commercial Vehicle Crash Maps by Year

2009

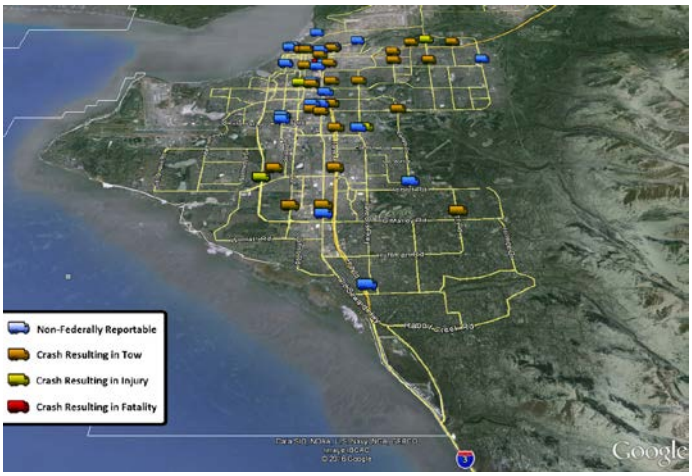
2010

2011

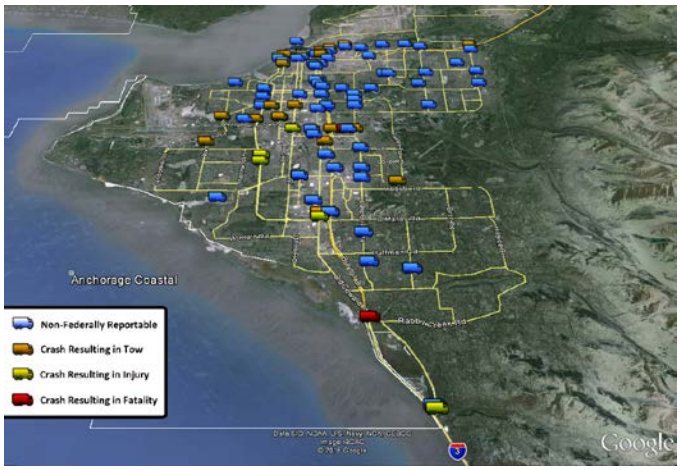
2012



2013



2014



Relevance to the FMS:

The number of commercial vehicle crashes varies substantially by year in Alaska, with the lowest number of crashes in the reporting period occurring in 2013 and the highest in 2011, with about three times as many incidents. In each reporting year, the majority of crashes occur on urban roadways. Further, in 2014, the majority (77 percent) of crashes occurred in daylight conditions, with only 14 percent occurring in dark lighted areas and 5 percent in dark areas. About one fifth of 2014's crashes occurred in adverse weather conditions.

Most truck crashes in the region are non-federally reportable, which means that no towing was required and no injuries or fatalities occurred. The number of crashes per year in the Anchorage Bowl area also varies substantially. Years 2009 through 2011 experience high levels of crashes with an average of about 140 per year. 2011 and 2012 show significantly fewer crashes, with about 50 per year. 2014 shows 110 truck crashes. More crashes occur in more dense and higher volume locations. There are few fatalities on the network. This information will be useful in defining potential freight strategies in support of the Anchorage FMS.

3.3 Freight Movement Data

3.3.1 US Army Corps of Engineers Waterway Data

Conducted for:

US Army Corps of Engineers, annually (2008 - 2013).

Summary:

The USACE records waterway and port cargo movements for ports and regions throughout Alaska. The USACE's reporting system includes domestic, international, and intrastate flows for ports in Anchorage. It also includes commodity-specific information.

Freight-Related Elements:

These data provide detailed water cargo commodity flows to, from, and within Alaska, providing an extensive overview of freight movements in the state's maritime market. Commodity flows specific to Anchorage are also provided in these data, identifying the types of cargo movements in and out of the region. Note that the information reported for Anchorage by the USACE aggregates tonnage and commodity information for the Port of Anchorage with other smaller scale local ports. The following figures present summaries of this waterborne cargo information:

- Table 3-10: 2013 Alaska Statewide Water Cargo Data Flow Summary;
- Figure 3-9: 2013 Alaska Statewide Water Movement Directions by Tonnage;
- Figure 3-10: 2013 Imports by Foreign Origin to Anchorage Port Area;
- Figure 3-11: 2013 Foreign Import by Commodity Tonnage to Anchorage Port Area ;
- Figure 3-12: 2013 Exports by Foreign Destination from Anchorage Port Area;
- Figure 3-13: 2013 Foreign Export by Commodity Tonnage from Anchorage ;

- Table 3-11: 2006 – 2013 Anchorage Port Area Commodity Tonnage Summaries;
- Figure 3-14: 2013 Total Tonnage at Anchorage Port Area;
- Table 3-12: 2008 – 2012 Anchorage Port Area Short Tons by Commodity All Directionse;
- Figure 3-15: 2008 – 2012 Anchorage Port Area Freight Movements Domestic and Foreign - All Directions;
- Table 3-13: 2008 – 2012 Anchorage Port Area Short Tons by Commodity Receipts ;
- Figure 3-16: 2008 – 2012 Anchorage Port Area Freight Movements Domestic and Foreign – To Anchorage Port Area;
- Table 3-14: 2008 – 2012 Short Tons by Commodity Shipments from the Anchorage Port Area;
- Figure 3-17: 2008-2012 Anchorage Port Area Freight Movements Domestic and Foreign – From Anchorage Port Area
- Table 3-15: 2008 – 2012 Anchorage Port Area Short Tons by Commodity Intraport Movements ;
- Table 3-16: 2008 – 2012 Anchorage Port Area Commodity Flows - All Directions for Domestic and Foreign Movements;
- Figure 3-18: 2012 Anchorage Port Area All Freight Movements - Domestic and Foreign;
- Table 3-17: 2008 – 2012Anchorage Port Area Commodity Flows – To-Port for Domestic and Foreign Movements;
- Figure 3-19: 2012 Anchorage Port Area To-Port Freight Movements Domestic and Foreign;
- Table 3-18: 2008-2012 Anchorage Port Area Commodity Flows – From Anchorage Port Area for Domestic an Foreign Movements; and
- Figure 3-20: 2012 Anchorage Port Area From-Port Freight Movements Domestic and Foreign.

Table 3-10: 2013 Alaska Statewide Water Cargo Data Flow Summary

State Summary	From (Domestic)	To (Domestic)	From (Foreign)	To (Foreign)	Intrastate	Total
Alaska	28,246,000	3,171,000	3,740,000	1,044,000	5,398,000	41,599,000
Percentage	67.9%	7.6%	9.0%	2.5%	13.0%	

State Summary	Total Domestic	Total Foreign	Intrastate
Alaska	31,417,000	4,784,000	5,398,000
Percentage	75.5%	11.5%	13.0%

Figure 3-9: 2013 Alaska Statewide Water Movement Directions by Tonnage

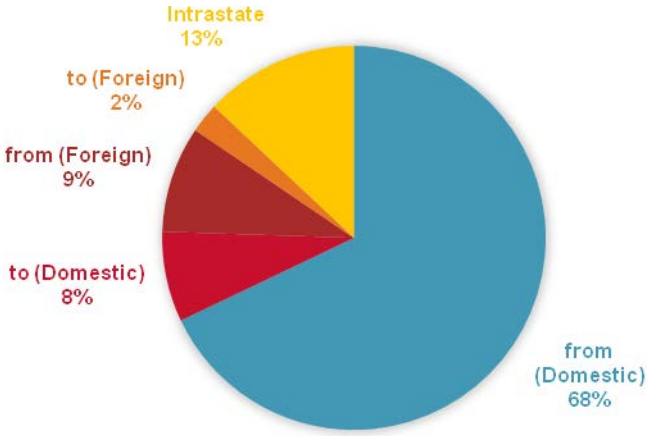


Figure 3-10: 2013 Imports by Foreign Origin to Anchorage Port Area

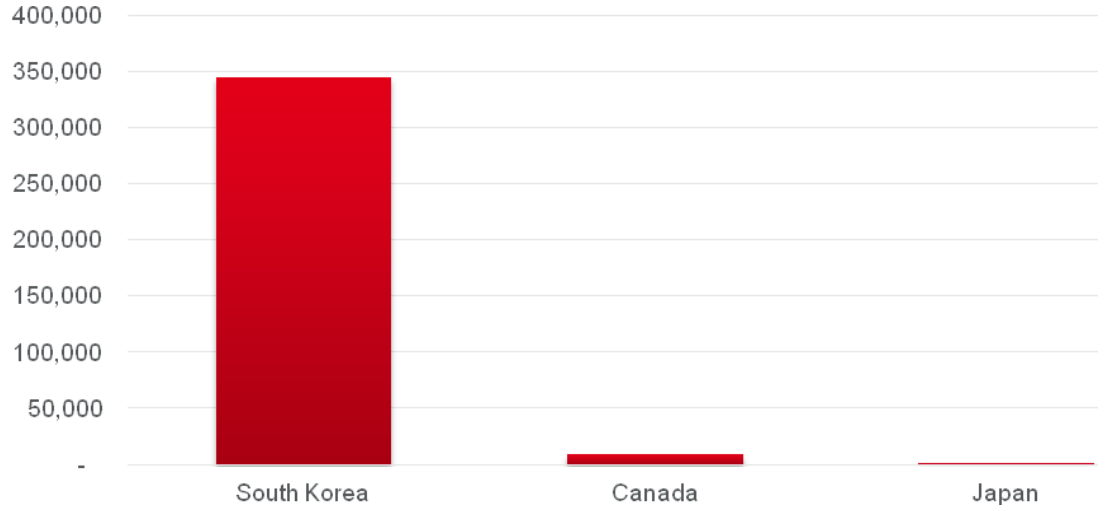


Figure 3-11: 2013 Foreign Import by Commodity Tonnage to Anchorage Port Area

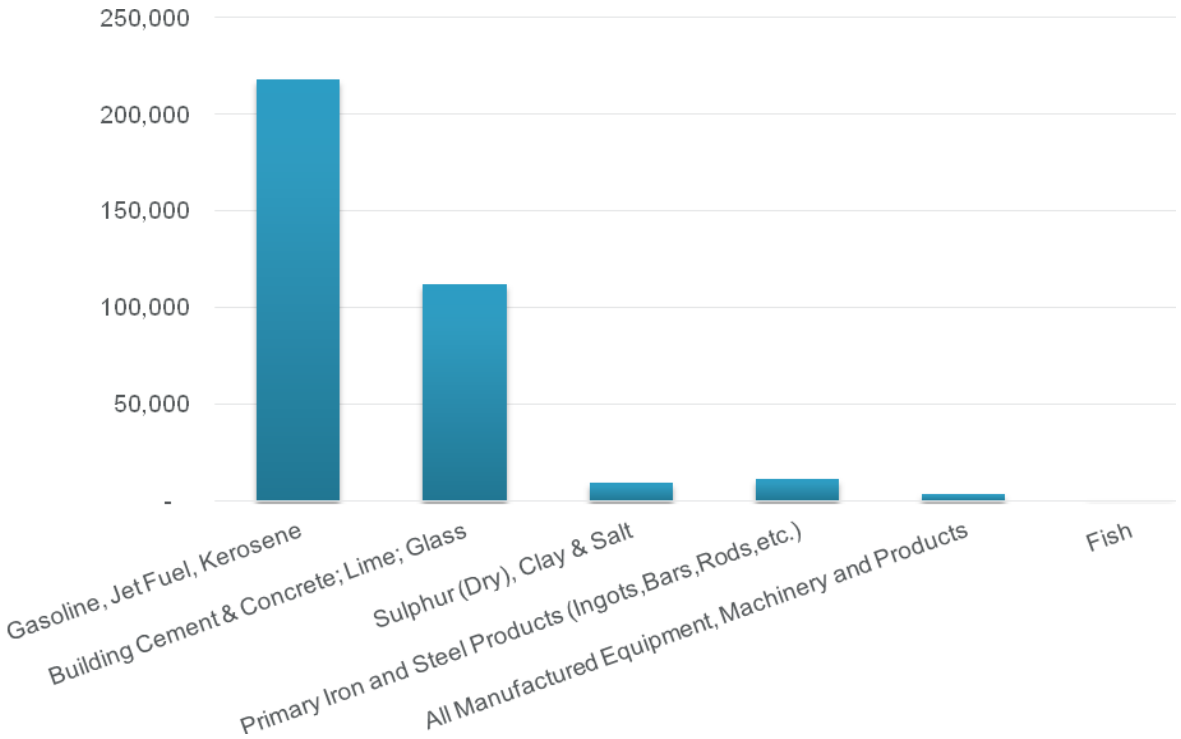


Figure 3-12: 2013 Exports by Foreign Destination from Anchorage Port Area

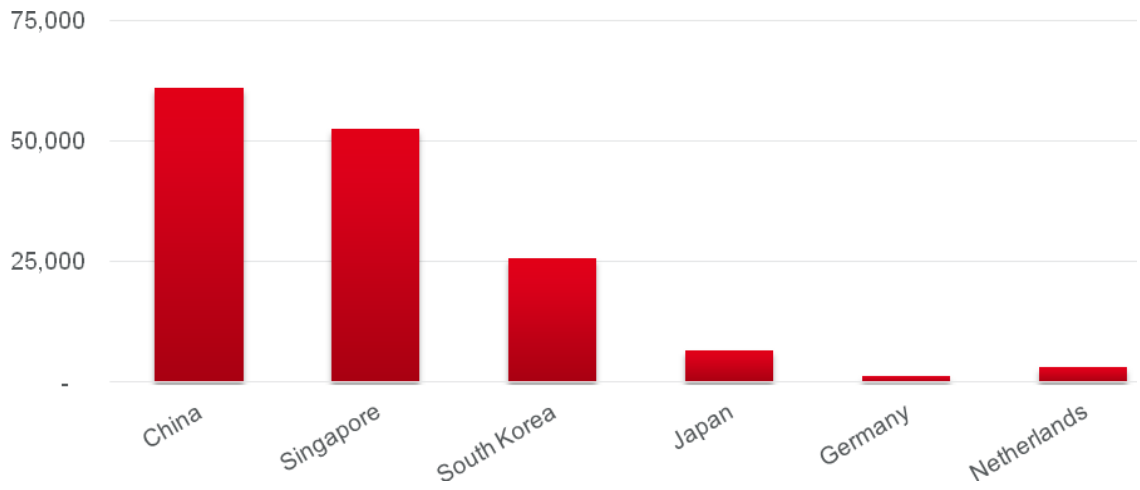


Figure 3-13: 2013 Foreign Export by Commodity Tonnage from Anchorage

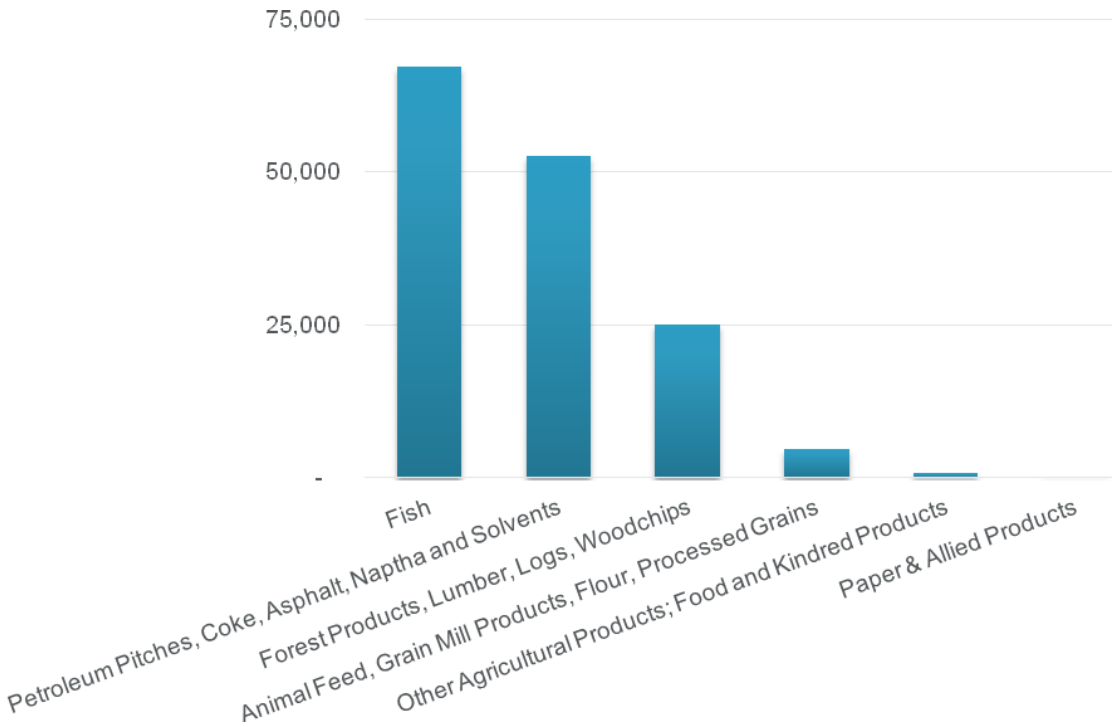


Table 3-11: 2006 – 2013 Anchorage Port Area Commodity Tonnage Summaries

YEAR	DOMESTIC	FOREIGN	IMPORTS	EXPORTS	TOTAL	% Change
2006	2,306,192	620,344	464,774	155,570	2,926,536	
2007	2,316,430	316,827	188,346	128,481	2,633,257	-10%
2008	2,115,455	289,768	193,088	96,680	2,405,223	-9%
2009	1,888,309	304,301	258,064	46,237	2,192,610	-9%
2010	2,212,429	557,871	526,226	31,645	2,770,300	26%
2011	2,270,172	513,738	503,739	9,999	2,783,910	0%
2012	2,319,975	522,937	507,894	15,043	2,842,912	2%
2013	2,444,840	504,616	354,142	150,474	2,949,456	4%

Figure 3-14: 2013 Total Tonnage for Anchorage Port Area

Table 3-12: 2008 – 2012 Anchorage Port Area Short Tons by Commodity All Directions

Commodity Classification	CY2012	CY2011	CY2010	CY2009	CY2008
Petroleum & Petroleum Products	901,392	926,710	865,460	402,775	405,636
Chemicals and Related Products	4,393	1,818	1,976	2,321	16,318
Crude Materials, Inedible Except Fuels	159,679	112,542	120,320	79,130	206,754
Primary Manufactured Goods	218,863	191,531	190,618	176,560	222,145
Food and Farm Products	251,082	250,179	310,361	338,516	353,855
All Manufactured Equipment, Machinery	1,288,236	1,285,185	1,260,600	1,182,134	1,200,180
Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	101	-	5	7	3
Unknown or Not Elsewhere Classified	19,166	15,945	19,654	11,167	332
Total	**2,842,912**	**2,783,910**	**2,768,994**	**2,192,610**	**2,405,223**

Figure 3-15: 2008 – 2012 Anchorage Port Area Freight Movements Domestic and Foreign - All Directions

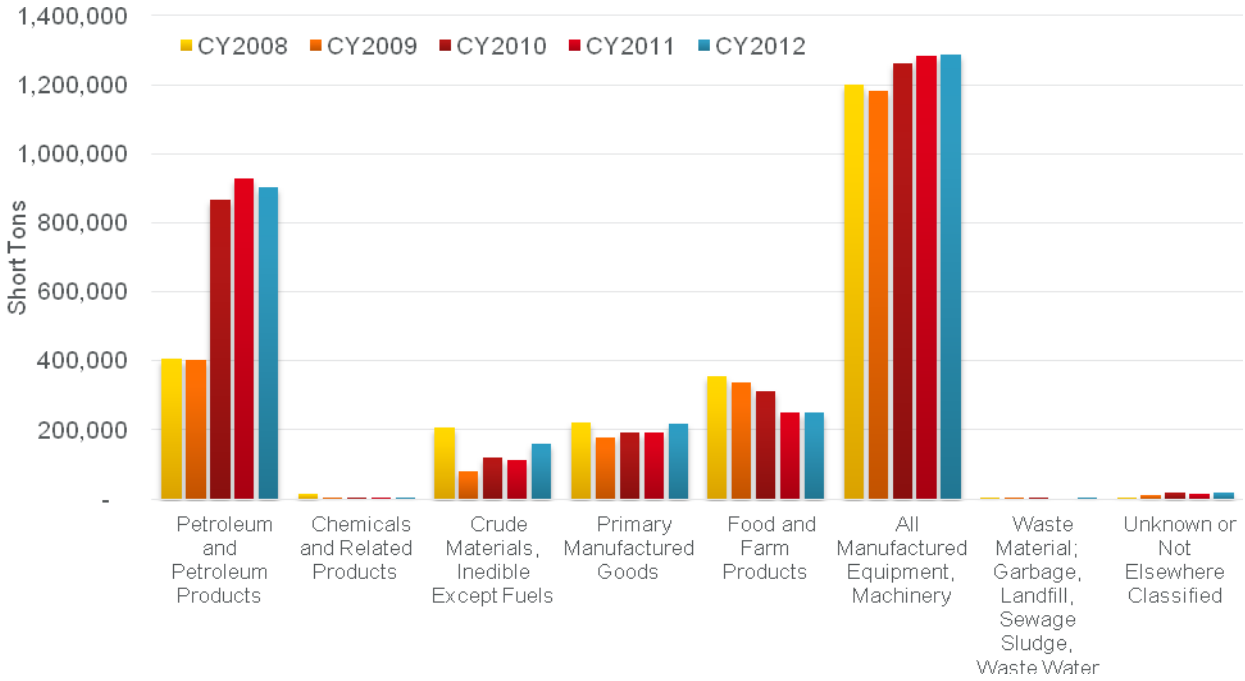


Table 3-13: 2008 – 2012 Anchorage Port Area Short Tons by Commodity Receipts

Commodity Classification	CY2012	CY2011	CY2010	CY2009	CY2008
Petroleum & Petroleum Products	806,666	811,378	774,452	264,774	280,890
Chemicals and Related Products	2,279	1,723	1,739	1,834	2,548
Crude Materials, Inedible Except Fuels	123,566	109,967	98,162	77,876	133,415
Primary Manufactured Goods	210,178	188,111	185,980	173,690	215,958
Food and Farm Products	227,083	220,748	263,553	283,229	313,030
All Manufactured Equipment, Machinery	1,135,445	1,121,001	1,112,579	1,052,539	1,043,446
Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	101	-	-	-	-
Unknown or Not Elsewhere Classified	15,346	12,324	15,910	8,245	220
Total	2,520,664	2,465,252	2,452,375	1,862,187	1,989,507

Figure 3-16: 2008 – 2012 Anchorage Freight Movements Domestic and Foreign – To Anchorage Port Area

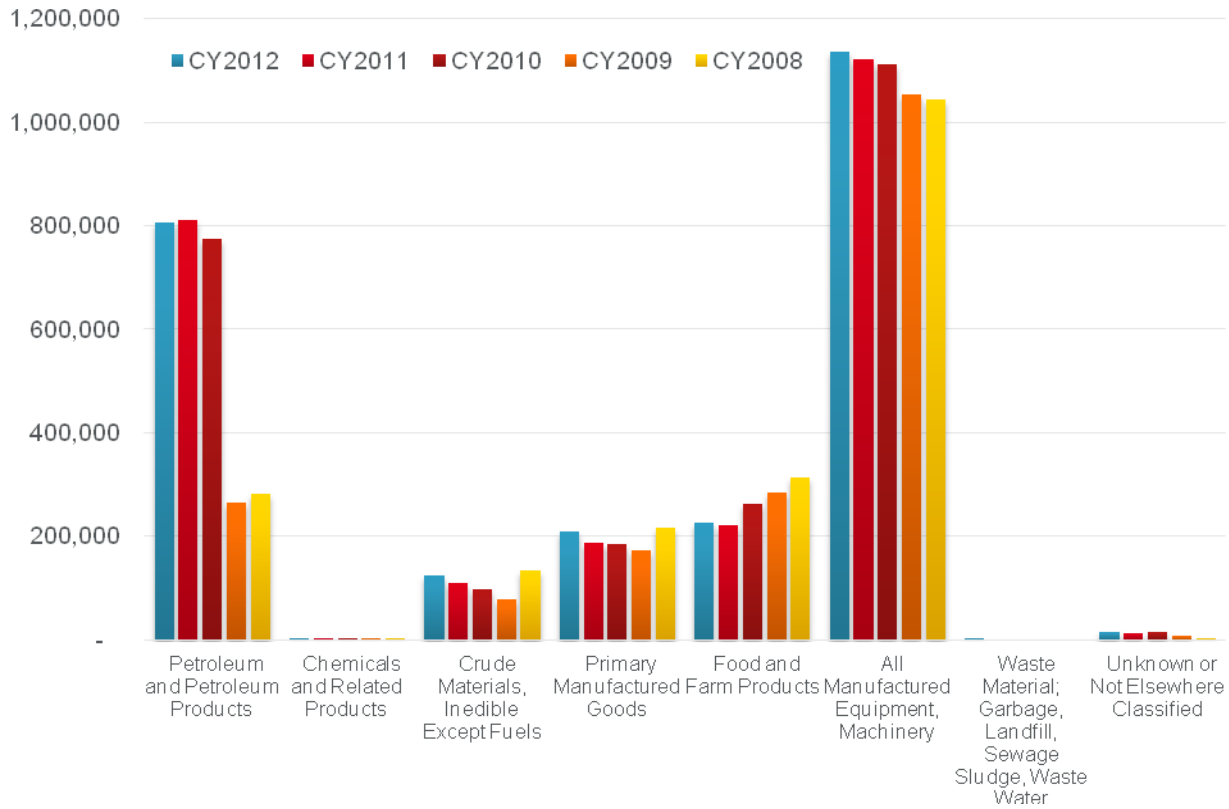


Table 3-14: 2008 – 2012 Short Tons by Commodity Shipments from Anchorage Port Area

Commodity Classification	CY2012	CY2011	CY2010	CY2009	CY2008
Petroleum & Petroleum Products	56,084	115,332	90,889	137,873	124,746
Chemicals and Related Products	2,114	95	237	487	13,770
Crude Materials, Inedible Except Fuels	36,113	2,575	22,158	1,254	73,339
Primary Manufactured Goods	8,685	3,420	4,638	2,870	6,187
Food and Farm Products	23,999	29,431	46,808	55,287	40,825
All Manufactured Equipment, Machinery	152,791	164,184	148,021	129,595	156,733
Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	-	-	5	7	3
Unknown or Not Elsewhere Classified	3,820	3,621	3,744	2,922	112
Total	283,606	318,658	316,500	330,295	415,715

Figure 3-17: 2008 – 2012 Anchorage Port Area Freight Movements Domestic and Foreign – From Anchorage Port Area

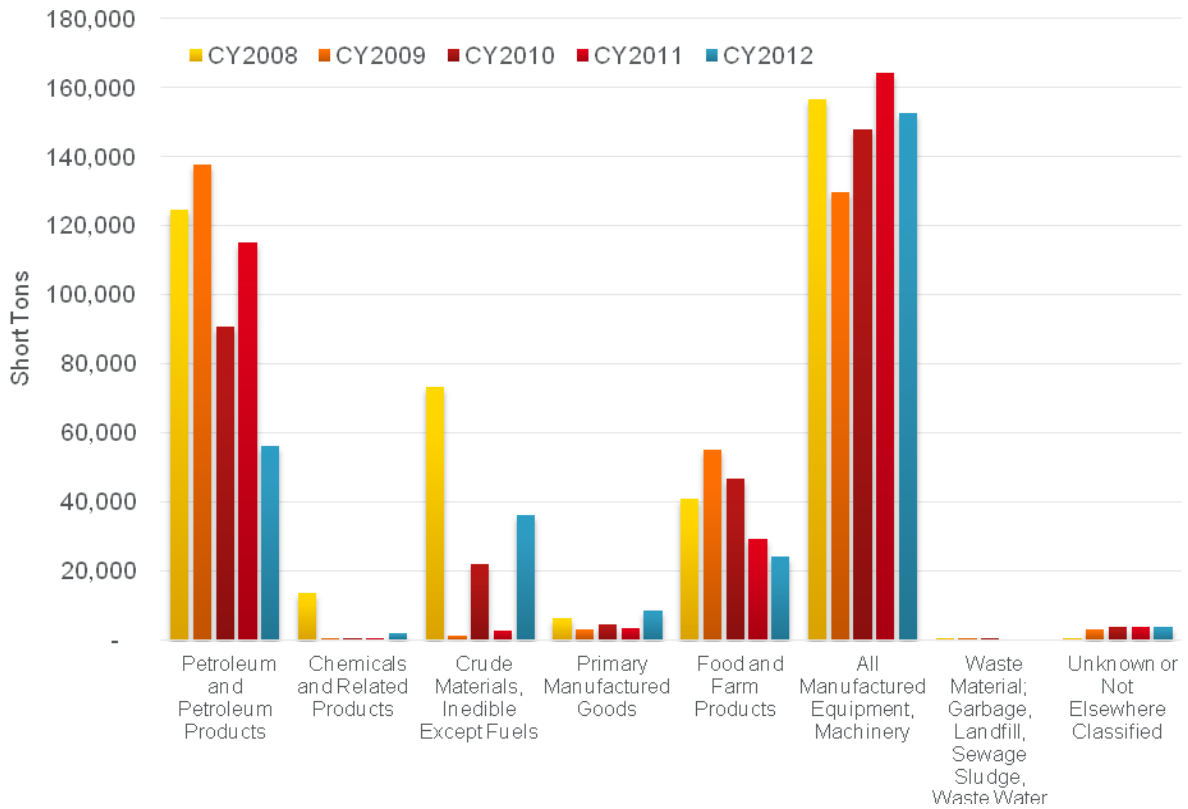


Table 3-15: 2008 – 2012 Anchorage Port Area Short Tons by Commodity Intraport Movements

Commodity Classification	CY2012	CY2011	CY2010	CY2009	CY2008
Petroleum & Petroleum Products	38,642	-	119	128	-
Chemicals and Related Products	-	-	-	-	-
Crude Materials, Inedible Except Fuels	-	-	-	-	-
Primary Manufactured Goods	-	-	-	-	-
Food and Farm Products	-	-	-	-	-
All Manufactured Equipment, Machinery	-	-	-	-	1
Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	-	-	-	-	-
Unknown or Not Elsewhere Classified	-	-	-	-	-
Total	38,642	-	119	128	1

Table 3-16: 2008 – 2012 Anchorage Port Area Commodity Flows - All Directions for Domestic and Foreign Movements

Commodity Classification	CY2012	CY2011	CY2010	CY2009	CY2008
Petroleum & Petroleum Products	901,392	806,666	56,084	38,642	901,392
Chemicals and Related Products	4,393	2,279	2,114	-	4,393
Crude Materials, Inedible Except Fuels	159,679	123,566	36,113	-	159,679
Primary Manufactured Goods	218,863	210,178	8,685	-	218,863
Food and Farm Products	251,082	227,083	23,999	-	251,082
All Manufactured Equipment, Machinery	1,288,236	1,135,445	152,791	-	1,288,236
Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	101	101	-	-	101
Unknown or Not Elsewhere Classified	19,166	15,346	3,820	-	19,166
Total	2,842,912	2,520,664	283,606	38,642	2,842,912

Figure 3-18: 2012 Anchorage Port Area All Freight Movements - Domestic and Foreign

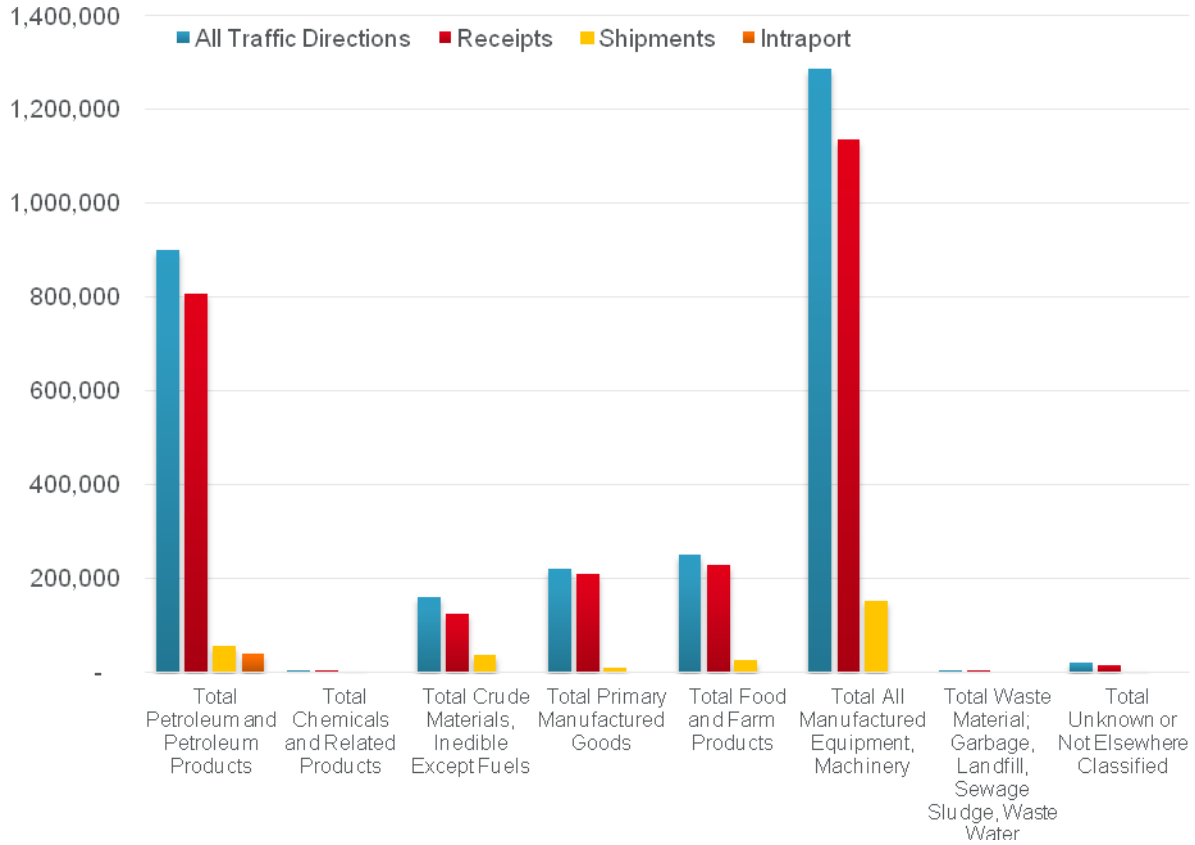


Table 3-17: 2008 – 2012 Anchorage Port Area Commodity Flows – To- Port for Domestic and Foreign Movements

Commodity Classification	CY2012	CY2011	CY2010	CY2009	CY2008
Petroleum & Petroleum Products	553,342	458,616	56,084	38,642	553,342
Chemicals and Related Products	4,272	2,279	1,993	-	4,272
Crude Materials, Inedible Except Fuels	139,101	102,988	36,113	-	139,101
Primary Manufactured Goods	80,642	78,305	2,337	-	80,642
Food and Farm Products	242,829	227,026	15,803	-	242,829
All Manufactured Equipment, Machinery	1,280,694	1,128,109	152,585	-	1,280,694
Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	101	101	-	-	101
Unknown or Not Classified	18,994	15,346	3,648	-	18,994
Total	2,319,975	2,012,770	268,563	38,642	2,319,975

Figure 3-19: 2012 Anchorage Port Area To- Port Freight Movements Domestic and Foreign

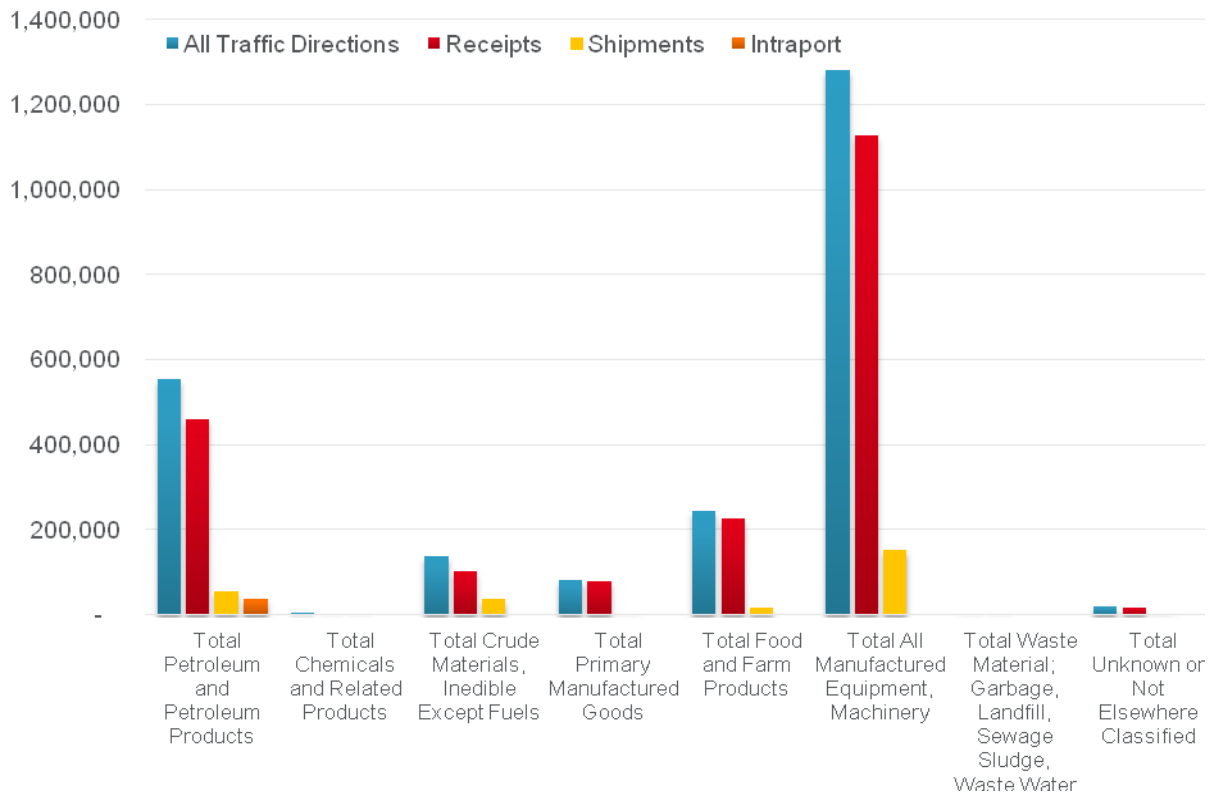
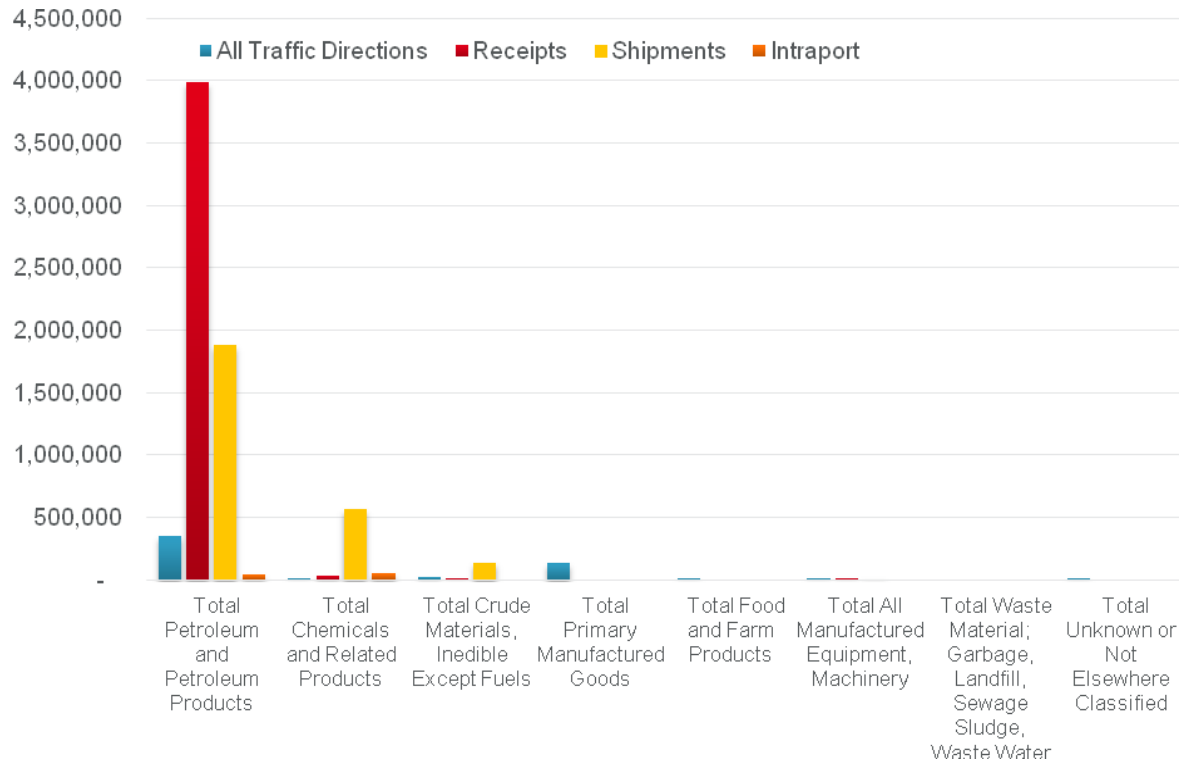


Table 3-18: 2008 – 2012 Anchorage Port Area Commodity Flows – From Anchorage Port Area for Domestic and Foreign Movements

Commodity Classification	CY2012	CY2011	CY2010	CY2009	CY2008
Petroleum & Petroleum Products	348,050	3,983,543	1,877,932	43,746	348,050
Chemicals and Related Products	121	33,761	563,522	47,210	121
Crude Materials, Inedible Except Fuels	20,578	5,600	138,051	-	20,578
Primary Manufactured Goods	138,221	-	-	-	138,221
Food and Farm Products	8,253	-	-	-	8,253
All Manufactured Equipment, Machinery	7,542	20	560	-	7,542
Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	-	-	-	-	-
Unknown or Not Classified	172	-	-	-	172
Total	522,937	4,022,924	2,580,065	90,956	522,937

Figure 3-20: 2012 Anchorage Port Area From-Port Freight Movements Domestic and Foreign



Relevance to the FMS:

The majority of water cargo flows into and out of Anchorage are domestic, of which 90 percent of domestic movements are to Alaska from other states. Foreign imports/exports into and out of Anchorage comprise roughly 10 percent of their freight market. The top commodities arriving in Anchorage from foreign origins include "Gasoline/jet fuel/kerosene" and "Building cement and concrete." South Korea is the most significant importer to Anchorage. The top commodities leaving Anchorage for foreign destinations include:

- Fish;
- Petroleum pitches/coke/asphalt/naptha/solvents; and
- Forest products/lumber/logs/woodchips.

China, Singapore, South Korea, and Japan are the major recipients of foreign outbound commodities from Anchorage. Tonnage by commodity has been relatively stable at the port over the past decade, with a slight increase overall. The foreign percentage of cargo movement has also been stable over this same period.

In terms of overall freight movements at the port, "All manufactured equipment/machinery" and "Petroleum and petroleum products" are the top commodities in transit. Intraport movements, which consist of about 13 percent of all Anchorage waterborne movements, are mainly "Petroleum and petroleum products." This information will be critical to the development of many aspects of the Anchorage FMS, including the definition of current and future freight trends, forecasts, and strategies and actions.

3.3.2 Port of Anchorage Ten Year Comparison

Conducted for:

The Port of Anchorage (POA) (2006 - 2015).

Summary:

The data provided in the POA's Ten Year Comparison is published with the POA's financial statements each year. The information includes a breakdown of tonnage arriving at the POA by commodity type.

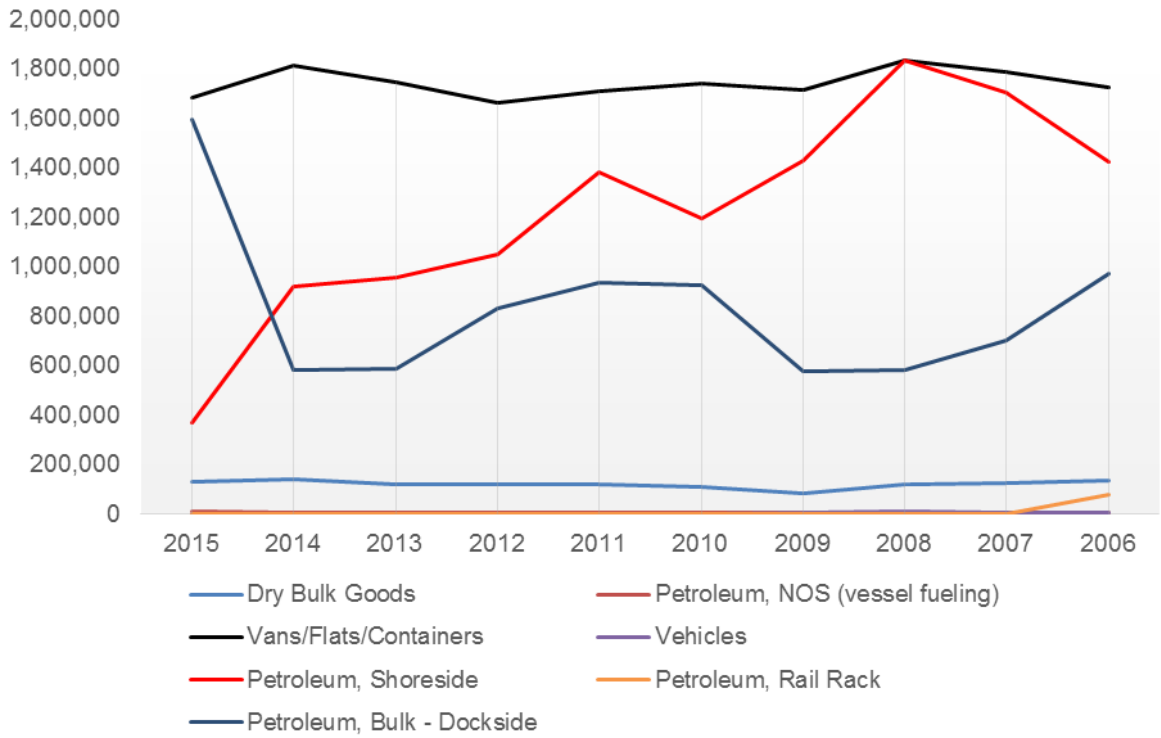
Freight-Related Elements:

The POA Ten Year Comparison illustrates the magnitude of waterborne commerce moving through the Port of Anchorage. Waterside traffic moving commodities into and out of the Port also impacts truck movements on the local highway system, rail patterns at the adjacent ARRC Rail Terminal, and airborne movements at nearby Ted Stevens Anchorage International Airport (TSAIA). The information in Table 3-18 summarizes the shifts in tonnage flow patterns at the POA.

Table 3-19: Ten Year Tonnage Comparison at Port of Anchorage

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Dry Bulk Goods	126,737	140,684	119,271	119,939	118,280	109,228	81,494	116,789	124,089	134,921
Petroleum, NOS (vessel fueling)	7,013	2,031	2,615	1,454	2,052	1,660	2,032	2,648	2,618	2,888
Vans/Flats/ Containers	1,681,222	1,811,136	1,742,704	1,658,813	1,705,176	1,736,943	1,713,086	1,831,816	1,785,518	1,722,499
Vehicles	0	0	0	0	864	0	1,473	10,725	5,381	1,158
Petroleum, Shoreside	368,294	916,050	952,631	1,046,636	1,376,909	1,192,705	1,426,711	1,830,848	1,698,581	1,421,133
Petroleum, Rail Rack	0	0	0	0	0	0	0	0	0	76,266
Petroleum, Bulk-Dockside	1,592,317	580,343	586,041	829,900	931,931	922,426	573,352	577,236	699,727	968,684
Total	**3,775,584**	**3,450,243**	**3,403,261**	**3,656,741**	**4,135,211**	**3,962,962**	**3,798,148**	**4,370,061**	**4,315,913**	**4,327,549**

Figure 3-21: Ten Year Tonnage Comparison for Port of Anchorage



Relevance to the FMS:

The information in the Ten Year Comparison show that variation in commodity tonnage across years is greatest for Shoreside Petroleum and Bulk Dockside Petroleum. These tonnage values are inversely related, Year to year variation is minimal for Petroluem NOS and Vans/Flats/Containers. Dry Bulk Goods experienced a decrease in the years of the Great Recession but are now at levels similar to those of the earlier 2000s.

3.3.3 Bureau of Transportation Statistics T-100 Segment

Conducted for:

Office of the Assistant Secretary for Research and Technology, Annually (2012).

Summary:

The Bureau of Transportation Statistics (BTS) T-100 segment data are available for all carriers to show non-stop segment freight transported for airports in states and regions.

Freight-Related Elements:

The T-100 segment data include airport information for Merrill Field airport. Note: The project team reviewed T-100 data for TSAIA; however, the data was not found to be accurate in terms of directionality and omitted from the analysis.

Table 3-24 summarizes the movements to and from Merrill Field Airport in 2012. All outbound traffic is within Alaska, specifically moving to Beluga Airport and Tyonek Airport. Table 3-25 summarizes inbound traffic to Merrill Field. Again, the primary movements travel between Beluga Airport and Tyonek Airport.

Table 3-20: Outbound Air Tonnage from Merrill Field Airport, 2012

Airport	Name	Sum of Outbound Freight (Tons)
BVU	Beluga Airport	355
TYE	Tyonek Airport	287
XWA	Granite Point	72
SKW	Skwentna Airport	19
JZE	Trading Bay	3
FAI	Fairbanks International Airport	1
		737

Table 3-21: Inbound Air Tonnage to Merrill Field Airport, 2012

Airport	Name	Sum of Freight Inbound (Tons)
BVU	Beluga Airport	58
TYE	Tyonek Airport	43
XWA	Granite Point	17
SKW	Skwentna Airport	3
JZE	Trading Bay	1
		121

Relevance to the FMS:

Merrill Field Airport is a regional airport located just south of the Port and ARRC Rail Yard in downtown Anchorage. Due to its smaller size, Merrill Field has limited freight traffic, with less than 1,000 cargo tons moving through the airport each year. The project team reviewed this information to determine if Merrill Field has the potential to yield anyr impacts on freight within the region.

3.3.4 TSAIA Monthly Cargo Summaries

Conducted for:

Ted Stevens Anchorage International Airport, Monthly (2014-2015)

Summary:

The TSAIA Monthly Reports provide weight carried in pounds by carrier to, from, and through TSAIA airport.

Freight-Related Elements:
The monthly cargo reports can be summarized annually to understand freight movement into, from, and through the airport. TSAIA breaks down cargo movements by carrier, directionality, and by international/domestic termini. The graph in Figure 11 illustrates the directionality of cargo for both 2014 and 2015. The data in Table 8 shows these shares by direction. The data in Table 9 lists the top carriers at TSAIA by directionality of movements.

Figure 3-22: Cargo Movements by Direction at TSAIA, 2014-2015

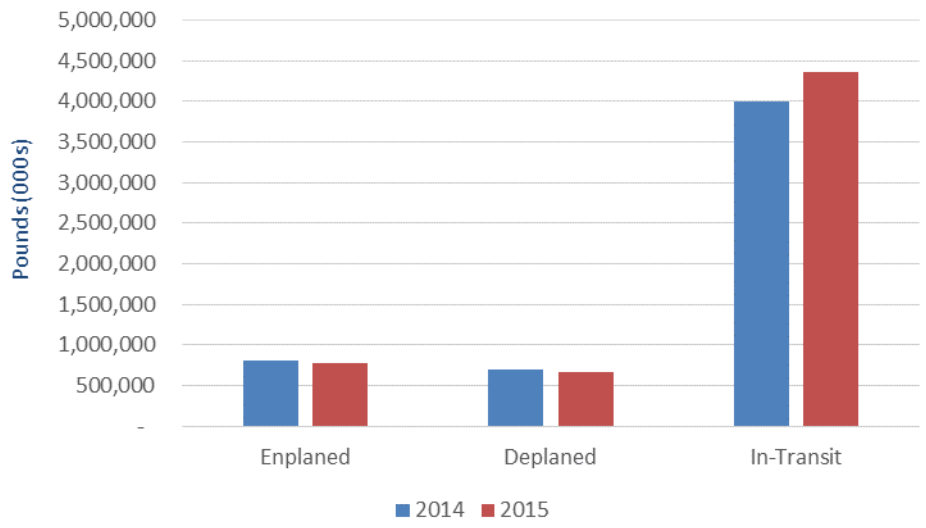


Figure 3-23: Table 3-Cargo by International and Domestic Share, 2015

Direction	International	Domestic	Total	International % of Total	Domestic % of Total
Enplaned	1,864	769,522	771,385	0%	13%
Deplaned	2,927	661,767	664,695	0%	11%
In-Transit	4,310,040	54,450	4,364,490	74%	1%

Total	4,314,831	1,485,739	5,800,570

Figure 3-24: Top TSAIA Cargo Carriers by Direction, 2014-2015

Top 5 Enplanement Carriers	Pounds (000s)	Top 5 Deplanement Carriers	Pounds (000s)	Top 5 In Transit Carriers	Pounds (000s)
2014					
Federal Express	316,326	United Parcel Service	333,168	Cathay Pacific Airways	664,070
United Parcel Service	288,870	Federal Express	298,420	Polar Air Cargo Worldwide, Inc.	663,560
Northern Air Cargo	47,251	Alaska Airlines, Inc.	25,122	Korean Air Lines	447,086
Alaska Airlines, Inc.	44,497	Northern Air Cargo	10,090	China Airlines	443,310
Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	40,420	Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	5,634	Eva Airways Corporation	423,588
Other Carriers	64,946	Other Carriers	21,650	Other Carriers	1,358,692
2015					
Federal Express	302,563	United Parcel Service	320,479	Polar Air Cargo Worldwide	831,434
United Parcel Service	272,897	Federal Express	275,233	Cathay Pacific Airways	713,648
Northern Air Cargo	47,944	Alaska Airlines, Inc.	22,612	Korean Air Lines	463,685
Alaska Airlines, Inc.	46,293	Northern Air Cargo	13,100	China Airlines	449,112
Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	40,794	Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	7,431	Atlas Air	381,708
Other Carriers	60,894	Other Carriers	25,840	Other Carriers	1,524,903

Relevance to the FMS:

Based on carrier reports from TSAIA, total cargo enplaned, deplaned, or in-transit through the airport totaled 5.8 billion pounds. About three-fourths of TSAIA cargo is in-transit international movements, meaning that carriers stop through TSAIA to refuel while on international trips. Most of the remaining cargo is domestic movements either loading or unloading at TSAIA.

FedEx is highest in terms of weight loaded at TSAIA, and UPS is the leader in terms of weight unloaded at TSAIA. Note that UPS is second in terms of weight loaded and FedEx is second in terms of weight unloaded at TSAIA, indicating that these are the strongest carriers in terms of domestic cargo moved at TSAIA. For in-transit cargo, Polar Air Cargo Worldwide, Inc. and Cathay Pacific Airways move the most weight through TSAIA. Korean Air Lines and China Airlines also create significant through movements at TSAIA.

3.3.5 Freight Analysis Framework

Conducted for:

US Department of Transportation, Federal Highway Administration, 2007/2012.

Summary:

The FHWA works with the US Census Bureau's Commodity Flow Survey (CFS) data to create the FAF commodity flow data for freight-related analysis. Data are available at 5-year intervals. FHWA reports these data by FAF zone, which are related directly to major US Census statistical reporting areas, or at the state-level for less-populated states. In Alaska, FAF data are provided at the state-level and not the local or regional level.

Freight-Related Elements:

FAF data include a breakdown of cargo movement by mode (i.e., air, water, truck, rail, and pipeline) and by commodity type. This information is helpful to gain an understanding the nature of goods movement, critical modes of freight transport, and a picture of trading partners within the State of Alaska and Anchorage. The following information is provided from the latest FAF data, which are the latest available:

- Table 3-26: 2012 Alaska Freight Flows by Mode;
- Table 3-27: 2012 Total Alaska Freight Flows - Domestic/Import/Export;
- Figure 3-21: 2012 Freight Flows by Direction - Domestic/Import/Export to/from Alaska;
- Figure 3-22: 2012 Freight Flows by Mode – Domestic/Import/Export to/from Alaska;
- Table 3-28: 2012 Mode Share - Domestic/Import/Export to/from Alaska;
- Figure 3-23: 2012 Flows by Mode - Domestic/Import/Export to/from Alaska;
- Table 3-29: 2012 Top Commodities by Direction to/from Alaska;
- Figure 3-24: 2012 Commodities by Direction to/from Alaska;
- Table 3-30: Within Alaska FAF Zone by Mode;
- Table 3-31: From Alaska FAF Zone to All Other FAF Zones by Mode;
- Table 3-32: From All Other FAF Zones to Alaska FAF Zone by Mode; and
- Figure 3-25: 2012 Value and Tonnage by Mode and Direction.

Table 3-22: 2012 Alaska Freight Flows by Mode (KTons)

Trade	Mode	Within AK	From AK	To AK	Total	Mode Share
Domestic	Truck	18,154	231	123	18,508	29.5%
	Rail	3,099	3	-	3,102	4.9%
	Water	310	26,555	2,181	29,046	46.3%
	Air (include truck-air)	108	15	68	191	0.3%
	Multiple modes & mail	111	133	991	1,235	2.0%
	Pipeline	8,731	-	1,907	10,638	17.0%
	Total	**30,513**	**26,937**	**5,270**	**62,720**	**100%**
Imports	Truck	800	25	13	838	26.2%
	Rail	236	1	19	256	8.0%
	Water	488	1	55	544	17.0%
	Air (include truck-air)	349	603	21	973	30.4%
	Multiple modes & mail	9	6	160	175	5.5%
	Pipeline	418	-	-	418	13.0%
	Total	**2,300**	**636**	**268**	**3,204**	**100%**
Exports	Truck	1,022	12	14	1,048	27.9%
	Rail	636	1	1	638	17.0%
	Water	226	71	133	430	11.4%
	Air (include truck-air)	126	29	399	554	14.7%
	Multiple modes & mail	3	84	818	905	24.1%
	Pipeline	183	-	-	183	4.9%
	Total	**2,196**	**197**	**1,365**	**3,758**	**100%**

Table 3-23: 2012 Total Alaska Freight Flows - Domestic/Import/Export (KTons)

Mode	Within AK	From AK	To AK	Total	Mode Share
Truck	19,976	268	150	20,394	*29.3%*
Rail	3,971	5	20	3,996	*5.7%*
Water	1,024	26,627	2,369	30,020	*43.1%*
Air (include truck-air)	583	647	488	1,718	*2.5%*
Multiple modes & mail	123	223	1,969	2,315	*3.3%*
Pipeline	9,332	-	1,907	11,239	*16.1%*
Total Alaska	**35,009**	**27,770**	**6,903**	**69,682**	*100%*
Percent of Total	***50%***	***40%***	***10%***	***100%***	

Figure 3-25: 2012 Freight Flows by Direction - Domestic/Import/Export (KTons) to/from Alaska

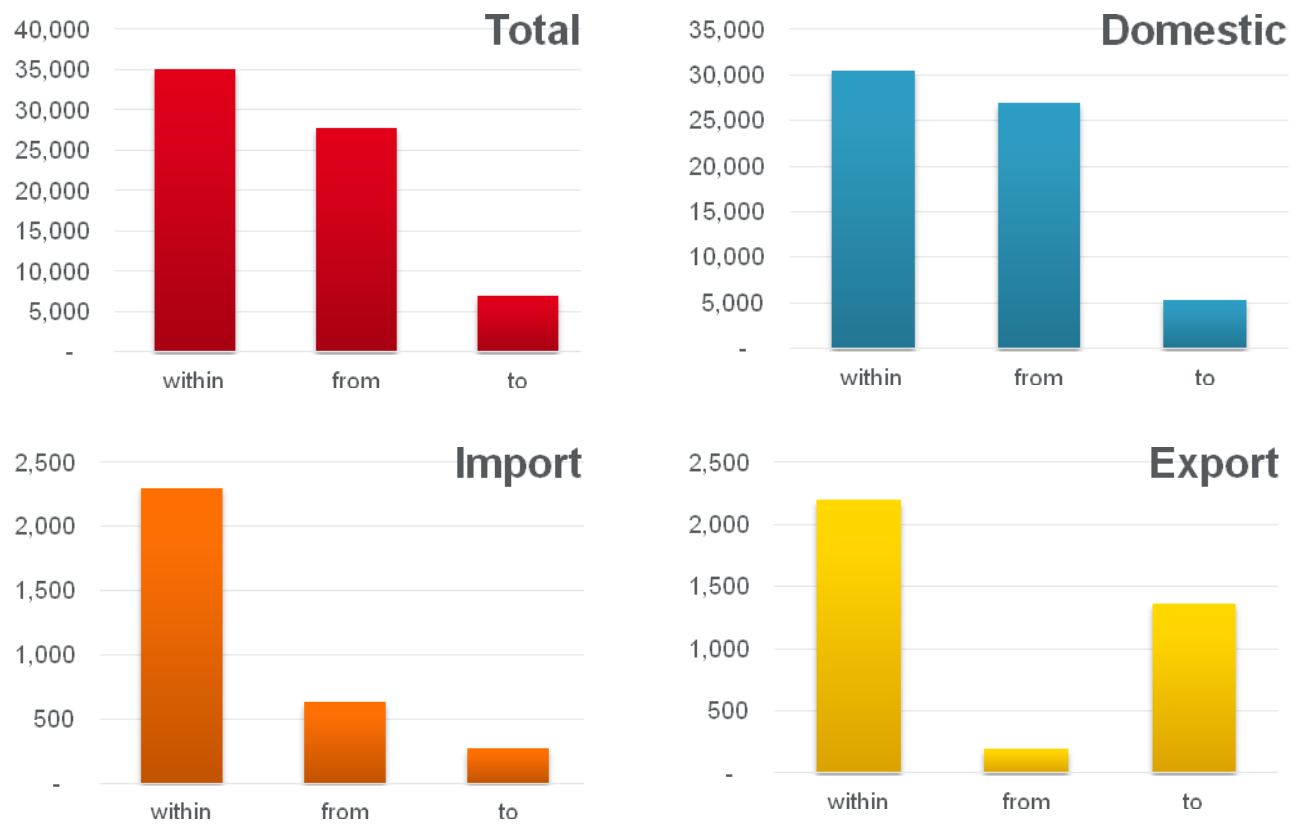


Figure 3-26: 2012 Freight Flows by Mode – Domestic/Import/Export to/from Alaska

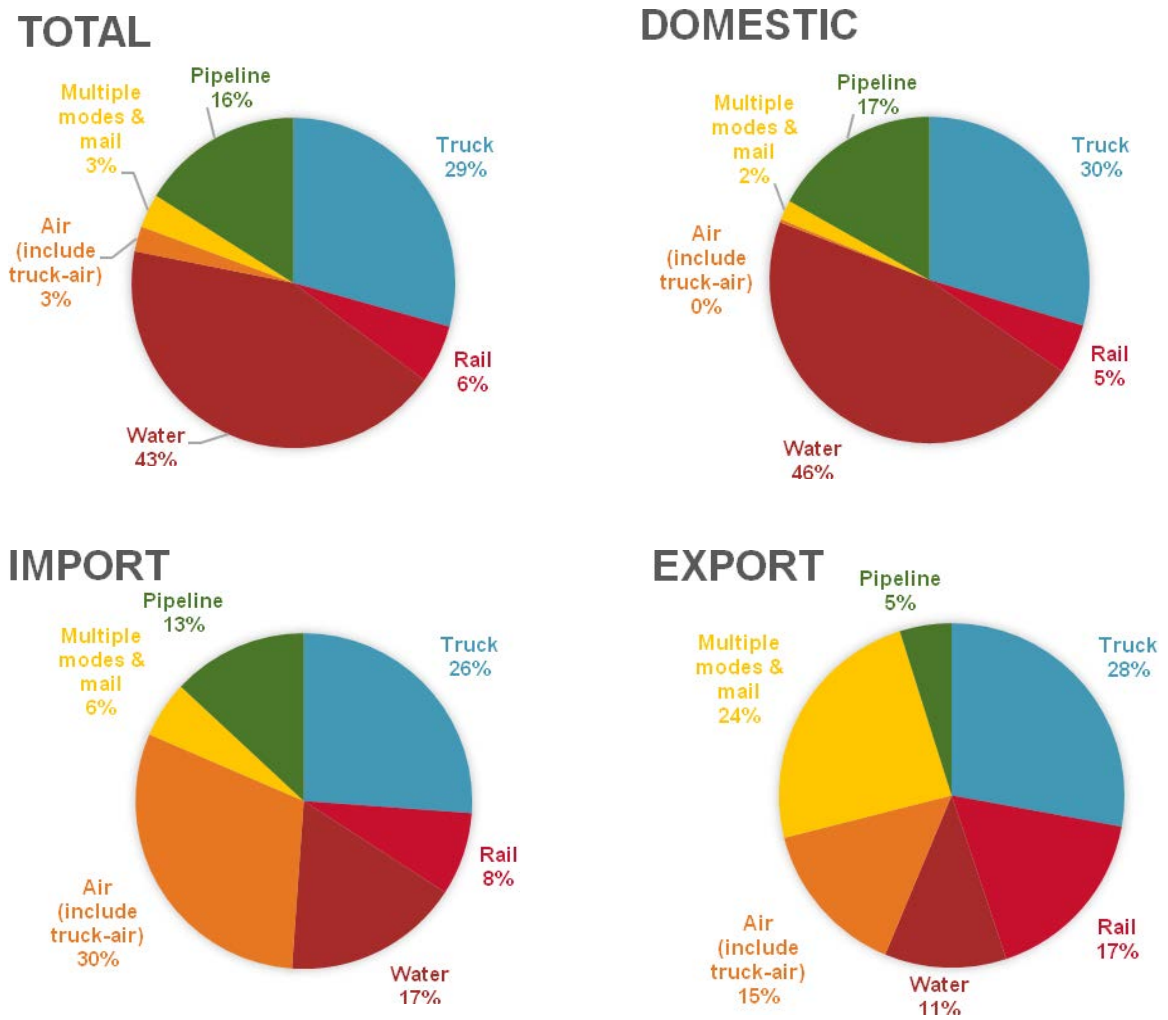


Table 3-24: 2012 Mode Share - Domestic/Import/Export to/from Alaska

Mode Shares	Truck	Rail	Water	Air (Inc. Truck-Air)	Multiple Modes & Mail	Pipeline
Domestic	30%	5%	46%	0%	2%	17%
Imports	26%	8%	17%	30%	5%	13%
Exports	28%	17%	11%	15%	24%	5%

Figure 3-27: 2012 Flows by Mode - Domestic/Import/Export to/from Alaska

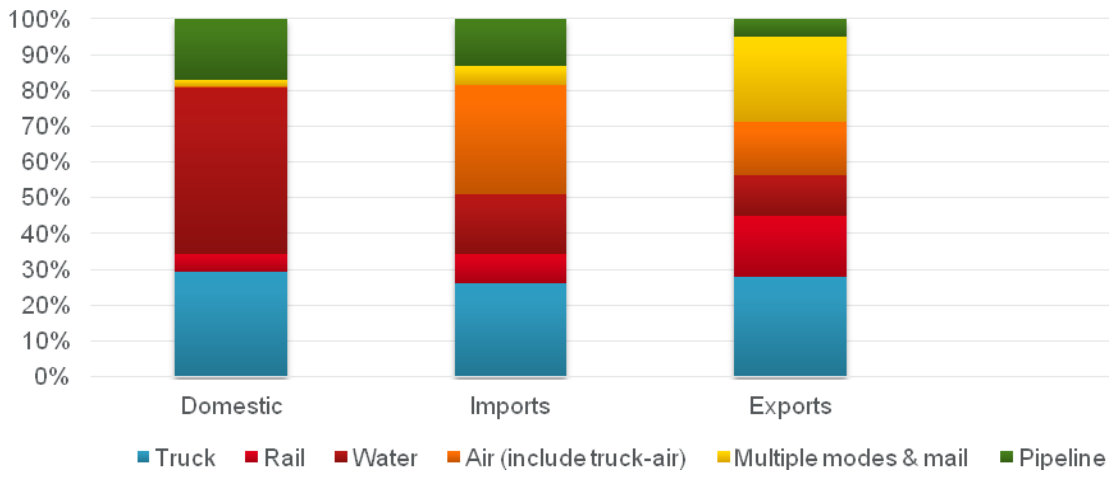


Table 3-25: 2012 Top Commodities by Direction (KTons) to/from Alaska

Top Commodities	Within	%	Top Commodities	From	%	Top Commodities	To	%
Coal-n.e.c.	7,867	22%	Crude petroleum	26,489	95%	Crude petroleum	3,405	49%
Gasoline	5,752	16%	Electronics	313	1%	Base metals	827	12%
Gravel	4,454	13%	Meat/seafood	237	1%	Mixed freight	697	10%
Fuel oils	3,279	9%	Articles-base metal	144	1%	Gasoline	217	3%
Live animals/fish	2,773	8%	Textiles/leather	96	0%	Other foodstuffs	171	2%
Nonmetal min. prods.	2,433	7%	Misc. mfg. prods.	58	0%	Nonmetal min. prods.	166	2%
Coal	2,333	7%	Furniture	56	0%	Machinery	151	2%
Logs	1,536	4%	Machinery	55	0%	Basic chemicals	145	2%
Waste/scrap	715	2%	Mixed freight	48	0%	Meat/seafood	143	2%
Meat/seafood	416	1%	Wood prods.	36	0%	Electronics	110	2%
All Commodities	**35,008**	100%	**All Commodities**	**27,768**	100 %	**All Commodities**	**6,904**	100%

Figure 3-28: 2012 Commodities by Direction (KTons) to/from Alaska

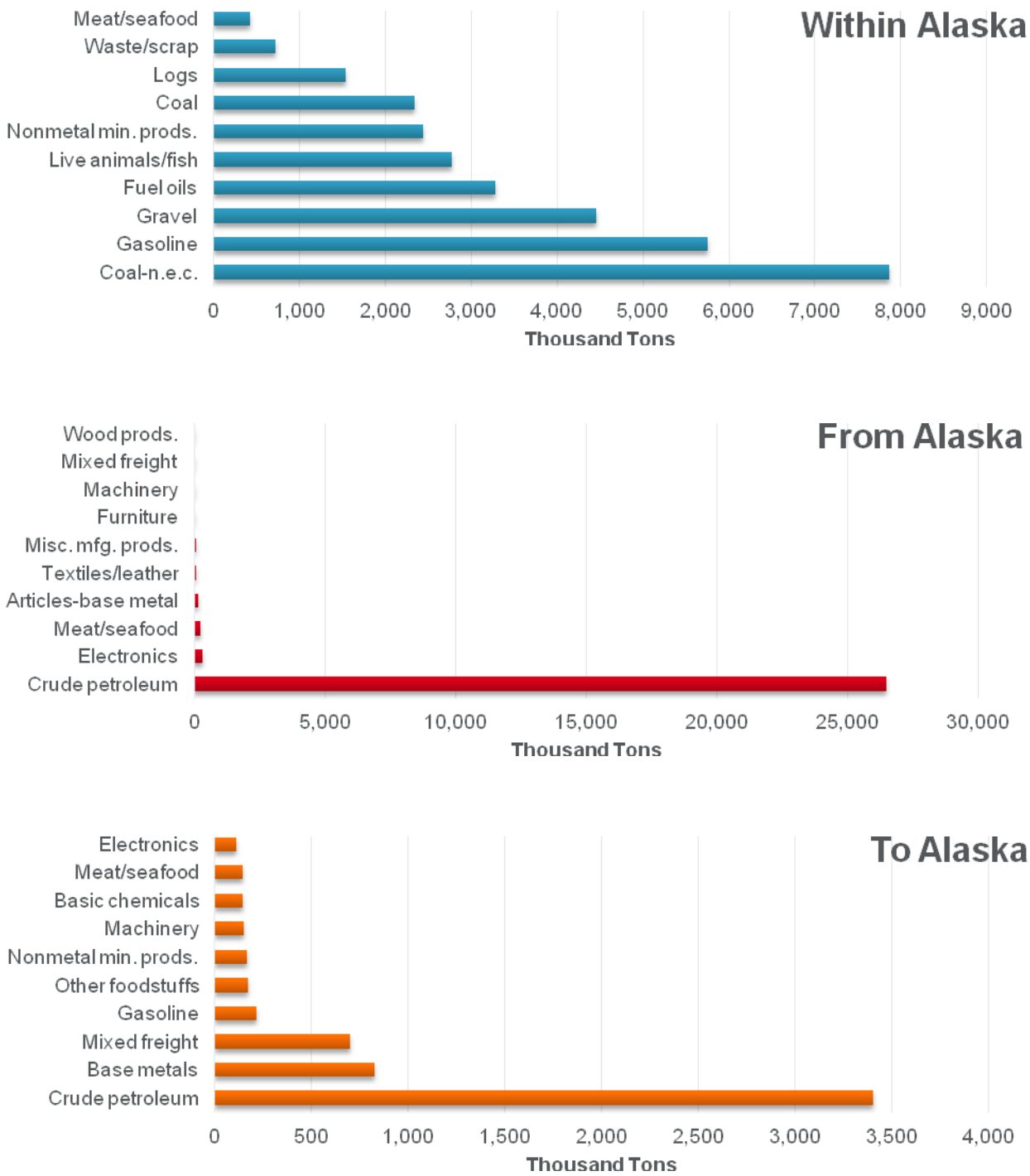


Table 3-26: Within Alaska FAF Zone by Mode, 2012

	Air (include truck-air)	Multiple modes & mail	Pipeline	Rail	Truck	Water	Grand Total
Value (Millions)	56,135	474	4,579	1,622	13,245	900	76,955
% of Value	73%	1%	6%	2%	17%	1%	100%
Tonnage (KTon)	582	123	9,332	3,971	19,976	1,024	35,008
% of Tonnage	2%	0%	27%	11%	57%	3%	100%

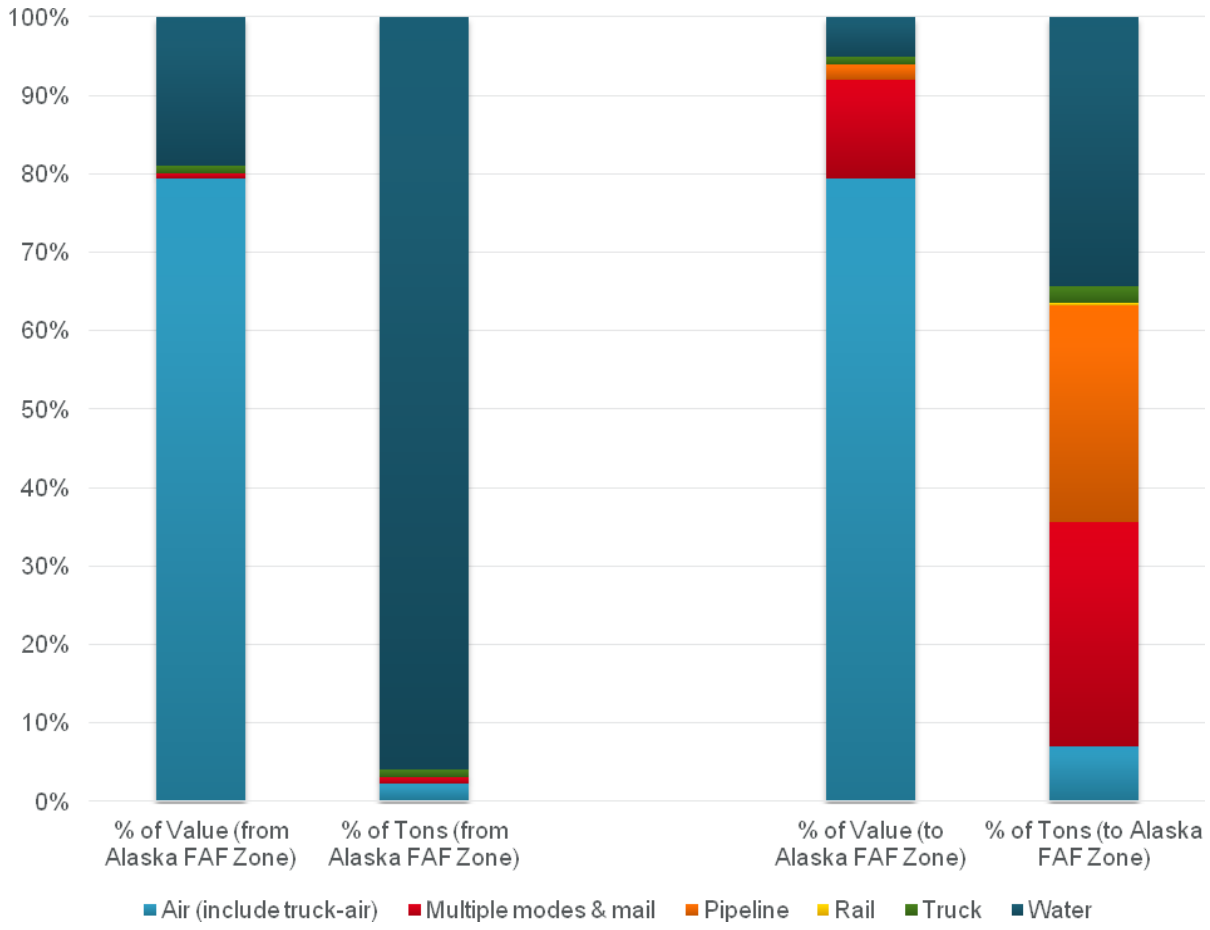
Table 3-27: From Alaska FAF Zone to All Other FAF Zones by Mode, 2012

	Air (include truck-air)	Multiple modes & mail	Pipeline	Rail	Truck	Water	Grand Total
Value (Millions)	76,213	709	-	8	922	18,157	96,009
% of Value	79.4%	0.7%	0.0%	0.0%	1.0%	18.9%	100%
Tonnage (KTon)	646	224	0	5	268	26,626	27,768
% of Tonnage	2.3%	0.8%	0.0%	0.0%	1.0%	95.9%	100%

Table 3-28: From All Other FAF Zones to Alaska FAF Zone by Mode, 2012

	Air (include truck-air)	Multiple modes & mail	Pipeline	Rail	Truck	Water	Grand Total
Value (Millions)	50,282	8,002	1,278	7	544	3,252	63,365
% of Value	79.4%	12.6%	2.0%	0.0%	0.9%	5.1%	100%
Tonnage (KTon)	488	1,969	1,907	20	151	2,369	6,904
% of Tonnage	7.1%	28.5%	27.6%	0.3%	2.2%	34.3%	100%

Figure 3-29: 2012 Value and Tonnage by Mode and Direction to/from Alaska



Relevance to the FMS:

FAF information in its original format is only helpful to understand and report statewide commodity flows. Additional processing is required to disaggregate these statewide data to support detailed regional information. Because Alaska is geographically separated from the contiguous United States (Lower 48), mode split is not as truck or rail heavy as in other states. Water and pipeline cargo in Alaska comprise high percentages of the domestic mode share, 46 percent and 17 percent, respectively. Air considers the highest share of international imports (30 percent) in the state. Truck is also a significant international trade mode, given a 26 percent share of imports and 28 percent share of exports in Alaska. This high percentage of international truck movement encompasses trade with Canada. For all movements collectively, waterborne cargo comprises the highest share in the state.

The top commodities moving within the state include coal n.e.c., gasoline, and gravel. The top commodity leaving the state is crude petroleum, which constitutes about 95 percent of outgoing commodities from the state. Finally, crude petroleum, base metals, and mixed freight make up the majority of incoming commodities to Alaska. Of the over $236,000 million value of commodities traded within, from, and to Alaska, 32 percent of the value traded is within Alaska, 41 percent is outbound from Alaska, and 27 percent is

inbound to Alaska. This commodity flow information is useful in defining current and potential future freight trends and conditions in Anchorage.

3.3.6 American Transportation Research Institute

Conducted for:

American Trucking Associations Federation, 2014.

Summary:

The American Transportation Research Institute (ATRI) works with the American Trucking Associations Federation to collect information regarding the trucking industry and its role in the overall national freight system.

Freight-Related Elements:

ATRI data collect and assesses commercial vehicle movements by traffic analysis zone (TAZ) in regions throughout the U.S. Table 3-33 provides total truck trips to and from TAZs for the top 30 "from-zone" trips reported in the Anchorage Regional Travel Demand Model. This information pulled data from 12 "2-week" datasets collected in 2014 and processed by ATRI (March 1-15, June 1-15, Aug 1-15, and Nov 1-15). Figure 3.26 shows the external TAZ structure versus the internal area for TAZs in the Anchorage region. Figure 3.27 illustrates the internal TAZ structure.

Table 3-29: Freight Trips to/from the Top 30 TAZs in the Anchorage Regional Model

ATRI TAZs	Trips From TAZ	Trips to TAZ
63 (Industrial Area W of Downtown/Various Businesses/Lynden Transport)	2,104	2,603
368 (Port of Anchorage)	1,504	1,656
367 (ARRC Terminal/Surrounding Industry)	1,211	1,215
7777 (External – Area South of Anchorage – See Yellow Portion in Figure 3-26)	1,084	1,041
381 (Port of Anchorage)	758	804
369 (JBER Next to Port of Anchorage)	708	662
476 (Industrial Area W of Downtown/Various Businesses)	384	259
882 (Area in Mat-Su)	345	342
9999 (External – Area North/Northwest of Anchorage – See Purple Portion in Figure 3-26)	331	331
0 (Knik Arm/Portions of JBER)	326	382
474 (Industrial Area W of Downtown/Various Businesses)	283	42
327 (Commercial Area/Fred Meyer-E Northern Lights Blvd)	282	279

ATRI TAZs	Trips From TAZ	Trips to TAZ
429 (Industrial Area NW of Downtown/Various Businesses)	262	264
8888 (External – Area Northeast of Anchorage – See Blue Portion in Figure 3-26)	258	252
473 (Industrial Area W of Downtown/Various Businesses)	244	282
371 (ARRC Terminal/Surrounding Industry)	222	220
140 (Industrial Area near C Street/O'Malley Road/Various Businesses and Distributors)	195	199
2 (TSAIA)	194	225
205 (Industrial Area East of TSAIA/Various Businesses)	165	153
129 (Industrial Area East of TSAIA/Safeway DC/Various Businesses)	158	113
626 (Commercial Area North of JBER/Fred Meyer- Old Glenn Hwy)	143	122
207 (Industrial Area East of TSAIA/Various Businesses and Distributors)	126	173
75 (Commercial Area/Fred Meyer- Debarr Road)	126	134
584 (Commercial Area/Tikahtnu Commons)	120	97
64 (Commercial Area/Glenn Square)	119	87
127 (Industrial Area East of TSAIA/Various Businesses and Distributors)	115	103
310 (Industrial Area East of TSAIA/Various Businesses and Distributors)	114	116
57 (JBER)	112	81
126 (Industrial Area East of TSAIA/Various Businesses)	108	79
Total	**12,101**	**12,316**
Percent	*60%*	*61%*
All TAZs	**20,329**	**20,329**

Figure 3-30: External TAZ Structure in the Anchorage Regional Model

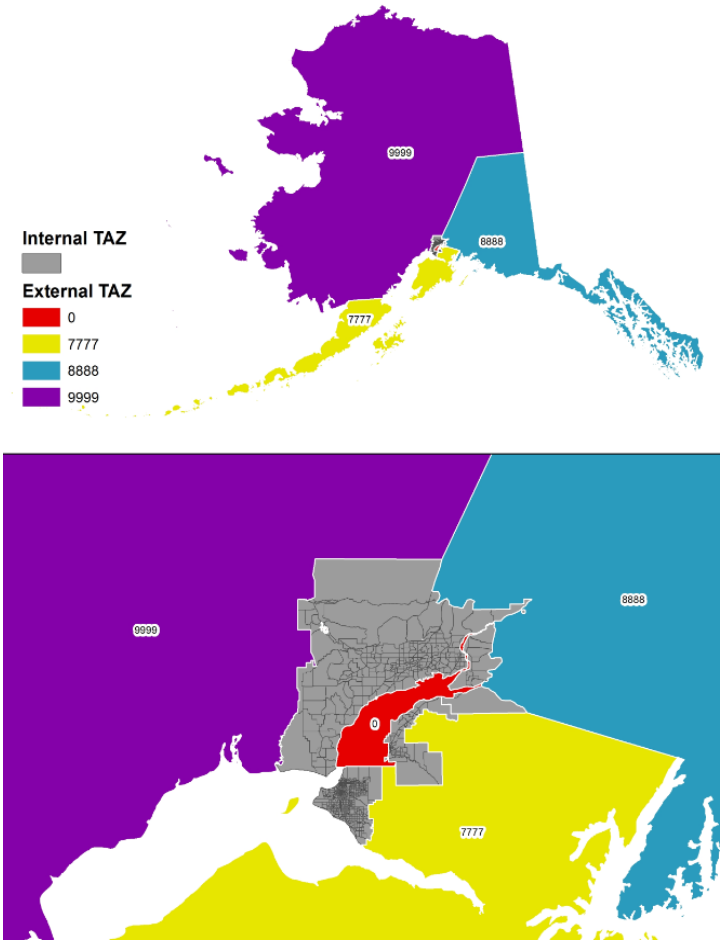
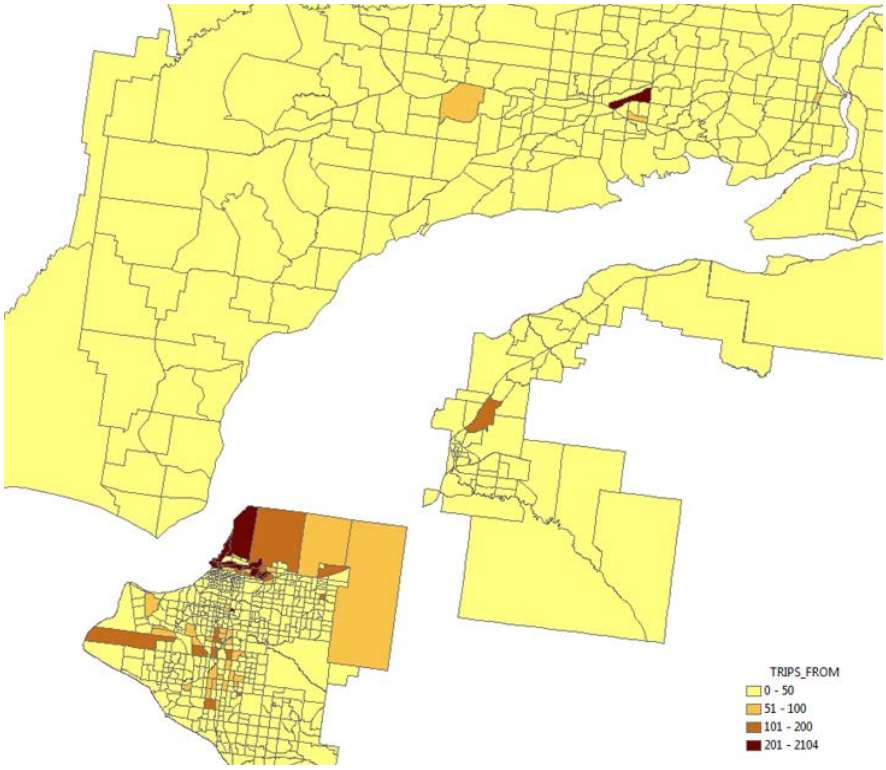


Figure 3-31: Internal TAZ Structure in the Anchorage Regional Model



Relevance to the FMS:

The ATRI data will be potentially used in the FMS to illustrate the major areas from which commercial vehicle trips originate and to where they end throughout Anchorage and between other external areas to/from Anchorage.

3.3.7 Weigh-In-Motion Data

Conducted for:

Alaska Department of Transportation and Public Facilities, 2013.

Summary:

DOT&PF provided Weight-In-Motion (WIM) data for this study. These data were provided for five Anchorage area WIMs broken down by classification on an hourly basis and then broken out into the individual 12 months.

Freight-Related Elements:

Table 3.34 summarizes WIM data for medium and heavy truck movements at the WIM station areas. The medium and heavy truck categories are based on 13 FHWA vehicle classes, assuming classes 4 to 7 are medium and classes 8 to 13 are heavy.

Table 3-30: WIM Data Summary for Five Anchorage WIM Stations

Location	Days	Total Annual Truck Crossing		Total Trucks	Average Daily Truck Crossing		Avg Daily Trucks	% of all vehicles		Trucks %
		Med	Hvy		Med	Hvy		Med	Hvy	
Glenn Highway, Highway 1, CDS route 135000 MP 9.1 (truck lane on far right only)	365	309,917	127,455	437,372	849	349	1,198	3%	1%	4%
Minnesota Drive (Anchorage, AK), CDS route 134300 MP 3.0 (5 lanes)	365	422,776	74,485	497,261	1,158	204	1,362	3%	1%	4%
New Seward Highway, Highway 1, CDS route 130000 MP 122.0 (4 lanes)	365	969,429	97,994	1,067,423	2,656	268	2,924	7%	1%	7%
Ocean Dock Road (Port of Anchorage), CDS route 134344 MP 0.3 (2 lanes)	365	91,420	225,390	316,810	250	618	868	14%	34%	47%
Tudor Road, (Anchorage, AK) CDS route 133899 MP 5.0 (4 lanes)	365	186,673	42,698	229,371	511	117	628	3%	1%	3%

MP = milepost

Relevance to the FMS:

This information will be used for the regional freight assessment to find locations with high number of trucks crossings. In combination with the ATRI data summaries, this information will be used to identify likely freight routes and corridors.

4 Report and Plan Summaries

This section summarizes transportation reports, plans, and studies relevant to the Anchorage FMS include the lead agency(s) name, and summaries of the data and analysis, freight-related elements, and potential usage in the Study.

4.1 Statewide

4.1.1 Let's Get Moving 2030 | Alaska Statewide Long Range Transportation Policy Plan, 2008 (2015 Update in Progress)

Conducted for:

Alaska Department of Transportation and Public Facilities, 2008.

Summary:

Let's Get Moving 2030 is Alaska's Statewide Long-Range Transportation Plan to guide transportation policies, programs, and investments throughout the state through 2030. It can be used as a framework for developing future transportation planning documents, capital programs, and budgets. The plan includes an evaluation of the most pressing transportation issues facing Alaska and forecasts for the future and is federally mandated.

Freight-Related Elements:

Efficient and productive intermodal travel and intermodal connection facilities are critical for moving people and goods to and from, and within Alaska. Trucks will be used if the product's final destination is connected by a roadway. Highway construction in remote areas is very costly per user due to distribution of population, extreme weather, rugged terrain, and geography. Private roads (built and operated by private industry, often mining and other extractive industries) have historically played a major role in the development of Alaska and have been made public in the past.

The relative lack of roads means that travel and freight movement by air and water are significantly more important in Alaska than the United States as a whole. Freight to remote communities is often transported by air to a regional hub, and then is further distributed by small truck, aircraft, or boat/barge. Heavy or bulky commodities (gravel, heavy equipment, etc.) are more likely to be moved by barge in remote areas. Many communities rely solely on aviation to connect to the rest of the state and beyond. The Ted Stevens Anchorage International Airport is State owned and operated.

The relative lack of roads means that travel and freight movement by air and water are significantly more important in Alaska than the United States as a whole. Port of Anchorage's focus is on containers, trailers, and higher value commodities. Most food, household items, and consumer goods usually arrive in Port of Anchorage by barge or container ship.

The Statewide Long-Range Transportation Plan (LRTP) indicated that freight volumes are expected to reach 21 million tons by 2020 (more than double 1998 numbers). Other roadway trends documented in the Statewide LRTP included:

- Increasing congestion in Anchorage and other areas due to more vehicles and more vehicle miles traveled;
- Safety improvements are critical when traffic volumes increase; and
- Transportation finance strategies uses in other areas of the country have limited applicability in Alaska, such as user fees, fuel tax, revenue bonds, tolls, vehicle miles traveled-based charges.

Maritime trends documented in the Statewide LRTP included:

- Alaska's Public ports and harbors have steadily deteriorated due to lack of funding for upkeep and improvement, increasing infrastructure risk and costs; and
- As Alaska's population has grown, so has the demand for marine shipping and the need for regular maintenance and periodic expansion of port and harbor facilitates.

Policies / Regulations / Standards / Goals Established by the Statewide LRTP included:

- 14 policies were developed to guide statewide transportation strategies and actions throughout the state, with preventative maintenance as a strategy for prolonging life of exiting highways; and
- Priorities identified included capacity and safety improvements on the Glenn-Seward Highway-to-Highway connection in Anchorage; widening of Seward Highway in Anchorage as detailed in the Anchorage Bowl LRTP; rebuilding subgrade and pavement in key section of the Parks Highway between Anchorage and Fairbanks, thus removing seasonal restrictions during ground thaw for truck/freight use on the highway; developing Port MacKenzie as a specialized bulk commodities exporter (complementing POA's focus); and implementing the Knik Arm Crossing connecting Anchorage with Point MacKenzie by road.

Relevance to the FMS:

The Statewide LRTP provides information about existing marine and aviation facilities and movements in Anchorage and statewide freight movement patterns. It also provides information about freight issues and trends that will be reviewed for potential use in the FMS include:

- Alaska's growing population is creating more demand for marine shipping and update/expanded port and harbor facilities;
- Alaska's highway system is becoming congested though additional demand and shortage of available funding for maintenance and new construction;
- Alaska has a shortage of funding to make all necessary investments in transportation. Consider maximizing and extending the life of Alaska's existing freight infrastructure. Also consider privatizing roads as appropriate;
- Alaska's transportation systems may be impacted by the effects of climate change; and

- Greenhouse gas emission regulations may impact Alaska's transportation system as it is heavily dependent on aviation and marine transportation, which both have large carbon footprints per person mile traveled compared to highway use.

The LRTP's recommendations also provide guidance regarding potential solutions that could be considered as part of the Anchorage FMS including:

- Improve efficiently and productivity of intermodal transportation systems, including maximizing available funding, conserving energy; minimizing disruption due to seasonal challenges;
- Improve security;
- Provide consistency with applicable policies set forth in the Statewide LRTP; and
- Provide consistency with the goals and priorities set forth in the Statewide LRTP.

4.1.2 Alaska Statewide Transportation Improvement Program (STIP) 2016 - 2019, 2015 (DRAFT)

Conducted for:

Alaska Department of Transportation and Public Facilities, 2015.

Summary:

The Alaska Statewide Transportation Improvement Program (STIP) covers all surface transportation improvements for which federal funding is approved and or expected (does not include aviation or port and harbor projects). Projects in the STIP must be consistent with, and implement, the policies of Let's Get Moving 2030, the Statewide LRTP. The plan articulates policies for system development, system preservation, management and operations, economic development, safety, security, environment and quality of life, and good government. The STIP identifies the specific projects to be completed and the timeline.

Freight-Related Elements:

As of October 2015, the STIP includes the following projects in the Anchorage area:

- Seward Highway Bridge Rehab from MP 17 – 22.5 and from MP 25 – 36 and along Seward Highway;
- Seward Highway improvements from MP 99 – 105 Seward Highway improvements from MP 105 -115;
- Seward Highway improvements from 36th Avenue to 20th Avenue;
- Seward Highway: Dimond Boulevard to Dowling Road Rehabilitation;
- Seward Highway: Dowling Road Interchange Rehabilitation;
- Seward Highway Reconstruction from O'Malley Road to Dimond Boulevard;
- Seward Highway at 36th Avenue Interchange;
- Glenn Highway: Airport Heights Boulevard to Hiland Road Pavement Preservation;
- Anchorage - Glenn Highway/Muldoon Road Interchange Reconstruction;

- Knik Arm Crossing Anchorage Access Connections;
- Knik Arm crossing toll financed bridge facilities - Anchorage Area Principal Arterial Pavement Resurfacing and ADA Compliance;
- Road Weather Information System (RWIS); and
- Weigh-In-Motion Maintenance and Operations.

For additional information about the projects listed above, the STIP is available on-line at http://www.dot.state.ak.us/stwdplng/cip/stip/

Relevant to the FMS:

The above projects may influence the preferred routing for truck traffic in the region and be useful in helping define freight corridors.

4.1.3 Alaska Regional Ports Report, 2014

Conducted for:

US Army Corps of Engineers and Alaska Department of Transportation and Public Facilities, 2014.

Summary:

In 2008, the first Alaska Regional Ports Conference convened to discuss issues faced by Alaska's ports and harbors. Local, state, and federal government officials discussed infrastructure and service needs with statewide port and harbor managers, staff, and users. The overwhelming mandate from this group was the need for ongoing collaboration, comprehensive planning, and leadership to meet Alaska's future needs. To achieve these goals, the USACE and DOT&PF championed a multi-staged research effort to lay the groundwork for developing a statewide port and harbor plan. This report is the summary of that independent research and analysis, and incorporates feedback from the 2010 Regional Ports Conference attendees and conceptual revisions and suggestions made by USACE, DOT&PF, and the Denali Commission.

Freight-Related Elements:

The reports stated that Anchorage handles 85 percent of the general cargo for the "railbelt" area. Other freight-related elements included:

- More than any other mode, maritime transportation is linked to the primary industries that are the foundation of Alaska's economy, including oil and gas, commercial fishing, mining, and cruise ship/tourism industries. The main advantage of maritime transportation is its economies of scale.
- The POA offers modal flexibility. Goods arriving by containership and barge are distributed across the state using road, rail, and air transportation networks. Most of the state's 350-plus communities lack road or rail access, so barging is critical for these communities.
- There are no alternatives to the POA's dock, storage, and crane facilities in Alaska. Other ports in the state include:

  - Port MacKenzie - located across Knik Arm from the POA. It is currently considered a sub regional hub but is developing as a bulk cargo port. The port has a substantial amount of developable land and is pursuing a rail link to the port.
  - Unalaska/Dutch Harbor and Kodiak - major consolidation point for containerized seafood.
  - Seward and Whittier - With rail and highway access, these communities have access to all other communities on the road system, giving them some value as potential alternatives to the POA.
- The POA is run by the MOA as a major enterprise fund.
- Facilities in Anchorage include:
  - Ten piers, wharves, and docks on record with the USACE within 1 mile of Ship Creek. Three of the facilities specialize in the receipt and shipment of containerized general cargo, two are for the receipt of sand, gravel, and bulk cement, two are intended for receipt and shipment of petroleum products, and one is for the mooring of tugs.
  - Nine of the piers, wharfs, and docks are owned by the MOA or the Alaska Railroad and are run entirely or in conjunction with private companies (shared or leased).
- There is a flat car connection from the port to the Alaska Railroad terminal located in TSAIA to allow for intermodal rail connection. The port also has road access improvements to reduce queuing at the port gate.
- The POA is undergoing a major intermodal expansion project. As of November 2015, the POA has shifted its focus from expansion to modernization of the existing port. This project will update port facilities to improve operational efficiently and accommodate modern shipping operations (e.g. support larger, deeper draft vessels, etc.).
- The POA's resupply trade is dominated by consumer goods, which include petroleum products, primary manufactured goods, and groceries, the majority of which are transported in containers, except for petroleum products delivered by tankers and/or fuel barges.
- Although the historical average annual growth rate of container traffic through the POA has been more than twice the population growth rate in Alaska, future growth is expected to more closely parallel population growth. The population of the area served by the POA is expected to increase at an average annual rate of about one percent over the next 10 years. The quantity of resupply cargo received by the POA will likely increase at a comparable rate.

This report concluded that a potential for Alaska Canadian Rail Link connection with the POA to relieve congestion in U.S. west coast ports would be more expensive and offer limited / no time saving benefits. The Canadian Rail Link would only be feasible in the "perfect storm" of conditions.

The report noted that there is potential for sea-air movements of high-value cargo from Asia (by barge) through the POA to TSAIA for just-in-time delivery to the Lower 48. Major volumes of coal and timber exports were deemed essential to make sea-air movements feasible. The report also indicated that the POA is unlikely to become a major transshipment container terminal for non-Alaska bound cargo but will likely see an increase in inbound containers to meet the needs of a growing population and increased economic activity. The greatest challenge in accessing the POA is the water depth. Dredging is required to regularly to maintain the 35-foot depth.

Relevance to the FMS:

This report will provide information about the existing conditions at the POA for use in the Anchorage FMS inventory and analysis. This report will also help refine the freight forecast. This report also provides useful information about intermodal trends generated by port activities that will be used to document existing conditions and recommendations.

4.1.4 Alaska Aviation System Plan, 2013

Conducted for:

Alaska Department of Transportation and Public Facilities, 2013.

Summary:

The Alaska aviation system is unlike any other system in the United States. This plan is a statewide aviation tool to assist the DOT&PF and other airport sponsors in efficiently guiding the development, maintenance, operation, and management of Alaska's vast airport system and understanding the many issues facing the system. The Alaska Aviation System Plan is a component of DOT&PF's Statewide LRTP, Let's Get Moving 2030, which incorporates and addresses all modes of transportation.

Freight-Related Elements:

The DOT&PF owns and operates 255 airports and seaplane bases. The TSAIA and Fairbanks International Airport make up Alaska's International Airport System; the other 253 airports operated by DOT&PF mostly serve small remote rural communities. Airports in the Lower 48 are more typically owned and operated by city, region or county governments, airport authorities, or other local sponsors. Alaskans ship 39 times more airfreight than other U.S. states. An annual average growth rate of 2.3 percent per year at the Anchorage and Fairbanks Airports is expected. Cargo tonnage is forecasted to grow by 5.5 percent per year statewide, or 1.8 percent per year, excluding the Anchorage and Fairbanks Airports.

Relevant to the FMS:

The plan provides growth projections for the TSAIA, which will be used as part of the estimate of future freight needs. It also documents the importance of air freight in distribution of goods to other regions of the state.

4.1.5 Alaska International Airport System | Air Cargo Related Economic Development Opportunity Assessment, 2014

Conducted for:

Anchorage Economic Development Corporation, 2014.

Summary:

This report examines the existing conditions of the Alaska International Airport System, assesses assets relating to transport and property, discusses air cargo supply chain trends and competition and makes recommendations to meet the needs of the Alaska's International Airport System.

Freight-Related Elements:

The 2012 dollar value of imports destined for Alaska was $2.1 billion and native Alaskan exports were $4.5 billion. The largest export category is fish and other marine products followed by natural resource products.

At present, the predominant movement of distributed goods from the distribution center to the Anchorage and Fairbanks markets is via truck. There is a relative deficiency of urban high-speed highways and a lack of continuity for some east-west roadway movements that must move through Anchorage city center.

The Alaska Railroad Corporation (ARRC) is a State of Alaska-owned Class II railroad which extends from Seward and Whittier in the south to Fairbanks in the north, passing through Anchorage. The ARRC does not currently have a direct, land-based connection with any other railroad lines on the North American network. ARRC's urban tracks are well-situated for servicing industrial areas of Anchorage and Fairbanks.

The TSAIA is ranked second in the US for landed weight of cargo aircraft, and sixth in the world for cargo traffic due to its location (allowing additional cargo weight), the growth of China's tech exports. Since Anchorage rests on a peninsula and the approaches to TSAIA are over water. TSAIA is a strategic and operational hub at good distance between many key destinations including Asia, Europe, and the Americas. Microelectronics and garments/apparel which are high value and generally lightweight are a dominate category of goods transported through Alaska by air. Others include: electronics, pharmaceuticals, aerospace components, auto components, medical devices, bio-science applications, toys and apparel

The Anchorage and Fairbanks International Airport (FAI) are the only two airports in the United States to have been granted the capability to transfer cargo from a foreign carrier's aircraft to any of its other aircraft, transfer from a foreign carrier to any US air carrier, and transfer from one foreign carrier to any other foreign carrier without being considered to have broken its international journey. Therefore, these goods do not need to go through customs.

Along with the airport administration (DOT&PF), approximately 265 businesses or agencies lease (or sublease) space at TSAIA. These tenants provide services directly to

the airport and its operation, or provide goods and services that primarily serve air passengers or air cargo clients.

The POA is an origin and destination cargo maritime transport terminal and does not serve as a market-to-market cargo transfer hub except perhaps to Alaskan communities. As recently as the past 10 years the Port was envisioned by some to grow into a Pacific cargo transfer hub, where cargos would be transshipped from vessel to vessel as a connection between Asian and West Coast North America markets. The Port is not pursuing this at present.

The Port has played a role for jet fuel supply and there is some cargo transfer from ocean carriage to small airplanes for intrastate supplies to remote communities. Otherwise, there is relatively little direct intersection between the business of the POA and TSAIA. There is potential to redevelop the area around the Port and to the northeast of downtown to redevelop into a multimodal served industrial center accessed by road, maritime, and rail. To the extent that the POA is serving as an inbound product distribution import center, there may be value to this if it were possible as the transport from vessel to distribution center would be minimized.

Key issues and trends include:

- The impact to investment potential associated with the TSAIA is important when considering the industrial development potential around the Port and north along the Glenn Highway where there is room for fairly large dimension modern industrial development. Areas considered for airport related industrial development include:
    - Downtown/POA - the area that stretches from the POA eastward along the rail line is challenged by poor highway access and terrain issues. This area is approximately 6 to 8 miles from the main entrance of TSAIA and requires at least 20 minutes travel time in good traffic conditions, 30 minutes or more during peak travel. With this travel time profile, this area would not easily be considered a viable, high-confidence airport-related investment location for operations that require quick access. For uses that do not require frequent high-velocity movements between plane and industrial site, this area may be suitable if there were suitable sites and buildings.
    - Mid-South Anchorage - The industrial areas east and southeast of TSAIA are larger than with the closest properties almost adjacent to the Airport, while the farthest properties are approximately 6 miles away. Generally, most of this industrial zone would be accessed from the Airport via arterial roadways. From a time and distance perspective, this area would be better than the near-downtown setting, but depending on the location, but still may meet high-velocity transfer requirements.
    - Eklutna/Birchwood – These sites are well-located in that they are in close access to the Glenn Highway and also nearby to rail access points. The negatives are fairly large challenges: the pure distance will be a major decision factor and this is exacerbated by the lack of high speed road access near downtown Anchorage. This area could be valuable for uses that do not require frequent transport between the TSAIA as it has the potential to offer modern fit-for-purpose assets.

- On Airport – By far, the most attractive location to support an airport-driven logistics-manufacturing operation would be at the TSAIA.

TSAIA's competitive position might be reduced as aircraft technology continues to increase which allows for aircraft ranges to increase. .

Relevance to the FMS:

This report identified potential ways to build upon the Airport's connectivity to other modes and improve connectivity in parts of Anchorage. These will be reviewed to determine if they should be recommended in the Anchorage FMS. The report also identified complementary industrial use land which will be useful in helping shape land use policy in support of the Anchorage FMS.

4.1.6 Ted Stevens Anchorage International Airport Master Plan Update, 2014

Conducted for:

State of Alaska Department of Transportation and Public Facilities, 2014.

Summary:

The TSAIA, owned by the State of Alaska and operated by the DOT&PF, serves a critical transportation function in Alaska. The TSAIA connects Alaska to the Lower 48 states and to international destinations, serves a key role in domestic and international cargo transportation, and links Alaskan travelers to other locations within the state. The Mission of the TSAIA is to "develop, operate, and maintain the TSAIA for Anchorage, Alaska, and the World." To help fulfill this mission and to strategically position the TSAIA for the future, the TSAIA initiated an Airport Master Plan Update effort in 2012.

Freight-Related Elements:

Approximately 90 percent of freight entering the region does so via ocean freighters at the POA located northeast of the TSAIA. Goods are then distributed primarily by truck along the Glenn and Seward highways as well as along International Airport Road, Minnesota Drive, and Tudor Road. Freight is also transported via rail operated by the ARRC. The remaining 10 percent of freight entering the Anchorage Metropolitan Statistical Area (MSA) occurs mostly at the TSAIA. Freight that enters at the Airport is typically express freight. Air freight is moved off aircraft and transported to distribution centers via trucks along dedicated truck routes. These routes include Postmark Drive, Lake Hood Drive, International Airport Road, Old International Airport Road, Raspberry Road, and Jewel Lake Drive. Northern Lights Boulevard is not identified as a truck route as it passes through residential communities.

Anchorage also serves as a cargo hub for communities connected by air throughout Alaska. More than 147.6 million pounds of cargo was transported from Anchorage to over 90 Alaska communities in 2010. Regional truck traffic is anticipated to increase in the future commensurate with projected growth in freight activity.

In addition, total cargo tonnage is forecast to grow at an average annual rate of 2.9 percent, while total cargo tonnage is forecast to grow from approximately 5.0 million

short tons in 2010 to 8.8 million short tons over time. The largest increase in growth will come from international cargo.

The TSAIA's planned cargo facility development is expected to meet long-term forecast cargo demand. The plan recommends optimizing and managing demand to both Anchorage and Fairbanks, and encourages more complete use of existing facilities, and also promoting use of FAI for a portion of cargo refueling stops in Alaska, which would likely require facility improvements at FAI.

Relevance to the FMS

Key inputs for use in the FMS could include the analysis of new projects for TSAIA. In addition, building upon the Airport's connectivity to other modes should also be considered in the FMS as should FAI additional capacity needs.

4.2 Regional and Local

4.2.1 2035 Metropolitan Transportation Plan, 2012

Conducted for:

Municipality of Anchorage and Anchorage Metropolitan Area Transportation Solutions, 2012.

Summary:

The Metropolitan Transportation Plan (MTP) is a blueprint to guide the development and implementation of needed transportation system improvements. This MTP looks more than 20 years into the future to recommend improvements in the transportation system from today to 2035. This MTP update considers the visions of community comprehensive plans and the context of unique subareas within the Anchorage metropolitan area, which encompasses the Anchorage Bowl and Chugiak-Eagle River. This MTP serves the entire Anchorage metropolitan area with an integrated plan.

Freight-Related Elements:

Freight distribution is an integral part of the daily economic activity of the Anchorage area. There is only nominal manufacturing in Alaska, so most goods need to be imported. Heavy duty truck movements are highest around the POA and on the Seward and Glenn Highways. Truck traffic is present on all arterial streets, reflecting the diffuse pattern of commercial activity in the area. Roads with large percentages of daily truck traffic include Glenn Highway, Seward Highway, Minnesota Drive, International Airport Road, and Tudor Road, as well as C Street and Northern Lights Boulevard.

Most trucks using city streets are smaller single-unit vehicles. To date, Anchorage has made progress in deploying a Commercial Vehicle Intelligent Systems Network (CVISN) which includes electronic weigh-in motion systems, automated vehicle classification count stations, motor carrier safety inspection data exchange, electronic oversize or overweight permit processing, and wayside safety detection and warning systems.

The ARRC operatives over 600 miles of track carrying freight and passengers between south-central and Alaska's Interior. Freight primarily consists of bulk resource products (gravel and coal), petroleum, military shipments, and containers with general cargo. In

2009, the railroad transported 5.5 million tons of freight through the state, of which, 3.9 million tons (70 percent) were gravel and coal. Gravel and coal rail tonnages have fluctuated from year to year since 2000, but are currently at approximately the same levels as there were in 2000, and petroleum volume has trended somewhat lower. ARRC track has several at grade crossings in Anchorage. Crossings of concern include: C Street, Dowling Road, and International Airport Road/Jewel Lake Road.

Cargo tonnage at the TSAIA continues to rise. Between 2000 and 2009, in transit freight (passing through the airport) increased by 4 percent while enplaned freight increased by 13 percent. TSAIA is primarily accessed via International Airport Road and Postmark Drive. Passengers usually use International Airport road. Cargo facilitates are primarily located on Postmark Drive.

According to the plan, Seventy-four percent of the merchandise goods and 95 percent of all refined petroleum products sold in the “Railbelt,” arrive via the POA. However, according to the Port of Anchorage, seventy-four percent of the merchandise goods and 95 percent of all refined petroleum products sold in the “Railbelt,” arrive via the POA.

By 2020, over 1.7 million containers moved through the port, an increase of 7 percent since 2001. If the sharp drop in 2009, likely due to the recession is excluded, growth is approximately 13 percent, about the same as population growth over that period. Bulk resource goods, particularly petroleum products, increased significantly in 2010. Existing facilities at the POA include three general cargo terminals, two bulk petroleum product terminals, loose cement offloading capability, intermodal connections (to rail, road, and air), an on-dock public transportation shed, rail mounted electric container cranes, portable cranes, and bulk petroleum valve yard. The current port facility is 55 years old and deteriorating. Infrastructure at the port must be upgraded to meet needs of new larger vessels capable of carrying 3,000 container units. The Anchorage Port Modernization Project addresses these needs. The POA is also a key logistic resource for Alaska military installations, and is the state’s only National Strategic Seaport. Access from the east is difficult due to presence of the railroad yard and mainline track between the Port and the major road network. Primary access is on the National Highway System (NHS) (Seward Highway, Ingra-Gambell Streets couplet, A-C Streets couplet, 5th/6th Avenue couplet, and the Glenn Highway) resulting in heavy vehicles being routed through downtown Anchorage.

Significant increases in truck traffic are anticipated (124,500 in 2007 to 181,200 in 2035, or 45 percent). Three quarters are single unit vehicles and the remainder is combination tractor trailers.

In 2008, the ARRC requested authority to construct and operated 31 to 46 miles of rail connecting Port Mackenzie to a point on the existing railroad main line (project currently under construction)The Port of Anchorage intermodal expansion project will replace deteriorating infrastructure with new larger dock, crane and cargo handling, improved road and rail links, and terminal facilities. Phase I is underway.

The freight element of the MTP identified the following constraints to freight transport in the area:

- Awkward access at Port of Anchorage;
- Delays from train operation in the Port vicinity;

- Road delays and poor signal timing;
- Congestion at intersections; and
- Difficulties executing left turns at busy intersection.

The plan sets forth a number of goals and objectives regarding accessibility, mobility, and safety of transportation uses, including freight.

MTP recommendations included:

- A new connection near the Ingra-Gambell Streets couplet and ramps to a new freeway that ties the Glenn and Seward Highways together;
- Continuing efforts to implement the CVISN throughout Anchorage;
- Safety enhancements at key grade crossings (at a minimum) until grade separations can be completed;
- Completion of ARRC projects including: Port Mackenzie Rail Extension project, development of passenger facilitates, pedestrian improvements, construction of additional track, realignment of track within the rail corridor, rolling stock rehabilitation, and signalization;
- ARRC Ship Creek Intermodal Transit Center (ITC) will include improvements to passenger areas and pedestrian connections, and public parking; and
- Continuation of the Port of Anchorage Intermodal Expansion Project.

Relevance to the FMS:

The following elements could be used to support the FMS:

- Improve connectivity and access between freight generators and the Port of Anchorage and the TSAIA;
- Consider projected growth in freight movements;
- Consider effects of recommended road projects on freight movement in the area; and
- Consider effects on Port expansion and the Ship Creek ITC project.

4.2.2 Anchorage Downtown Comprehensive Plan | Chapter 5 Transportation and Circulation, 2007

Conducted for:

Municipality of Anchorage Planning Department, 2007.

Summary:

Chapter 5 of the Downtown Comprehensive Plan identifies specific planning considerations, outlines transportation goals that support the plan's vision, and recommends transportation and circulation solutions to realize the full potential of Downtown Anchorage.

Freight-Related Elements:

Automobiles currently are the primary mode for access to Downtown Anchorage and are likely to remain the primary access mode for the foreseeable future. Key street conversions were recommended based on the analysis.

Relevance to the FMS:

Consider these changes and how they will affect the ability for freight to move in the area when making recommendations in the Freight Study.

4.2.3 West Anchorage District Plan, 2012

Conducted for:

Municipality of Anchorage, 2012.

Summary:

The West Anchorage District Plan establishes general public policy that reflects the vision of residents, landowners, and public entities for future growth in West Anchorage. The plan addresses specific issues such as residential growth, infill, and densities, commercial and industrial expansions, redevelopment sites, drainage, roads, trails, and parks. The planning process will serve as the mechanism to formally identify, address, and resolve or mitigate land use issues within and adjacent to the TSAIA. It will also interface with the TSAIA Master Plan.

Freight-Related Elements:

The existing land uses in West Anchorage are shown in the figure below. Land use in the planning area consists of 37 percent residential, 2.5 percent commercial, 6 percent industrial, and 33 percent TSAIA, 19 percent public lands, and 2.5 percent transition. Industrial and commercial uses are relatively disbursed. There is a concentration of industrial uses to the east of the airport.

Daily truck traffic is highest on the Glenn and Seward Highways and around the Port, outside the planning area. The goods intended for the Alaska market are distributed by truck from the airport to several nearby freight distribution centers in West Anchorage. Several streets were designated for use by commercial vehicles (as determined by the Official Streets and Highways Plan). Key industrial / truck routes include Spenard Road, Industrial Street, and C Street.

The ARRC main line track runs from the Intermodal Center in Ship Creek, through Turnagain and Spenard neighborhoods and the industrial areas south of International Airport Road. The tracks also run across Dimond Blvd and C Street as well as on Arctic Blvd. The airport spur is used primarily for seasonal cruise ship charter service to the airport. During summer months, several trains per day can run from the airport spur and a total of 20 trains per day can run from MP 110 (near International Airport Road and Minnesota Drive) to MP 114 in Ship Creek. ARRC is considering an addition of 10 miles of double-track in the existing right-of-way on both sides of its terminals to accommodate additional passenger and modest increases in freight.

The TSAIA plays a key role in international aviation activities, being located within 9.5 hours of 90 percent of the industrialized world. It ranks as the fifth largest airport worldwide in cargo throughput. The Lake Hood Seaplane Base (LHD) accommodates the General Aviation (GA) component at TSAIA consisting mostly of small, privately

owned, fixed-wing aircraft. Lake Hood GA operations decreased from 89,959 in 1996 to 69,502 in 2005. The TSAIA has grown steadily since its inception in the 1950s. Between 1990 and 2005, cargo activity more than doubled. Cargo "landed weight" tonnages at TSAIA peaked in 2006, but overall have remained strong for the last 10 years. Air cargo traffic flowing from Asia to North America accounts for the majority of such traffic at TSAIA. Most air cargo flights using TSAIA are merely stopping to refuel before continuing to their final destination. The TSAIA airfield complex includes three runways and an extensive system of taxiways, aprons, buildings, and navigational equipment.

In addition, the Plan identified an "industrial reserve" southeast of Minnesota and International Airport Road. The West Anchorage District Plan (WADP) implements this concept by assigning industrial land uses clustered around the intersection of Minnesota Drive and International Airport Road and extending as far south as Raspberry Road. This area is characterized by existing industrial uses proximate to major road, rail, and air transportation facilities.

The plan sets forth the following goals:

- Preserve sufficient developable industrial land with access to rail, air and truck transport, to meet estimated future demand and contribute to a strong, vibrant local economy. Growth in air cargo is one of the contributing industries with land needs. Anchorage 2020 reinforces this approach by identifying an Industrial Reserve in the eastern portions of the West Anchorage study area. The WADP implements this concept by assigning industrial land uses clustered around the intersection of Minnesota Drive and International Airport Road extending as far south as Raspberry Road. This area accommodates existing industrial uses and is proximate to major road, rail and air transportation facilities.
- Prepare an "Airport Street Master Plan" to prepare for capacity issues.
- Recommends MOA cooperate with ARRC and DOT&PF to minimize safety concerns at at-grade crossings, and collaborate with a Context Sensitive Solutions/Context Sensitive Design (CSS/CSD) process when funding is found to separate crossings in the future.

Relevance to the FMS:

The primary conclusions of this Plan, the infrastructure connections to industrial land use areas, the potential for distribution of goods by air to rural communities at TSAIA, and the effects on increased rail activity in the International Airport / Minnesota Drive to Ship Creek Corridor, will be used to support the FMS.

4.2.4 Anchorage Industrial Land Assessment, 2009

Conducted for:

Anchorage Economic Development Corporation, 2009.

Summary:

This report constitutes an effort by the Anchorage Economic Development Corporation and the MOA to measure the quantity and quality of the industrial land supply in the Anchorage Bowl, as compared to the demand through 2030.

Freight-Related Elements:

Shipping and logistics industries could still see significant future expansion. Industrial development in Anchorage is fickle and needs to be coaxed to develop locally. Industrial development in Anchorage is demand inelastic compared to other regions of the U.S. Companies that would otherwise prefer to be located in Anchorage will elect to produce in the lower 48 and ship to Anchorage unless development is made easier.

Relevance to the FMS:

Key outcomes from this Plan could be used to support the FMS:

- The level of encouragement being provided for industrial development could change regional freight movement patterns;
- Identify ways to efficiently move cargo between Port of Anchorage and TSAIA and industrial areas; and
- Consider freight routes and their effects on the attractiveness of industrial areas to companies considering locating in Anchorage.

4.2.5 Chugiak – Eagle River Comprehensive Plan, 2006

Conducted for:

Municipality of Anchorage Planning Department, 2006.

Summary:

This Comprehensive Plan Update provides a summary of the re-evaluation of the 1993 Plan in the Community Overview chapter, which includes updated population, employment and housing projections for 2025. The 2006 Comprehensive Plan Update is not a radical change from the 1993 Plan. It shares many of the same community intentions and aspirations. As with the 1993 Plan, the 2006 Plan Update continues to apply the simple logic that it is wise to look ahead, to anticipate rather than to react, to coordinate rather than to compete, and to make decisions that are based on community objectives.

Freight-Related Elements:

Industrial uses are generally found along the Glenn Highway and along the Alaska Railroad corridor. Key issues and trends included:

- Encourage commercial and industrial development that takes into account potential impacts on other uses, access, utilities, parking, aesthetics and environmental quality.
- Promote continued use, expansion and development within established commercial and industrial areas determined to be suitable for continuing use. Protect the supply of industrially zoned land by discouraging nonindustrial uses within those areas.
- To the extent practicable, develop uses such as self-storage facilities, light manufacturing, construction, contracting, warehousing and wholesale distribution activities, in clearly defined districts.

- Consider the amount of existing vacant or under-utilized commercial space in the area before new commercial areas are developed.

Relevance to the FMS:

Understanding the existing zones of industrial and commercial activity and the recommendations that were defined to support continued use of existing industrial and commercial land will be used to support the FMS.

4.2.6 Chugiak – Eagle River Long-Range Transportation Plan, 2007(Replaced by 2014 Plan)

Conducted for:

Municipality of Anchorage Traffic Department, 2007.

Summary:

The Chugiak-Eagle River LRTP is an element of the Chugiak-Eagle River Comprehensive Plan and one of several elements of the AMATS Long-Range Transportation Plan. The objective of the LRTP is to create a balanced transportation system, based on community values—as expressed through the Comprehensive Plan—that meets future travel demands of the community through the support of multiple transportation modes while enhancing area safety, meeting environmental standards, and reducing impacts on residential neighborhoods. The LRTP recognizes the need for road, transit, trail and pedestrian, and freight improvements, and is intended to be general in nature.

Freight-Related Elements:

No major international airport, port facility, or intermodal transportation facilities are within the Chugiak-Eagle River study area. However, the Glenn Highway crosses this area and is a major freight distribution route connecting the Anchorage Bowl with a large part of Alaska, Canada, and the lower 48.

The percentage of truck traffic on Glenn Highway and Old Glenn Highway has not increased significantly since 1994. Residents expressed concerns for gravel and concrete trucks pulling onto the Old Glenn Highway. Companies have expressed the need for a truck-climbing lane to address concentrated trucking near Klondike Concrete. Concerns also have been expressed regarding the ability to accommodate trucks safety on South Birchwood Loop Road given its narrow width and the geometrics of intersections of South Birchwood Loop Road with the Old Glenn Highway and Glenn Highway. Improving the Glenn Highway interchanges with Artillery Road and Hiland Road to address oversize freight movements has been identified as a need, as well as identifying possible deficiencies along the entire length of the Glenn Highway for over-height and oversize trucks.

The policies, regulations, standards, and goals established in this Plan included:

- Increased enforcement of street cleaning requirements (service hours) of hauling operation to reduce the impacts on the neighborhoods, and requiring the shortest viable routes between the gravel areas and the arterial system. Considerations were made to conduct a safety study to evaluate commercial vehicle traffic from the Glenn

Highway to the gravel pits along the Old Glenn Highway. Considerations were also identified to monitor traffic volume along Birchwood Loop Road to determine whether future improvements are needed.

- Old Glenn Highway Reconstruction Phase II (rural section, Fire Lake to Peters Creek) – Add 4-foot shoulders and new pavement, construct a paved pathway, truck climbing lane, left-turn pockets at South Birchwood Loop Road, Birchwood Loop Road, and Ski Road, and replace bridge across Peters Creek. Construction in 2008 from Fire Lake to South Birchwood. Construction in 2010 from South Birchwood to Peters Creek. Right-of- way funding previously authorized in 2005. Purpose: improve circulation; improve safety for pedestrians, bicyclists, vehicles; freight movement.
- Eagle River Central Business District (CBD) Study – Conduct a comprehensive circulation study for the entire road network within the downtown core of Eagle River. Study to assess pedestrian improvements needs, access management alternatives, the need for improved connectivity between the Old Glenn Highway and Business Boulevard, and traffic flow along the Old Glenn Highway, including the movement of freight vehicles. Purpose: relieve congestion; improve circulation for vehicles and pedestrians.

Relevance to the FMS:

This plan identifies existing conditions in the Chugiak-Eagle River area and needed improvements that will prove useful for assessment in the FMS

4.2.7 Eagle River Central Business District and Residential Core Circulation Study, 2011

Conducted for:

Municipality of Anchorage Transportation Planning Section, 2011.

Summary:

The purpose of this study is to enable the Chugiak-Eagle River community to develop cost-effective and implementable solutions that address access, circulation, safety, and multi-modal amenities, creating a robust and vibrant downtown core. The development of a complete, interconnected network of roadway, pedestrian/bicycle, and transit facilities was the primary technical task of this study.

Freight-Related Elements:

Chugiak-Eagle River area is projected to grow to a population of approximately 55,000 residents and an employment base of roughly 8,100 within the next 20 years. The Old Glenn Highway is main north-south local traffic thoroughfare through Chugiak-Eagle River CBD. While the majority of users on the Old Glenn Highway travel by automobile, the corridor is also a vital link for pedestrians, bicyclists, transit users, emergency service providers, and freight traffic.

For a vibrant economy and community, the Old Glenn Highway must balance the need to provide access to adjacent land uses while maintaining end-to-end mobility along the corridor. The primary high priority projects affecting freight are: the partial interchange to Farm Avenue off the Glenn Highway and some modification to roads connecting to the

Old Glenn Highway. The plan also describes a medium priority project that would provide a north south collector between existing interchanges on Glenn Highway.

Relevance to the FMS:

The development of the FMS should consider the projects identified in this Plan that could affect traffic/freight movements on the Glenn Highway.

4.2.8 Government Hill Neighborhood Plan, 2013

Conducted for:

Municipality of Anchorage Community Development Department Planning Division, 2013.

Summary:

The Government Hill Neighborhood Plan gives specificity to the goals, objectives, policies, and strategies of the Comprehensive Plan. The overarching goal of this neighborhood plan is to promote the orderly growth, improvement, and future development of the Government Hill neighborhood. This plan guides the development of the Government Hill community, enhancing it as a place to live, work, and promote economic vitality.

Freight-Related Elements:

The railroad yards form the southern edge of the district while the Port forms the western edge. The POA Charter Area lies along the shoreline of Knik Arm, framing the western edge of the Government Hill neighborhood. It consists of a mix of industrial facilities, including office buildings, storage tanks, and docks.

The Industrial Mixed-Use Character Area lies along Ship Creek Road. This is an industrial corridor in which buildings flank the road. The Industrial Knuckle is a point at which the POA yards and the ARRC yards merge with a mix of office buildings, services, and some visitor-oriented facilities. This also includes the bridge leading from downtown to Government Hill.

The ARRC, POA, and a corridor of industrial uses along upper Ship Creek comprise the majority of industrial land in the area. The planned land uses for the neighborhood are shown in the figure below. Nearly all of the areas to the west and south are planned Major Transportation Facility, Industrial / Commercial and Industrial / Industrial Reserve.

A traffic study of the Government Hill Neighborhood was a recommendation before implementation of the Plan begins. Preserve street system while enhancing connectivity (particularly east-west movement). This includes an improved east-west connector between the Hilltop neighborhoods, improved intersection from downtown to the neighborhood center, and JBER.

Relevance to the FMS:

This plan provides direction about the desired street network in Government Hill and their priorities which will be an input into the FMS planning process.

4.2.9 Hillside District Plan, 2010

Conducted for:

Municipality of Anchorage, 2010.

Summary:

The Hillside District Plan (HDP) covers a wide range of issues, including the levels of public services, wastewater disposal and water supply, drainage, land use, and delineation of the urban-rural boundary. As a subarea plan, the HDP is consistent and in accordance with Anchorage 2020 but provides more specificity and a greater level of analysis than Anchorage 2020. The HDP implements and provides further clarity and refinement on a number of Anchorage 2020 policies.

Freight-Related Elements:

The majority of the land use in the area is residential except for those shown on the figure below. Approximately 52 acres are used for industrial purposes, but there the study area does have a centralized industrial area. The Hillside road system is generally able to handle current demands; however, in some areas, congestion issues are increasing as the Hillside continues to grow. Traffic and delivery vehicles may not be more “than would normally be expected in a residential neighborhood.”

Relevance to the FMS:

Freight traffic generations should be incorporated into the FMS planning process.

4.2.10 Turnagain Arm Comprehensive Plan, 2009

Conducted for:

Municipality of Anchorage Planning Department, 2009.

Summary:

The Turnagain Arm Comprehensive Plan (Plan) is a revision of the 1987 Turnagain Arm Comprehensive Plan (1987 Plan), which covered the communities of Rainbow, Indian, Bird Creek, Girdwood, and Portage. In 1995 Girdwood adopted its own comprehensive plan called the Girdwood Area Plan. This Plan revision covers Rainbow, Indian, Bird, and Portage, including the Twenty Mile River area. (See Vicinity Map for planning area boundaries.) Like the 1987 Plan, this document addresses general land use issues and presents land use recommendations for future development. The Plan provides guidance for future growth through policies that will be carried out with the implementation actions identified in this Plan.

Freight-Related Elements:

Turnagain Arm is outside of the Municipality of Anchorage’s road services area. The Alaska Department of Transportation and Public Facilities funds and maintains all paved roads and all the main thoroughfares in the region. There are no consistent means to raise funds for roadway improvements in the Turnagain Arm region, so no changes to the existing conditions are foreseen. Turnagain Arm residents are divided about the most desirable approach to local road management.

The only formally identified industrial parcels include a meat processing plant in Indian and a sawmill and communications station in Bird Creek. Any consideration for new industrial sites must not conflict with surrounding land uses. A new land use category of transportation facility was introduced in response to the ARRC's identification of possible cargo-handling opportunities. Commercial and industrial uses will be permitted in areas surrounding transportation facilitates. Such secondary uses are mostly found in Portage Valley along the ARRC corridor.

Since the opening of the Whittier Tunnel, cargo transportation has expanded greatly and the ARRC and trucking firms are considering alternative transport operation that can take advantage of industrial land in Portage Valley. Cargo imported at Whittier has historically been sorted and reloaded in Anchorage; however, through some basic development, the ARRC could provide these services more efficiently in Portage at existing industrial land for shipment south.

The state and the federal government established a Seward Highway Corridor Partnership Plan that identified management strategies for the road to preserve its Scenic Byway qualities.

Relevance to the FMS:

Encouraging industrial land in Portage for deliveries bound for destinations south, rather than bringing goods north to Anchorage, should be considered as a strategy ion the FMS.

4.2.11 Port of Anchorage Cargo Distribution Patterns, 2011

Conducted for:

Municipality of Anchorage.

Summary:

The purpose of this study is to describe the distribution patterns of good which enter the POA (and are delivered to other Alaskan regions).

Freight-Related Elements:

The general sequence of freight distribution considered the following tiers:

- The first tier consists of shipping companies and operators who deliver cargo to the POA including containerized cargos of consumer goods and business supplies fuel, cement, construction materials, military equipment, building materials, automobiles and commercial vehicles.
- The second tier is made up of trucking and rail operations which move goods from the POA to a secondary location where they are either delivered directly to retail markets or consolidated and shipped via third tier transporter to a further destination.
- The third tier is comprised of air cargo carriers and barge operators who ship consolidated freight to hub airports and local harbors via bypass mail, air freight and barge operations. Once received at a hub airport or harbor, the freight is then further broken down for delivery by smaller air carriers or barge shippers for final delivery to rural villages.

- The fourth tier includes those goods delivered to the POA and then transshipped to Kodiak, Dutch Harbor, and Western and Northern Alaska by container ship and barge. This includes consumer goods and business supplies, fuel, construction materials, automobiles and commercial vehicles.

Fuel and cement are often delivered by rail thought state. Seventy-five percent of total goods move to rural Alaska via bypass mail. Nearly 90 percent of consumer goods and business supplies for Fairbanks, Mat-Su, and the Kenai Peninsula first enter through the Port of Anchorage. The goods are primarily transported 60 percent by intermodal transfer to ARRC for rail transport and 40 percent delivered by trucking operations,

In 2009, Port of Anchorage received 4,370,000 tons of cargo comprised of containerized consumer goods and business supplies US mail, fuel, construction materials, drill pipe, cement for concrete, automobiles and military equipment. Currently about 7.7 million barrels of fuel are delivered to the Anchorage area by rail car annually. An additional 4.5 million barrels come across the ports dock.

An additional 706,000 tons of annual cargo deliveries entered South-centrals Alaska via the Alaska Railroad Corporations rail barge operations in Seward and Whittier and through barge deliveries to Northstar Terminal and Stevedoring and the Swan Bay dock. It is estimated that 25 percent of cargo delivered to rural communities is transshipped via POA and 75 percent is sourced directly out of Seattle.

Anchorage which typically receives four or five tanker deliveries per year and are stored at the POA's tank farms. It is then distributed to Fairbanks, Mat-Su, and the North Slope by truck and to western and southeast Alaska by barge. 1.7 million barrels of refined petroleum are shipped out of the port of Anchorage via barge to rural communities each year.

Aircraft Service International Group operates the tank farm and valve manifolds that facilitate deliveries of jet fuel to the TSAIA by pipeline. POA is one of only Alaska facilities with bulk offloading capacity for cement. It is offloaded via a vacuum and pumps system and transferred to storage tanks though a pipeline.

Petroleum operators at the port who supply fuel to TSAIA have indicted the need for increased storage tanks to cover peak periods of demand at airport. Two dedicated pool berths with new state of the art offload headers at the future petroleum docks provide opportunities for new storage capability and capability to handle a wider variety of refined petroleum products newly added acreage behind POA berths could be used for additional tanks.

Due to limited draft at the port, the current bulk cement carrier can only load and receive 24,000 tons at a time despite the vessels capacity of 40,000 tons. After port improvements, can allow cement shippers with full capacity to enter and unload.

Relevance to the FMS:

This report provides information about the existing cargo distribution patterns. Plan recommendations will be reviewed The FMS should consider existing staged method of distribution, identify any inefficiency, and identify any recommendations to improve the system as part of the FMS planning process. In addition, information about the operations and improvements being made to the Port of Anchorage should be reviewed

and considered in the FMS including changes that would maximize efficient freight flow in and out of the Port.

4.2.12 Ship Creek Framework Plan, 2014

Conducted for:
Municipality of Anchorage, 2014.

Summary:
This Framework Plan presents a long-term vision for the future of the Ship Creek area, including downtown Anchorage and the Cook Inlet waterfront. This Plan will guide future development for the area and provide an accessible and public waterfront in Anchorage.

Key-Freight Elements:

Much of the land in owned by ARRC including transportation and shipping related land use functions in close proximity to parks, open spaces, and commercial and residential uses in the downtown and Government Hill. Existing conflicts to truck movements through the area include at-grade railroad crossings, intersection geometry, and pedestrian activities. Double load trucks use Ocean Dock Road and Whitney Road to access the Port. Downtown access is available via Post Road / 3rd Avenue. The Glenn Highway is accessible through Post Road / Reeve Blvd / 5th Avenue. Single Load trucks use these routes from Ship Creek Bridge to downtown. The ARRC is facing increasing competition from the trucking industry to move freight in this area. This project was designed to provide a new connection near Ingra/Gambell streets as a couplet including ramps connecting to a proposed freeway that would tie together the Glenn and Seward highways.

The plan presents an overview of the project recommended in the 2035 Metropolitan Transportation Plan. The projects include the Knik Arm Crossing (Phase I and II), Glenn Highway HOV Lane from Boniface Parkway to Artillery Road interchange and Ship Creek bridge improvements, C Street / Ocean Dock Road Access Ramp reconstruction, and Ingra-Gambell Couplet Extension from 3rd Avenue to Whitney Road. In addition, the plan provides an overview of the projects recommended in the 2000 Ship Creek Multi-Modal Transportation Plan and projects recommended in the 2001 AMATS Freight Mobility Study. These included building a consolidated freight terminal in the Ship Creek Area, Ocean Dock Road widening and grade separation improvements, Whitney Road reconstruction and realignment, and Ship Creek Avenue realignment among other projects.

The proposed street network assumed ARRC's conversion of laydown yards / operational land into development sites. ARRC freight and passenger operational efficiency and safety were recommended as the primary design parameter for any redevelopment plans and all new track crossings were defined as grade separations to reduce conflicts between truck movements and rail lines.

Relevance to the FMS:

The FMS will use several outcomes from this Plan as key inputs into the planning process including a more recent assessment of how freight currently moves through the area, how the future vision for Ship Creek will help drive recommendations for potential future projects.

4.2.13 Anchorage 2020 Comprehensive Plan, 2002

Conducted for:

Municipality of Anchorage, 2002.

Summary:

The Anchorage 2020 Comprehensive Plan is a plan which was adopted by the Anchorage municipal Assembly on February 20, 2001 and amended on September 10, 2002 as the 20-year blueprint for guiding development and growth in the Anchorage Bowl. Since the plan was adopted, the City's planning department has focused on plan implementation with projects such as rewriting the municipal land use code (Title 21), updating the Comprehensive Plan's Anchorage Bowl Land Use Map, a new sign code, off-street parking standards, and developing a parks and open space plan. The Anchorage 2020 Comprehensive Plan covers a full range of goals through the coordination of four long-range planning initiatives. The plan addresses issues regarding existing land uses and transportation, public improvements and services and how implementation of such plans will come about for the next 20 years.

Freight-Related Elements:

Transportation improvements were identified one of the key issues which will define and shape growth in the Anchorage Bowl in the 2020 plan. The plan highlights on having freight movement facilitated throughout the community, especially in areas in proximity with the port, international airport, railroad services and industrial reserves.

Most goods need to be imported to Alaska. TSAIA is identified as one of the most important economic generators for Southcentral Alaska and a focal connector of goods for the state. Due to public concern, future expansion of airport-related land uses outside current boundaries of the airport is restricted to existing commercial and industrial zoning districts. The POA is also another focal point for freight goods in Anchorage and the state. The comprehensive plan has identified industrial reserves in the Anchorage area, which are strategically located near industrial areas to be set aside for industrial purposes which can affect the transportation and mobility of freight.

Industrial reserves, as the 2020 Plan lays out, can be found in three main areas. The northern industrial reserve is strategically placed near the POA and railroad services while the central industrial zone is located conveniently near TSAIA. The third industrial reserve can be found at the southern end of the city. Non-industrial uses will be limited in these areas in order to preserve land which may be valuable for future industrial development and freight movement.

The 2020 Plan concludes that significant amount of Anchorage's industrial and commercial land is currently underutilized and there will be no industrial land shortage to meet future commercial needs. The 1996 Anchorage Bowl Commercial and Industrial Land Use Study also found that 37 percent of land in current commercial use was fully developed while 11 percent had the capacity for redevelopment. Ship Creek area contains a significant amount of vacant and under-used industrial property. Potential to develop areas such as Ship Creek for future freight demand is high as it is located conveniently to the port and railroad, thus having the capacity to be of greater use.

Relevance to the FMS:

Elements which may be used for the FMS may include:

- Distribution of goods by air to rural communities through TSAIA and Merrill Field airports;
- Improvements to access between freight hubs located in the Anchorage Bowl (POA to Merrill Field and central industrial sites);
- Growth of industrial areas in the region; and
- Location of industrial centers and commercial activity growth areas.

4.2.14 2015 3-Year Economic Outlook | Anchorage, 2015

Conducted for:

Anchorage Economic Development Corporation, 2015.

Summary:

This Anchorage Economic Development Corporation (AEDC) 3-Year Economic Outlook examines economic trends based on historical data, interviews with representatives of businesses and organizations in various sectors and current events. It discusses trends in terms of eight key indicators: population, employment, personal income, air passenger and freight volumes, building permits, POA tonnage, visitor industry activity and oil prices.

Freight-Related Elements

Anchorage population growth has slowed in 2013 / 2014 after several years of increases as showing in the figure below. Overall, AEDC expects Anchorage's population to increase slightly (about 0.5 percent) in 2015, decline in 2016 and 2017 (approximately 0.75 percent each year), and stabilize by 2018. Looking ahead, the resiliency of the Anchorage economy will once again be tested by volatility in oil prices and oil revenue-related spending. Growing domestic demand for consumer goods means more TSAIA air freight activity.

Air cargo weight through the airport increased of 3.0 percent from 2013; it remains 3.0 percent below the post-recession peak of 2.83 million short tons in 2010. The number of cargo landings in 2014 was relatively stable, down only 0.2 percent 2013 to 2014 (from 35,545 to 35,471 landings). AEDC anticipates that TSAIA air freight volume will increase by 10 percent in 2015, and 5 percent in each of the subsequent years (2016 to 2018), to reach 3.5 million short tons in 2018.

AEDC expects total volume at the POA to grow at rate of approximately 10 percent in 2015, setting a new "norm" for tonnage, before slowing to a growth rate of 3 percent in 2016 through 2018.

Relevance to the FMS:

Reviewing and using the growth trends identified for the freight distribution system will be useful in supporting the FMS.

4.2.15 Anchorage Truck Route Maps

Conducted for:

Municipality of Anchorage.

Summary:

The maps present routes where trucks are permitted in Anchorage.

Freight-Related Elements:

The Permitted Truck Route Maps for Anchorage as well as permitted double load truck routes for Anchorage are presented in this material.

Relevance to the FMS:

The FMS will include an analysis of these freight routes and their continued use.

4.2.16 Anchorage Congestion Management Process Update and Status of the System Report, 2015

Conducted for:

Municipality of Anchorage, 2015.

Summary:

The Status of the System Report describes the current transportation conditions in Anchorage. The main objective of this report is to describe the current conditions of transportation infrastructure and services in the Anchorage Metropolitan Area by examining historical trends, current data, and effectiveness.

Freight-Related Elements:

Generally, the average daily number of single unit trucks has declined between 2009 and 2013 while the number of trucks and tractor values has increased. Anchorage is experiencing increased traffic volumes to other regions (as indicated by traffic volumes on the Glenn and Seward Highways), particularly on the Glenn Highway north of the city. Trends in railroad shipping include a reduction in gravel tonnage and petroleum, but a general increase in coal shipping. The amount of cargo transported through the POA corresponds to domestic trade, which has increased at an average constant rate of 3 percent since 2010.

Air passengers and cargo declined in volume in 2009. Volumes since then have not shown signs of a recovery. However, in 2013, both passenger numbers and air cargo increased from the previous year, by 3 and 2 percent, respectively. The Port of Anchorage also showed the lowest volume in 2009. Since then, domestic cargo, which represents the mayor type of cargo movement, has increased at an average rate of 3 percent. It is also worth noting that in the most recent years, foreign exports increased in 2013 by 10 times the volume registered in 2012.

Rail cargo has decreased since peaking in 2005. Gravel cargo was approximately half of the tonnage moved in 2005. Petroleum decreased even further, reducing the tonnage moved from approximately 2.5 million tons in 2005 to less than 1 million in 2013. However, coal rail shipment has increased, particularly for export, as tonnage increased from a low of 224 thousand tons in 2003 to a peak in 2011 of 1195 thousand tons of coal for export.

Motor freight has also shown a decrease in volumes from previous years. The main highways, Glenn Highway and Seward Highway, experienced a reduction in the number of single unit vehicles by 50 percent and 25 percent, respectively, without increasing the number of truck and tractors. However, other roads have experienced increases in the number of trucks and tractors. The main Highway connections of Anchorage with the rest of Alaska, Glenn Highway and Seward Highway, have experienced increased traffic volumes from previous years, particularly on the Glenn Highway which connects the fast-growing Mat-Su Borough and areas to the north and east.

Relevance to the FMS:

Understanding the key trends in order to identify modes that will require the most investment to maintain system functionality and mitigate congestion will be a key element of the FMS. In addition, reviewing and integrating selected performance measures from the congestion management analysis will be used to support the development of performance measures for the FMS, as well as to help the MOA maintain as much consistency as possible between measures prepared for various regional plans.

4.3 National Publications & Statistics

4.3.1 National Cooperative Freight Research Program | Performance Measures for Freight Transportation, 2011

Conducted for:

Transportation Research Board, 2011

Summary:

This report develops measures to gauge the performance of the United States freight transportation system. The report attempts to define measures which incorporate local, regional, national, and global perspectives from all the stakeholders on efficiency effectiveness, capacity, safety, security, infrastructure condition, congestion, energy, and the environment.

Freight-Related Elements:

National freight system performance programs, goals and targets partially explain the lack of freight system performance data and the need for the development of freight-related performance measures to support freight planning. This Report suggests implementing a web-based freight system report card that utilizes existing resources and is structured like a modified “Balanced Scorecard.” The report card is intended to provide “at-a-glance” summaries and also allow the user to drill-down into details to answer more nuanced questions, or to explore trends in further detail. To that end, the report suggests basing the scorecard on six categories including: demand, efficiency, system condition,

environmental impacts, safety, and adequacy of investment in the fright system, each of which are broken down into various metrics:

- Freight Demand Measures included Freight Demand Measures, All Modes; Truck Freight Volumes; Rail Freight Volumes; Inland Water Freight Volumes; and Containerized Waterborne Freight Volumes;
- System Efficiency Measures included Interstate Highway Speeds; Travel speeds at top Interstate Highway Bottlenecks; Interstate Highway Reliability; Class 1 Railroad Operating Speed; and Cost of Logistics as a Percent of Gross Domestic Product;
- System Condition Measures included NHS Pavement Conditions and NHS Bridge Conditions;
- Environmental Condition Measures included Freight – Produced Greenhouse Gas Emissions; Truck Greenhouse Gas Emissions; Rail Greenhouse Gas Emissions; Freight-Produced Ozone Related Emissions; Truck Related Volatile Organic Compounds (VOC's); Truck Related Nitrogen Oxide (NOX) Emissions; Rail NOX Emissions; Rail VOC Emissions; Truck Particulate Emissions; and Ship Produced NOX and Particulate Matter;
- Freight Safety Measures included Truck Injury and Fatal Crashes and Highway/Rail At-Grade Crashes; and
- System Investment Measures included Estimated Investment in NHS to sustain conditions; Rail Fright Industry Earning Cost of Capital; Estimated Rail Capital Investment to Sustain Market Share, and Inland Waterway Investment to Sustain Lock and Dam Average Age at Less than 50 Years.

Difficulties associated with implementing the report card nationally included: no designated national entity with resources to maintain a new freight performance measure system, enormous data needs, lack of national goals and strategies to prioritize measures, and lack on consensus on how measures should be used. This Report suggests that data and measures should be continually reviewed and refined.

Relevance to the FMS:

Although this Report presents implementation of a means to track performance on a national scale, a similar program could also be implemented on a local / regional scale to evaluate the system holistically as part of the FMS. Key measures and processes identified in this Report should be evaluated and potentially used to support the FMS, including establishing performance programs, goals, and targets and requiring and/or encouraging tracking and reporting by applicable participants in the system.

Task 6.2 Current Freight System Inventory

AMATS Freight Mobility Study

Anchorage, AK
March 15, 2016

Contents

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1 Introduction

As part of the development of the Task 5 Freight Issues and Trends White Paper, the project team developed an inventory of the MOA's freight system documenting the existing freight infrastructure in the region. Using existing AMATS and DOT&PF GIS data, the project team produce d11X17 freight system inventory maps including the following information:

Exhibit 1: Major Freight Generators

- Major freight generators, receivers, providers;
- Port and intermodal facilities
- Airport facilities and carriers
- Alaska Railroad facilities/yards
- Military facilities
- Pipeline Terminals

Exhibit 2: Water Cargo Facilities

- Marine routes and carriers
- Waterborne strategic transportation facilities

Exhibit 3: Highway Facilities

- Intelligent Transportation Systems (ITS) and operations technology
- National Highway System designations
- STRAHNET (Strategic Highway Network)
- National Highway Freight Network (NHFN)

Exhibit 4: Local Freight & Oversized Routes

- State and MOA designated freight routes
- Last mile, intermodal, and other significant freight connections
- Heavy and oversized vehicle routes

Exhibit 5: Pipeline Facilities

- Pipelines
- Pipeline Terminals

Exhibit 6: Bridge Clearances

- Bridge structures on designated truck routes including clearance height and width

Exhibit 7: At-Grade Crossings

- At-grade crossings for ARRC rail facilities

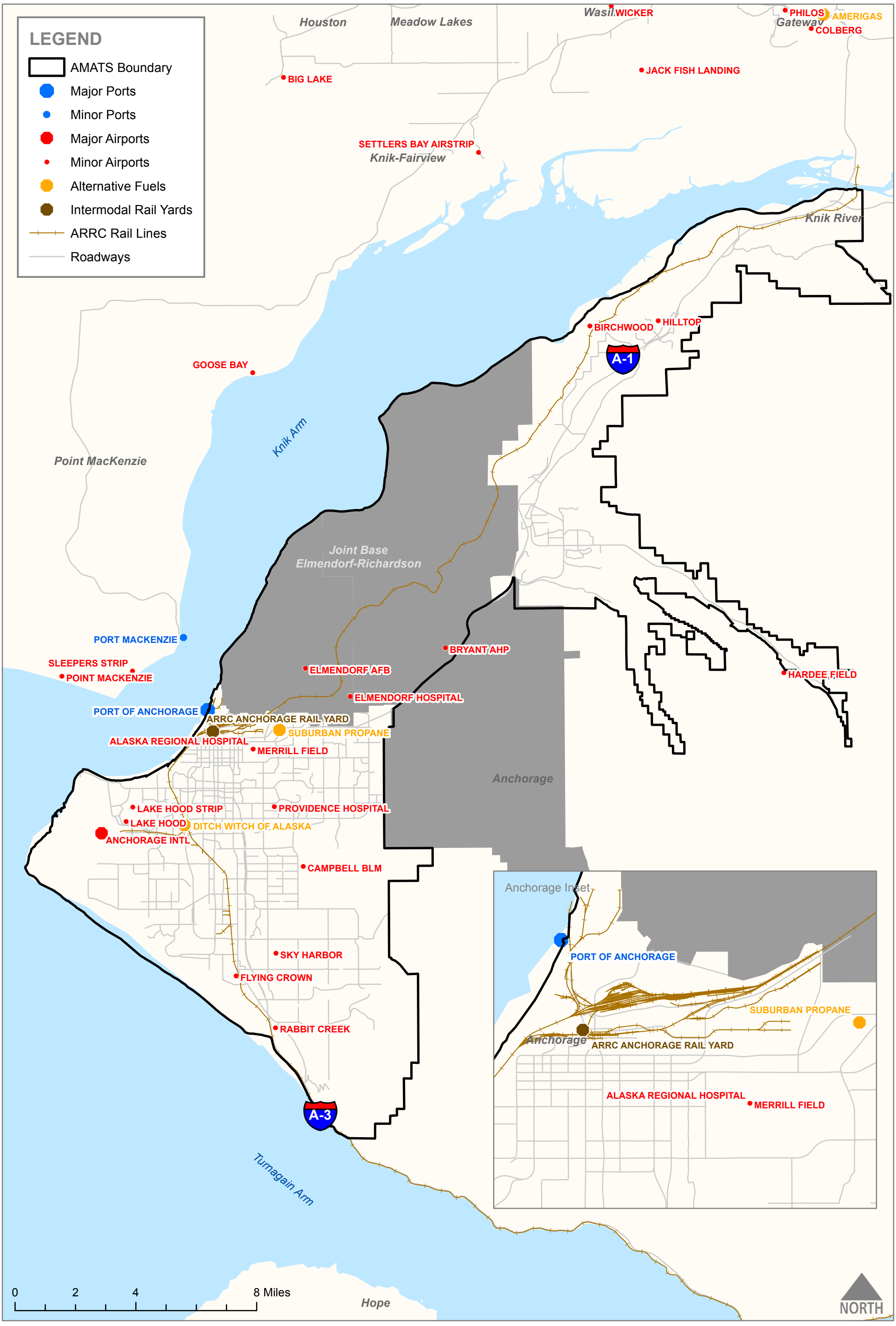

Exhibit 1: Major Freight Generators

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

AMATS

Anchorage Metropolitan Area Transportation Solutions

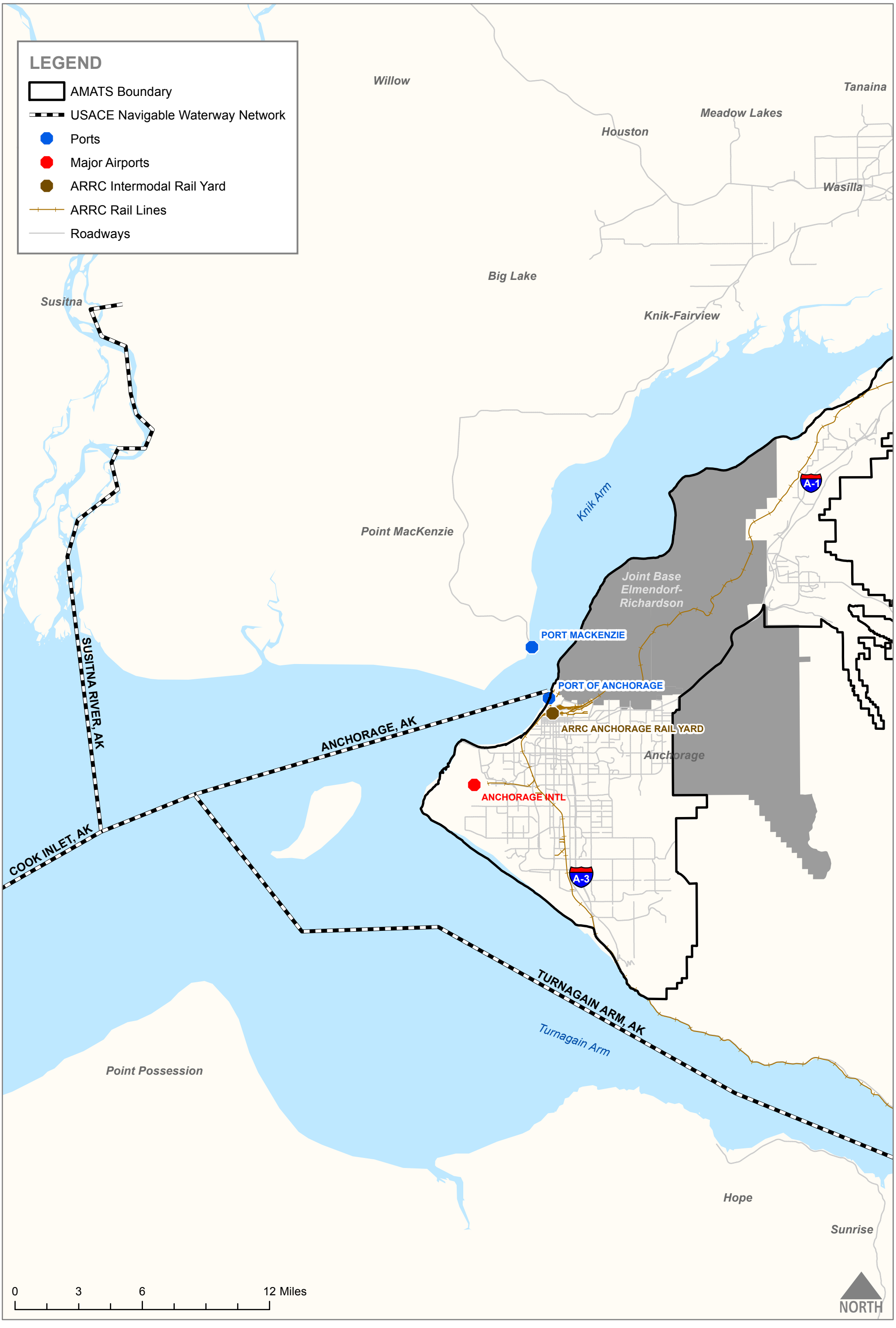

Exhibit 2: Water Cargo Facilities

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

AMATS
Anchorage Metropolitan Area Transportation Solutions

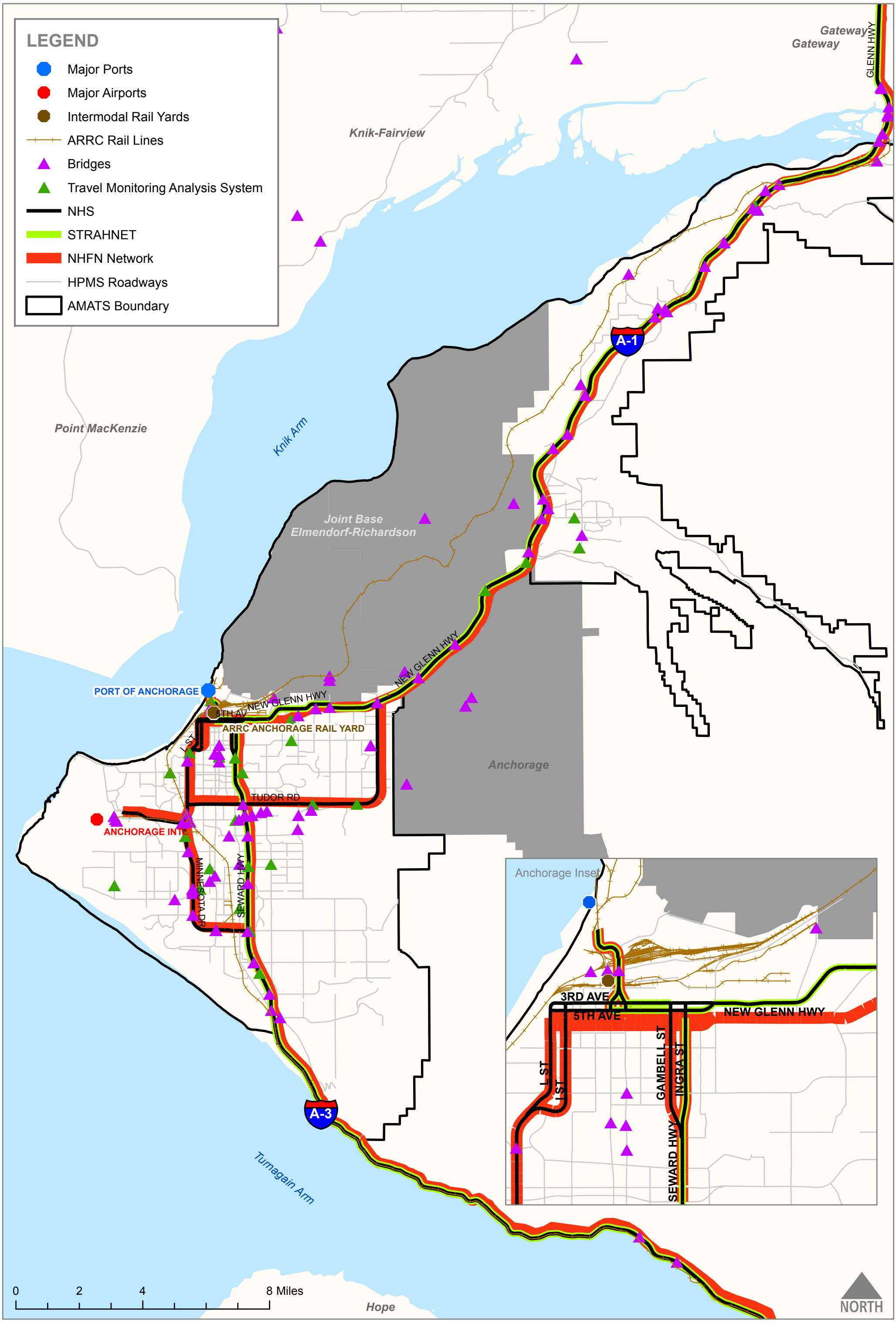

Exhibit 3: Highway Facilities

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

AMATS

Anchorage Metropolitan Area Transportation Solutions

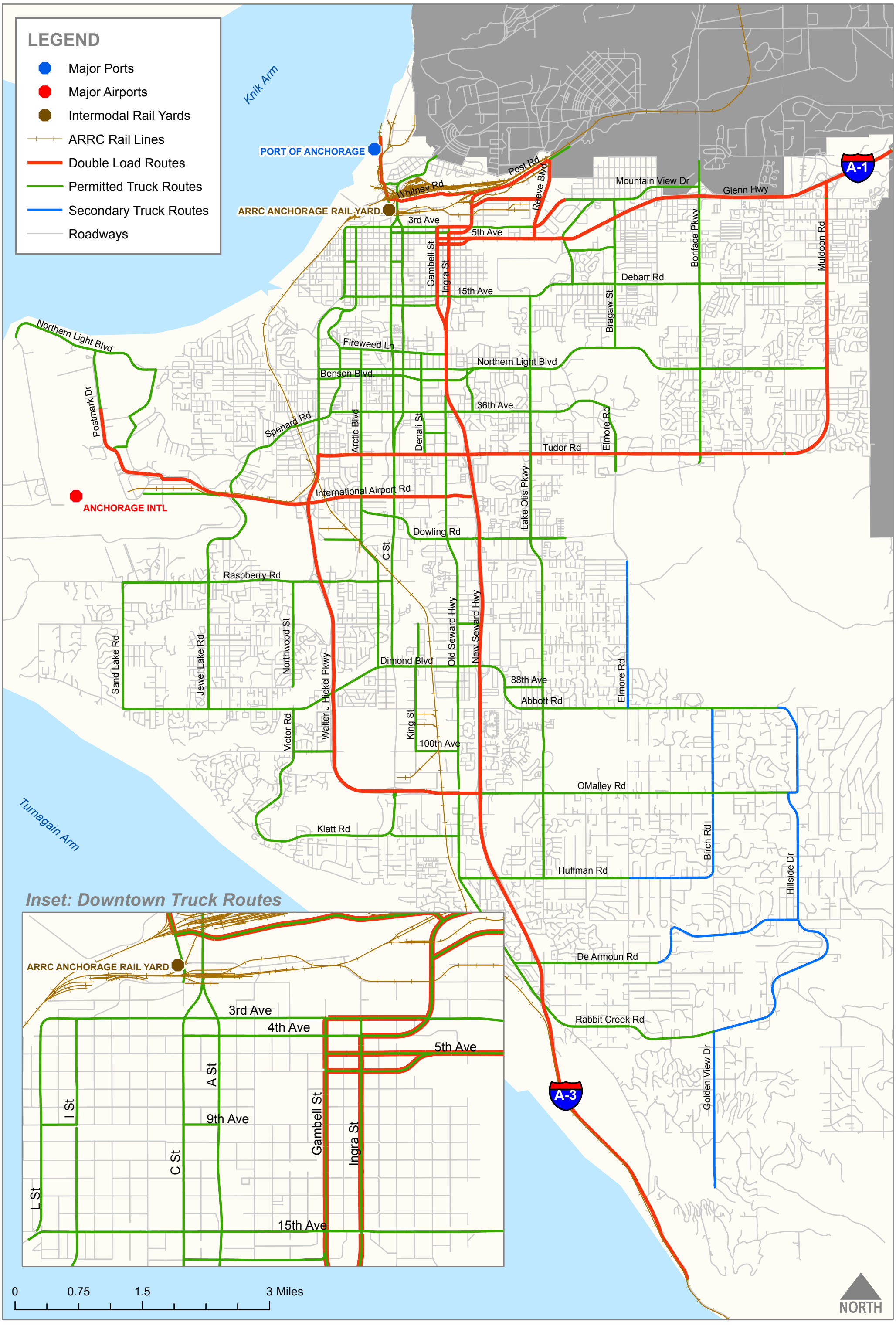

Exhibit 4: Local Freight & Oversized Routes

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

AMATS
Anchorage Metropolitan Area Transportation Solutions

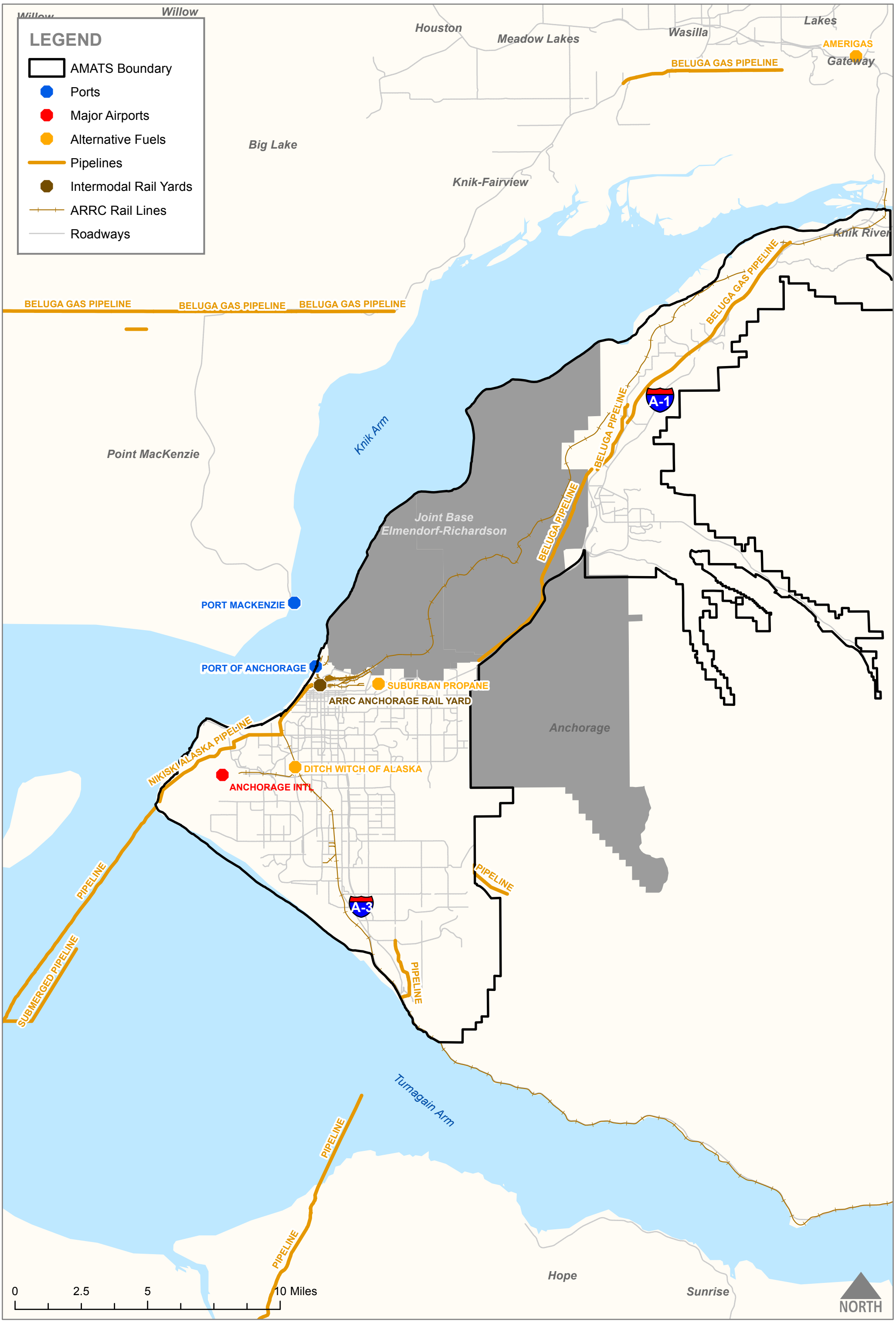

Exhibit 5: Pipeline Facilities

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

AMATS
Anchorage Metropolitan Area Transportation Solutions

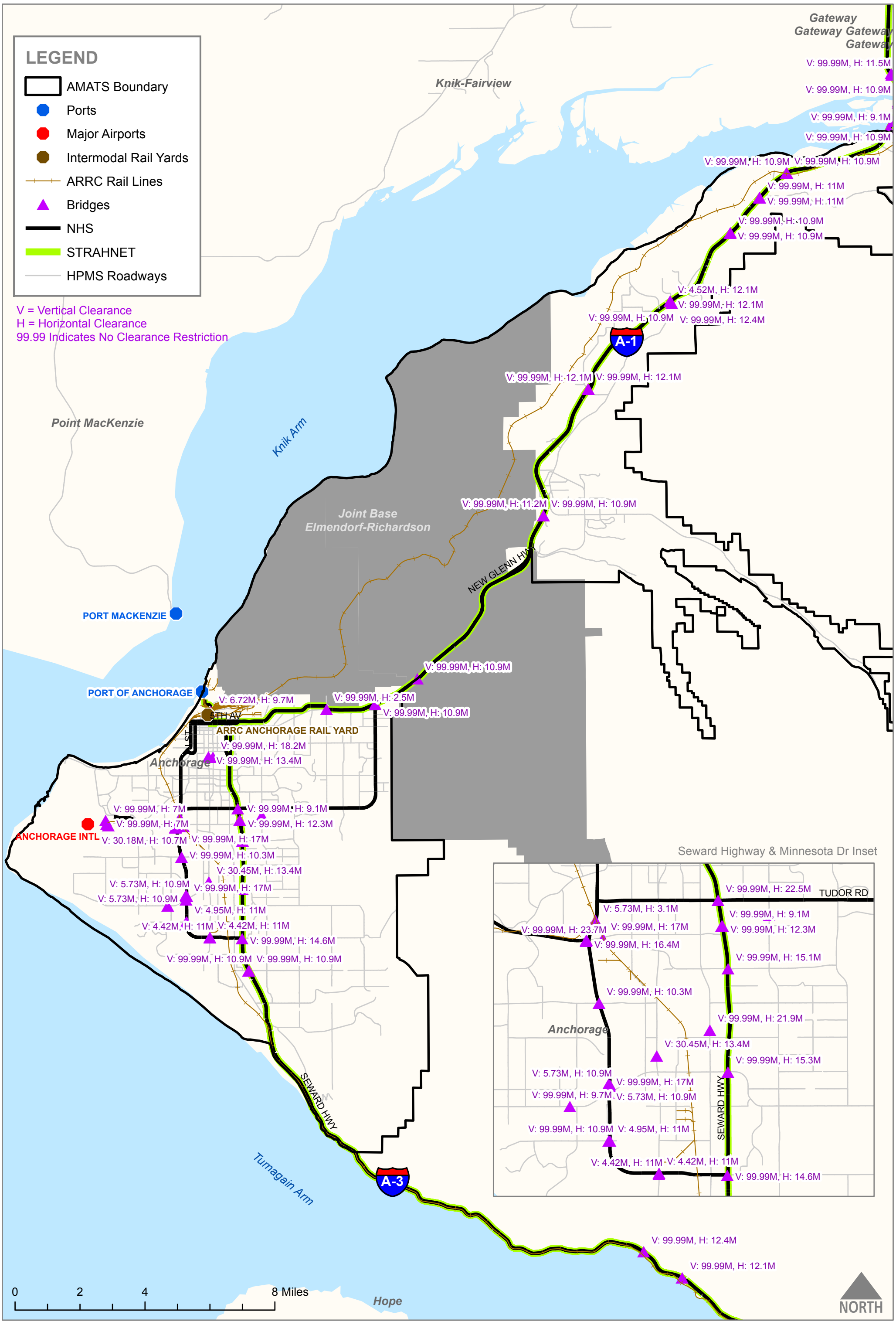

Exhibit 6: Bridge Clearances

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

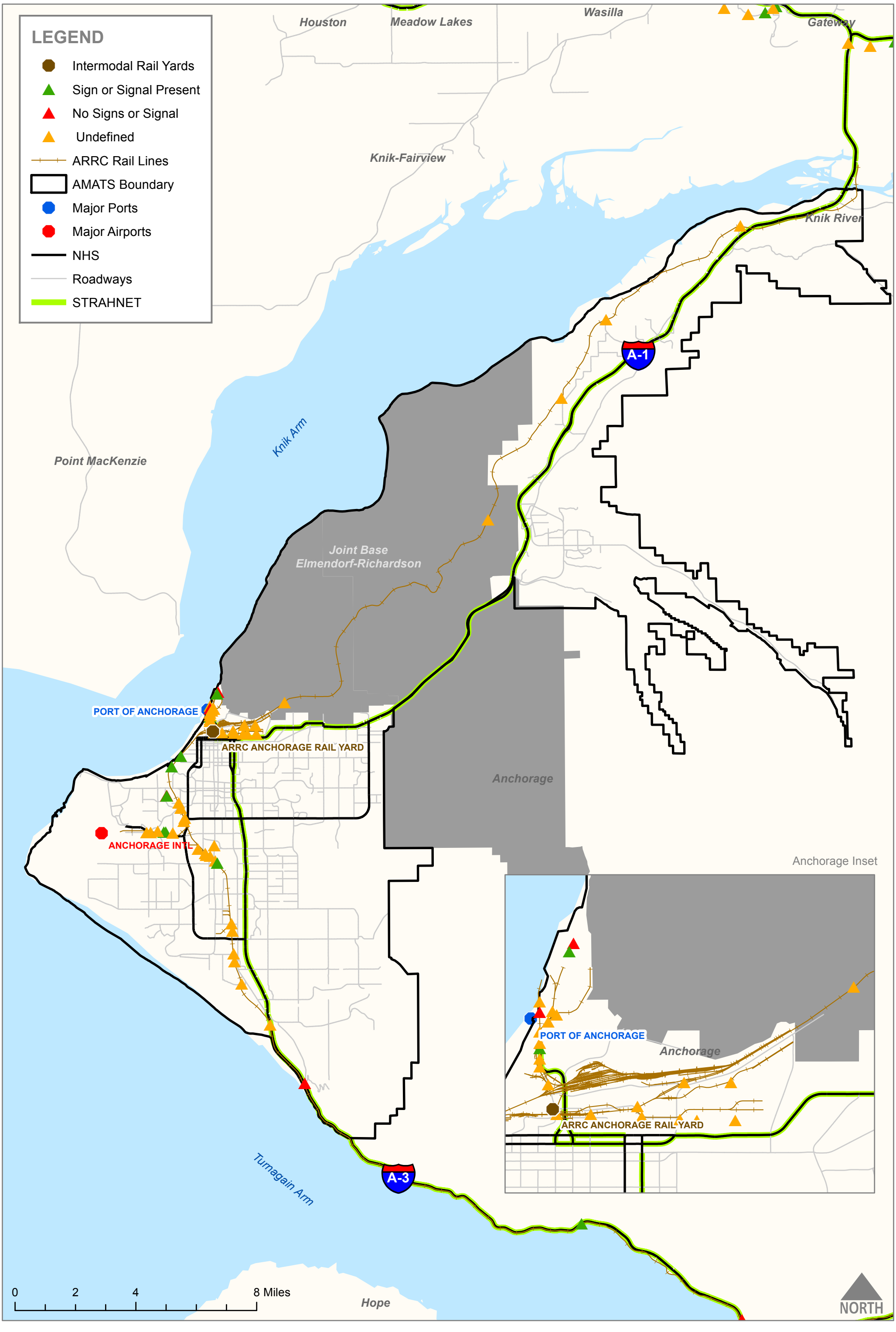

Exhibit 7: At-Grade Crossings

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

AMATS

Anchorage Metropolitan Area Transportation Solutions

Task 5: Freight Issues & Trends White Paper

AMATS Freight Mobility Study

Prepared for

AMATS

Prepared by

HDR with RSG

Anchorage, AK
March 21, 2016

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Exhibits

Acronyms

AADTT	Average Annual Daily Truck Traffic
ADEC	Alaska Department of Environmental Conservation
AEDC	Anchorage Economic Development Corporation
AFB	Air Force Base
AMATS	Anchorage Metropolitan Area Transportation Solutions
ARRC	Alaska Railroad Corporation
ATRI	American Transportation Research Institute
BTS	Bureau of Transportation Statistics
CBP	Customs and Border Protection
CDS	Coordinated Data System
CVISN	Commercial Vehicle Information Systems and Networks
DC	Distribution Center
DLA	Defense Logistics Agency
DoDAAC	Department of Defense Activity Address Cod
DOE	Department of Energy
DOT&PF	Alaska Department of Transportation and Public Facilities
EIA	Energy Information Administration
EPM	Electrical Preventative Maintenance
FAA	Federal Aviation Administration
FAF	Freight Analysis Framework
FARS	Fatality Analysis Reporting System
FMS	Freight Mobility Study
FRA	Federal Railroad Administration
FRSA	Federal Railroad Safety Act
FTZ	Foreign Trade Zone
GIS	Geographic Information System
HRI	Highway-Rail Intersection
ITS	Intelligent Transportation System
JBER	Joint Base Elmendorf-Richardson
LQ	Location Quotient
MTP	Metropolitan Transportation Plan
NFPA	National Fire Protection Association
NHS	National Highway System
NHTSA	National Highway Transportation Safety Administration
NTAD	National Transportation Atlas Database
PHMSA	Pipeline and Hazardous Materials Safety Administration
RWIS	Road Weather Information System
STIP	Statewide Transportation Improvement Program

STRAHNET	Strategic Highway Network
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TAZ	Traffic Analysis Zone
TMAS	Travel Monitoring Analysis System
TSA	Transportation Security Administration
TSAIA	Ted Stevens Anchorage International Airport
USACE	US Army Corps of Engineers
USDOT	US Department of Transportation
VC	Vertical Clearance
WIM	Weight-In-Motion

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1 Introduction

In support of the Anchorage Metropolitan Area Transportation Solution (AMATS) Freight Mobility Study (FMS), this White Paper presents key local and regional freight issues and trends in Anchorage based on the review and analysis of the municipality, regional, and statewide plans and data resources conducted in Task 4. The White Paper also presents a review of the following topics of relevance to the AMATS FMS:

- **The Regional Economic Market:** Local industries drive the regional freight market. This section presents the key industries in the region that impact commodity movements within, to, from, and through the region. Given this understanding of the past, present, and future regional marketplace, trends were highlighted that may affect the freight system in the future.
- **Logistics Patterns, Flows, and Modes:** Building on the knowledge of core industries in the region, this section presents an investigation of the travel patterns and freight flows of commodity movements by mode (i.e., water, air, truck, rail, and pipe). This information provides an understanding of how the region's multimodal freight system operates and integrates as commodities are moved between trade partners.
- **Safety & Security Issues:** Safety and security issues come to the forefront in freight mobility. Freight involves massive shipments using various transportation modes and systems. Safety is paramount to ensure that large containers or vessels of costly and/or potentially hazardous materials arrive at their destinations on time and intact. Security is also a major concern as these shipments cross various borders, each with different regulations and protocols. This section presents a discussion of safety and security issues at both major intermodal facilities and the overall system in the region.
- **Bottlenecks, Level of Service, & Capacity Issues:** Bottlenecks can occur anywhere on the freight system: choke points along heavily-traveled corridors, intermodal transfer locations, and/or last-mile of delivery. Bottlenecks may be the result of a lack of capacity on the freight system or could stem from operational issues unrelated to infrastructure. Bottlenecks of any type present a major threat to the regional freight system because they prevent on-time delivery of goods. This section presents an investigation of existing and potential future bottlenecks in the region, which will be critical to identifying system needs related to both transportation infrastructure issues and operations and maintenance.
- **Fuel & Energy Issues:** The cost of fuel influences the movement of goods both in overall tonnage moved (i.e., when the cost of moving commodities increases with fuel costs, the amount of commodities shipped reduces) and modal choices (i.e., when the cost of moving commodities on a mode that requires high fuel costs increases, the amount of commodities shipped on that mode reduces or shifts to a different mode). Key fuel and energy trends are presented in this Section that may impact goods movement and the economy in the region.

- **Information & Energy Strategies:** Given the issues identified above related to bottlenecks, safety and security, and fuel and energy, this section presents a review of the potential information and energy strategies that may be implemented to mitigate infrastructure and operational concerns in the regional freight system as well as to set the stage for considerations for recommendation in the Freight Mobility Study.
- **Key Conclusions & Next Steps:** This section outlines the major findings of the White Paper and how this information will be used to support the next steps in the development of the AMATS FMS.

2 The Regional Economic Market

Local industries drive the regional freight market. This section identifies the key industries in the region that have major impacts on commodity movements within, to, from, and through the region. Given this understanding of the past, present, and future regional marketplace, trends were highlighted that will likely affect the future freight system in Anchorage.

2.1 Population & Households

According to the 2010 Census, Anchorage has over 291,000 inhabitants and over 107,000 households; it is the largest municipality in the state and is a strong economic driver for the state. [1] According to annual US Census population estimates, population grew by about 2.6% in the five-year period between 2010 and 2014. Based on the socioeconomic data made available from the AMATS travel forecast model, the region anticipates that the population will grow by about 20% to almost 348,000 by year 2040. The forecast data suggests that growth in households will grow at a similar rate.

At the time of the Census, 94% of households had at least one available vehicle, and almost 70% of households had an annual income of over $50,000. The unemployment rate was relatively low at 5.1%, indicating a stable economy.[2] The socioeconomic data utilized in the AMATS travel forecast model estimates an overall 21% increase in population leading into 2040 – with an overall employment total of almost 240,000 in Anchorage (Table 1). This employment growth parallels population estimates. The Anchorage Economic Development Corporation's 2015 Three-Year Economic Outlook also predicted stable population growth in the region.

Table 1: AMATS Travel Model Employment Estimates 2013-2040

Employment Category	2013	2040	%Change
Natural Resources Employment (NAICS 11, 21)	4,651	5,182	11%
Wholesale Trade, Manufacturing and Utilities Employment (NAICS 22,31,32,33,42)	8,415	10,434	24%
Construction Employment (NAICS 23)	13,306	14,723	11%
Retail Trade Employment (NAICS 44, 45)	23,315	28,372	22%
Transportation & Warehousing Employment (NAICS 48, 49)	12,983	15,146	17%
FIRE, Professional Services and Other Employment (NAICS 51-56, 81)	61,014	72,562	19%
Educational Services Employment (NAICS 61)	2,784	4,121	48%
Health Care & Social Assistance Employment (NAICS 62)	25,928	36,402	40%
Accommodation, Food Services, & Entertainment Employment (NAICS 71, 72)	20,063	26,648	33%
Government Employment (NAICS 92)	25,599	25,890	1%
Total Employment	**198,058**	**239,541**	**21%**

The information in Table 1 also summarizes employment by category defined in the AMATS forecast model. Employment categories with the highest anticipated growth rates to 2040 include education, healthcare, and accommodations/food services/entertainment. Employment categories including

[1] 2010 US Census Bureau Summary File 1
[2] American Community Survey 2012 5-Year Estimates

wholesale trade/manufacturing and transportation/warehousing are on par with the overall regional growth rate, each at about 20%, indicating moderate growth in these sectors that have the greatest impact on freight movement.

2.2 Major Industries

Location quotients (LQs) illustrate the saturation of each industry in the Region with the saturation of that industry in both the US and Alaska. An LQ value of greater than one indicates that the industry is stronger within Anchorage compared to either Alaska or the U.S. as a whole. LQs provide insight as to the major industries in the region and gauge the region's freight environment. The data in Table 2 identifies LQs in the Municipality of Anchorage over the past 10 years to illustrate the strongest industry sectors.

The major industries in Anchorage compared to the US as a whole include 'mining, quarrying, oil/gas extraction' and 'transportation and warehousing. 'Information,' while also an identified LQ, does not generate a significant amount of freight movement.

Anchorage's major industries compared to Alaska as a whole includes 'wholesale trade' – a significant freight-generator. 'Professional and technical services' and 'management of companies/enterprises' industries are also significant in the Anchorage area compared to the state, but these industries do not produce significant freight traffic.

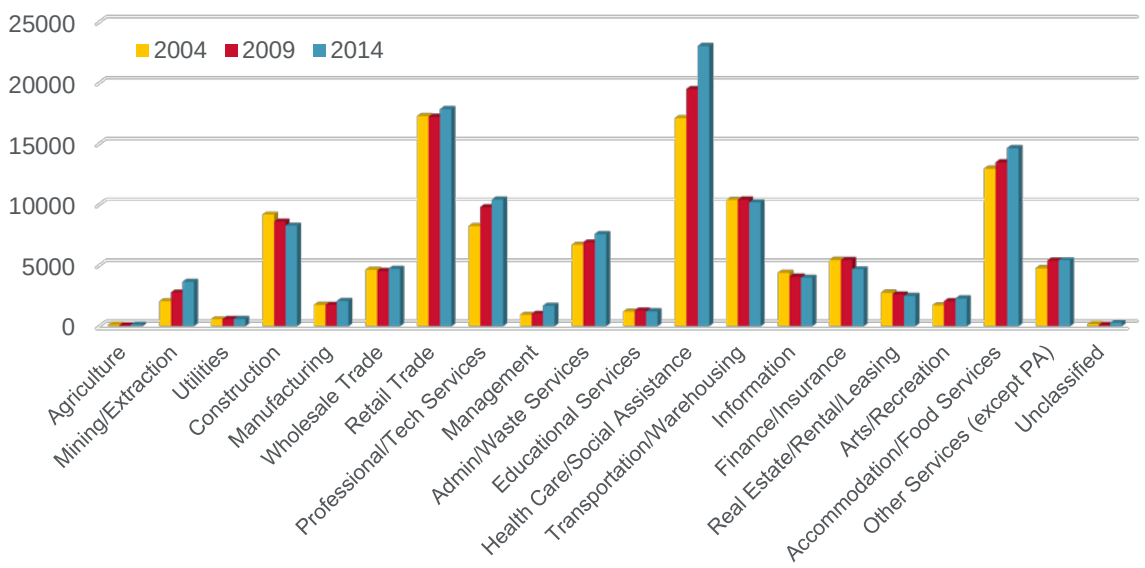
The employment data provided in Figure 1 are the basis for the LQ calculations. These employment ranges illustrate 'health care/social assistance' - a growing industry - as the highest absolute regional employment industry. Other steadily growing industries include 'mining/extraction' and 'retail trade.' These sectors affect the freight system. For example, 'mining/extraction' facilities require bulk materials moving in and out to support the extraction process. 'Retail trade' facilities and stores receive large shipments of commodities for distribution.

Though military employment numbers are not explicitly reported through BLS data, the military also has a significant presence in Anchorage because of the Joint Base Elmendorf-Richardson (JBER). Similarly, government employment numbers are explicit in the BLS data; however, the figures reported in Table 1 demonstrate that government is also a significant source of employment for the region.

Table 2: Anchorage Location Quotients 2004, 2009, 2014[3]

Anchorage Base Area	US			Alaska		
Industry by NAICS Code	**2004**	**2009**	**2014**	**2004**	**2009**	**2014**
NAICS 11 Agriculture, forestry, fishing and hunting	0.10	0.06	0.10	0.21	0.20	0.24
NAICS 21 Mining, quarrying, oil/gas extraction	3.81	3.93	3.99	0.42	0.37	0.42
NAICS 22 Utilities	0.97	0.97	0.99	0.61	0.60	0.57
NAICS 23 Construction	1.28	1.31	1.25	1.02	1.06	0.98
NAICS 31-33 Manufacturing	0.12	0.14	0.16	0.28	0.28	0.29
NAICS 42 Wholesale trade	0.79	0.74	0.75	1.44	1.44	1.47
NAICS 44-45 Retail trade	1.11	1.08	1.07	0.97	0.97	0.98
NAICS 54 Professional and technical services	1.17	1.19	1.15	1.44	1.44	1.43
NAICS 55 Management of companies/enterprises	0.53	0.51	0.72	1.58	1.66	1.14
NAICS 56 Administrative and waste services	0.83	0.88	0.82	1.20	1.21	1.26
NAICS 61 Educational services	0.56	0.49	0.42	1.18	1.26	1.10
NAICS 62 Health care and social assistance	1.18	1.11	1.19	1.03	1.05	1.07
NAICS 48-49 Transportation and warehousing	2.5	2.37	2.14	1.08	1.08	1.07
NAICS 51 Information	1.37	1.32	1.35	1.26	1.23	1.3
NAICS 52 Finance and insurance	0.91	0.88	0.77	1.25	1.24	1.37
NAICS 53 Real estate and rental and leasing	1.28	1.21	1.13	1.13	1.11	1.04
NAICS 71 Arts, entertainment, and recreation	0.90	0.97	1.00	0.87	0.91	0.96
NAICS 72 Accommodation and food services	1.18	1.10	1.08	0.97	1.01	1.01
NAICS 81 Other services, except public admin	1.07	1.12	1.18	1.01	1.07	1.08
NAICS 99 Unclassified	0.7	0.53	1.25	0.73	0.81	0.97

Figure 1: Anchorage Employment Levels for 2004, 2009, and 2014[4]



[3] Bureau of Labor Statistics Quarterly Census of Employment and Wages, 2004, 2009, 2014
[4] Bureau of Labor Statistics Quarterly Census of Employment and Wages, 2004, 2009, 2014

As identified in the LQ analysis and in AMATS's 2035 Metropolitan Transportation Plan (MTP) published in 2012, 'manufacturing' is not a significant industry sector in the region. Rather, the area is dependent on imported goods. 'Transportation/warehousing,' while not a growing industry, is a stable industry within the top five employment sectors in the region. UPS and FedEx have facilities onsite at Ted Stevens Anchorage International Airport (TSAIA). Additionally, West Anchorage hosts various distribution centers (DCs) and warehouses that receive/distribute goods from TSAIA. A quick scan of regional distributors and other industry freight generators included:

- NAPA Auto Parts DC (6220 Rovenna St, Anchorage, AK 99518);
- Safeway Corp DC (C St, Anchorage, AK 99518);
- McKesson Pharmaceuticals DC (Electron Dr, Anchorage, AK 99518);
- Odom Corporation – Wholesale Beverage DC (Ship Ave, Anchorage, AK 99501 & West 1st Avenue Anchorage, 99501);
- Food Services of America DC (Olive Lane, Anchorage, AK 99515);
- Sysco Alaska DC (Changepoint Dr, Anchorage, AK 99518);
- Domino's Pizza DC (King St, Anchorage, AK 99518);
- Frito Lay DC (North Wrangell St, Anchorage, AK 99501 & East 76th Ave Anchorage, AK 99518);
- Dreyer's Ice Cream DC (6721 Arctic Spur Rd, Anchorage, AK 99518);
- K & L Distributors – Beverage Distributors (6307 Arctic Spur Rd, Anchorage, AK 99518);
- Pepsico Bottling Group DC (521 E 104th Ave, Anchorage, AK 99515);
- Air Liquide – Fuels (6415 Arctic Blvd, Anchorage, AK 99518);
- American Fast Freight – Freight Forwarding Service (5025 Van Buren St, Anchorage, AK 99517);
- Carlile Transportation Solutions – Third-Party Logistics (East 1st Avenue Anchorage, AK 99501);
- Lynden Freight Shipping and Logistics – Third-Party Logistics (3027 Rampart Dr, Anchorage, AK 99501);
- Weaver Bros. Transportation Services – Third-Party Logistics (Spar Ave, Anchorage, AK 99501);
- Alaska Truss – Truss Plant (28275 Denaina Elders Rd., Chugiak, Alaska 99567); and
- Spenard Builders Supply – Truss Plant (4412 Lois Drive, Anchorage, AK 99517).

2.3 Freight-Related Land Use

Figures 2 and 3 illustrate land use in the northeast and southwest portions of the region respectively. The far northeast shows sporadic industrial areas within vacant parcels. Other industrial facilities are located adjacent to the Old Glenn Highway. The Anchorage Regional Landfill encompasses a large industrial parcel in the southern portion of the Chugiak-Eagle River area near the JBER. This facility is the only major landfill in the region, which have the potential to attract significant truckloads of scrap/waste. The Anchorage Bowl map illustrates a significant amount of industrial activity along the Alaska Railroad Corporation (ARRC) rail line and adjacent to TSAIA.

Figure 2: AMATS Anchorage Bowl Land Use Designated by the Municipality of Anchorage

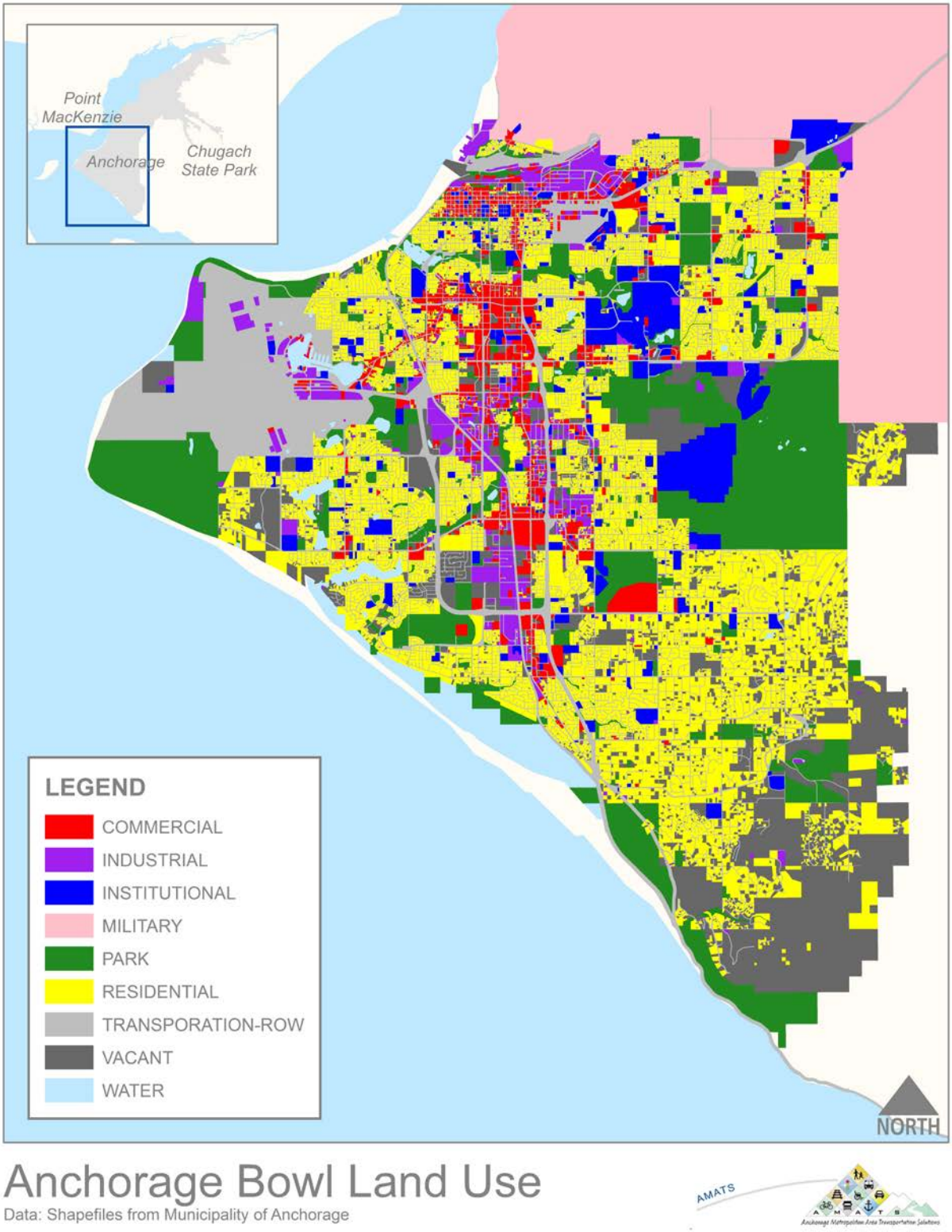
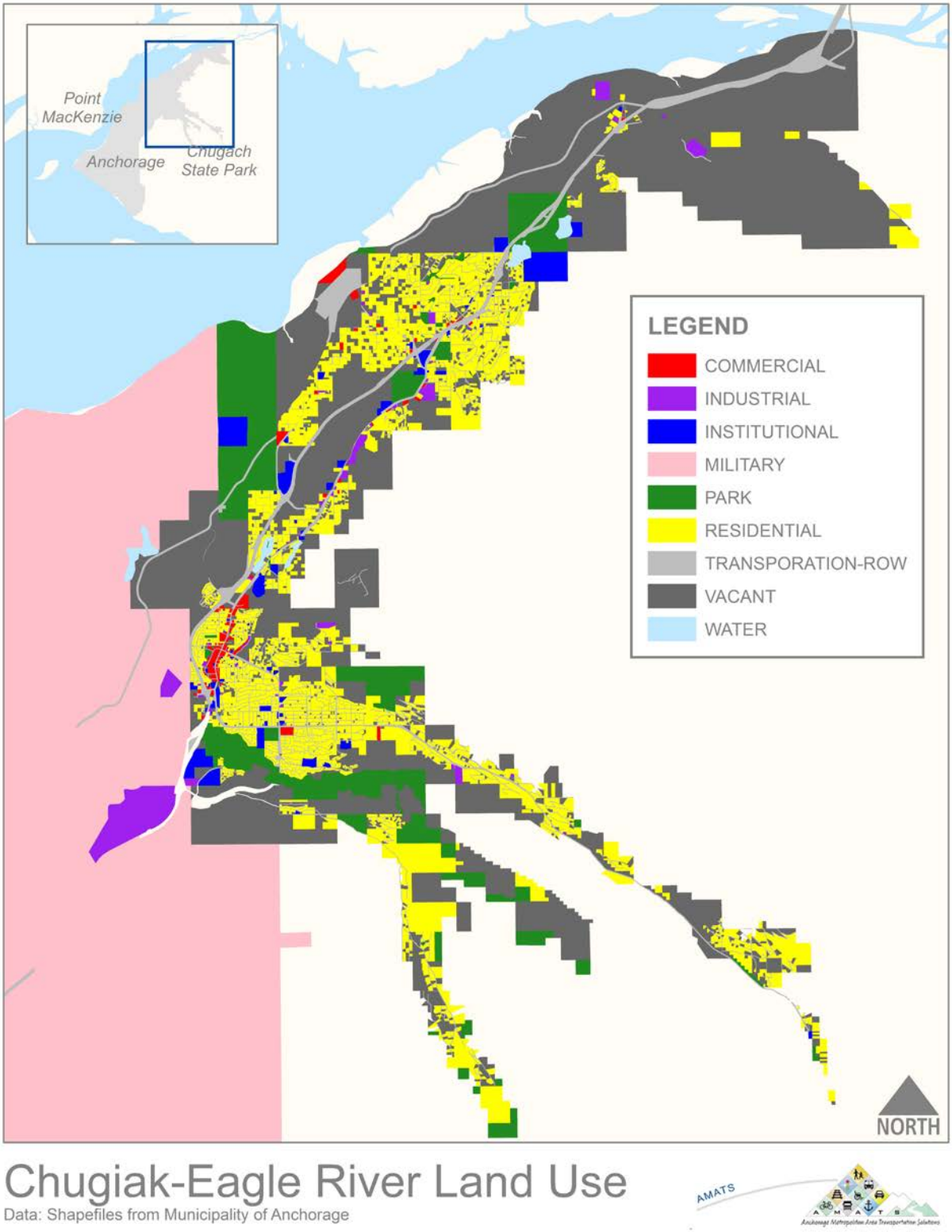
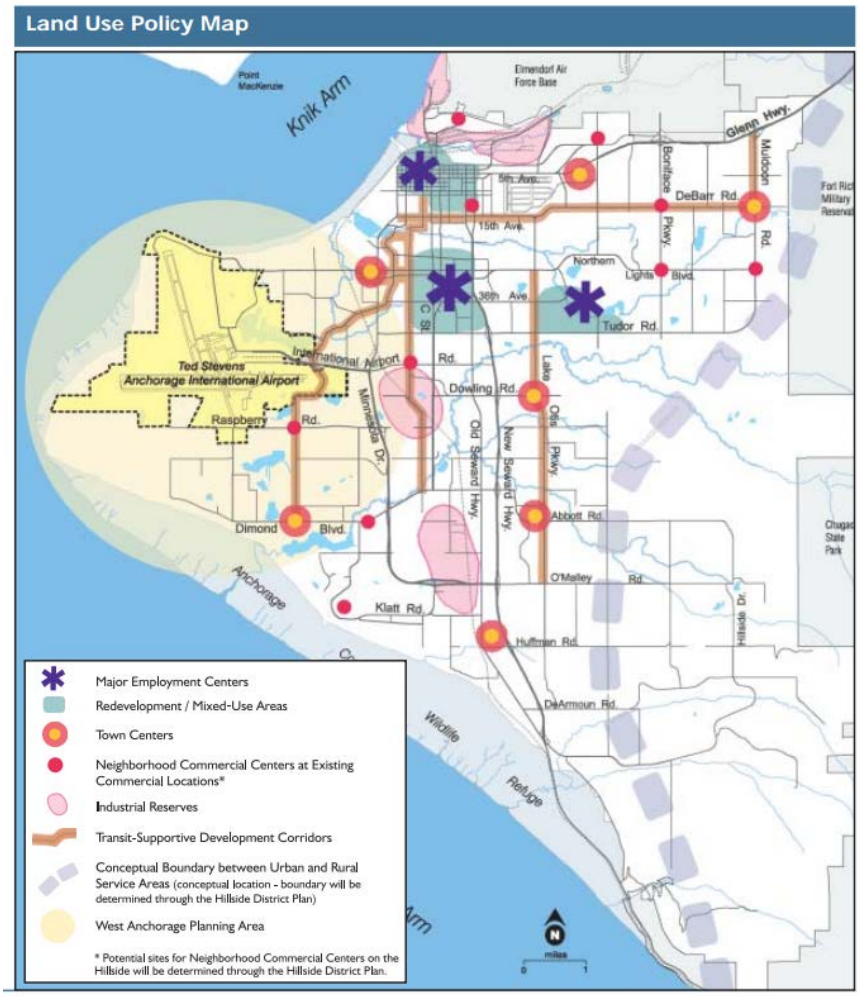


Figure 3: AMATS Chugiak-Eagle River Land Use Designated by the Municipality of Anchorage



Clustering industrial land uses helps municipalities to both avoid conflicts of land use and increase efficiency for freight transportation. Removing industrial land uses from other types of commercial and residential uses ensures the limited use of personal vehicle traffic and consolidates the need for truck routes within the areas. Anchorage 2020, the Comprehensive Plan for the Anchorage Bowl, supports cluster-type land use planning practices by adding "Industrial Reserve" land use areas. The plan shows three specific industrial reserves, as depicted in Figure 4.

Figure 4: Land Use Policy Map, Anchorage 2020: Anchorage Bowl Comprehensive Plan

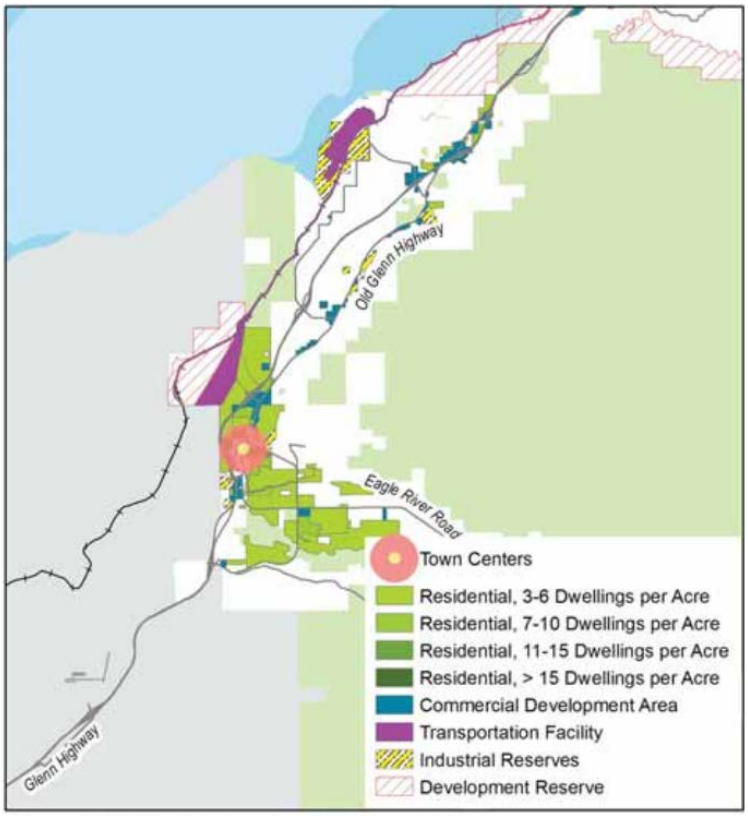


One of the industrial reserve areas occupies the parcels south of the Port of Anchorage and along the ARRC Intermodal Center. The second industrial reserve land use area is located just south of where International Airport Road intersects Artic Boulevard. The third industrial reserve land use area is located further south along the ARRC line between Minnesota Drive and Old Seward Highway surrounding the intersection of C Street and 100th Avenue. This area accommodates a number of the distribution centers listed in Section 2.2. Further, the West Anchorage District Plan cites the need for industrial reserves in the eastern portions of the District to preserve space for industrial cluster development near TSAIA rather than a mixed-land use environment.

In Title 21.10: Land Use Planning, Chugiak-Eagle River identifies industrial districts, including light, heavy, and rural industrial districts. These districts limit land use to those that are compatible with or

support industrial practices and development. The map in Figure 5 illustrates these industrial reserves, with designated areas along Old Glenn Highway, to the north near Birchwood Airport, and around the town center in Eagle River.

Figure 5: Industrial Land Use Areas in the Chugiak-Eagle River



The local plans reviewed previously in Task 4 of this FMS each emphasize the importance of coordinated land use planning integrated with major transportation infrastructure. The Chugiak – Eagle River Comprehensive Plan and Long Range Transportation Plan underscore the need to keep industrial and residential land uses separate. These types of context-sensitive land use policies will be critical when developing recommendations for the FMS, to maintain a harmonized land use system to ensure the safe, efficient, and non-disruptive freight services in the region. Further, the Alaska Trucking Association (ATA) also emphasizes the important of coordinated planning efforts for major freight-related facilities to avoid conflicts between commercial vehicles and pedestrians, transit, and personal vehicles.

2.4 Foreign Trade Zone

The region includes the only activated Foreign Trade Zone (FTZ) in the state. U.S. Customs and Border Protection (CBP) defines FTZs as:

> *"secure areas under CBP supervision that are generally considered outside CBP territory upon activation… Foreign and domestic merchandise may be moved into zones for operations, not otherwise prohibited by law, including storage, exhibition, assembly, manufacturing, and processing… Under zone procedures, the usual formal CBP entry procedures and payments of duties are not required on the foreign merchandise unless and until it enters CBP territory for domestic consumption, at which point the importer generally*

has the choice of paying duties at the rate of either the original foreign materials or the finished product. Domestic goods moved into the zone for export may be considered exported upon admission to the zone for purposes of excise tax rebates and drawback."[5]

FTZs stimulate economic activity as the less stringent regulations encourage companies to locate within the US. The FTZ Board approved Anchorage's application for 'Anchorage FTZ 160' in 1989. The zone includes the following sites:

- Site 1 (56.89 acres)—the Port of Anchorage and Port of Anchorage Industrial Park, 1075 Dock Rd., 1076 Ocean Dock Rd. and 1601 Tidewater Rd, Anchorage;
- Site 2 (920 acres)—Anchorage International Airport, Postmark Drive and International Airport Rd, Anchorage;
- Site 3 (2.7 acres)—315 East 2nd Ave., Anchorage;
- Site 4 (25 acres)—Altman/Greenbrier Partnership Site, 1800 West 48th Ave., Anchorage;
- Site 5 (2.3 acres)—619 East Ship Creek Ave., Anchorage;
- Site 6 (12.2 acres)—Douglas Management Company, 660 Western Dr., Anchorage; and
- Site 7 (135 acres)—Eklunta Inc., Birchwood Loop Rd. and Birchwood Airport Rd., Anchorage.

The designation of Anchorage FTZ 160 emphasizes the region's importance in foreign trade for the entire state.

2.5 Major Freight Generators

The region's major freight generators include the Port of Anchorage, TSAIA, the ARRC Rail Yard, and JBER. Details for each are presented below. Exhibit 1 (all Exhibits are presented at the end of this document) shows these major freight generators spatially and includes minor airport facilities that generate small amounts of cargo. It also includes Alternative Fuel facilities identified as part of the National Transportation Atlas Database (NTAD). These facilities are further discussed in Section 3.

2.5.1 Port of Anchorage

The Port of Anchorage is owned by the Municipality of Anchorage. The Port is a self-supporting facility that operates using revenue and grant funding. The Port of Anchorage receives the majority of freight tonnage arriving into and out of the state.[6] Based on 2010 to 2014 data, the Port averaged 203 container ship port calls, 63 petroleum vessel port calls, and 176 "other" (i.e., cement, cruise, bulk) ship calls each year.[7] The Port of Anchorage is located on the US Strategic Highway Network (STRAHNET), indicating that the facility is critical to the Department of Defense's domestic operations.

The Port is not only critical to moving freight in and out of the Anchorage area; over 350 communities in the state rely on cargo shipped to the Port, which is then distributed via barge to these communities that lack major highway or railway connections.

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[5] U.S. Customs and Border Control. About Foreign-Trade Zones and Contact Info. http://www.cbp.gov/border-security/ports-entry/cargo-security/cargo-control/foreign-trade-zones/about
[6] Let's Get Moving 2030: Alaska Statewide Long Range Transportation Policy Plan
[7] Stephen Ribuffo, Anchorage Port Director, Port of Anchorage, http://alaskaalliance.com/wp-content/uploads/2013/10/Stephen-Ribuffo-Anchorage-Port-Director2-.pdf

The existing facilities at the Port of Anchorage include three general cargo terminals, two bulk petroleum product terminals, loose cement offloading facilities, an on-dock public transportation shed, rail mounted electric container cranes, portable cranes, a bulk petroleum valve yard, and intermodal exchange infrastructure to transition goods to rail, road, and air modes. Current on-site issues noted by the Port of Anchorage include annual dock pile repairs, issues with storm drainage, lack of an emergency back-up power source, and outstanding erosion at the Ship Creek Boat Launch.

The 55-year-old Port of Anchorage has been undergoing a modernization. This effort at the Port of Anchorage includes a variety of improvements including:

- Redeveloping the marine terminal to accommodate larger vessels (note that prior to the modernization project, regular dredging was necessary to maintain a 35-foot depth at the terminal);
- Replacing Petroleum Terminals 1 and 2;
- Replacing Cargo Terminals 1 and 2;
- Improving seismic resilience of the Port's facilities;
- Incorporating modernized technology throughout the Port;
- Constructing a new storage facility to accommodate 40,000 additional tons of cement (Private Sector Investment - Alaska Basic Industries);
- Building a six-tank petroleum, oils and lubricants (POL) terminal with a capacity of 360,000-barrels and ability to store methanol (Private Sector Investment - Delta Western);
- Adding four tanks to existing storage, raising capacity over one million barrels (Private Sector Investment – Crowley); and
- Enhancing operational efficiencies.

Given the ongoing port modernization efforts and investments on behalf of the private sector, the Port of Anchorage's total storage capacity will be 3.4 million barrels (146.2 million gallons). According to the Alaska Regional Ports Report published in 2014, the Port of Anchorage anticipates that container traffic will parallel population growth – indicating modest growth at the facility. The Anchorage Economic Development Corporation (AEDC) cites areas adjacent to the Port of Anchorage as candidate parcels for development of a "multimodal industrial center" connecting the Port to rail and highway modes.

2.5.2 Ted Stevens Anchorage International Airport

Air transport is critical in the state as a result of geographic limitations of Alaska's highway, railway, and waterway systems. The Alaska Aviation System Plan, published in 2013, cites that Alaska ships 39 times more air freight than other states, underscoring this dependence on air cargo.

TSAIA is a 4,612-acre complex owned and operated by the State of Alaska. The facility employs over 15,500 people in Anchorage. TSAIA is also a critical through-point/fueling station for international air traffic. The facility pumps over 2 million gallons of fuel onsite each day.[8] TSAIA ranks fifth in terms of worldwide cargo throughput, and imports from Asia account for a significant amount of this inbound cargo.[9] In 2015, TSAIA received its fourth consecutive Diamond Award at the Air Cargo Excellence at the International Air Transport Association World Cargo Symposium in Shanghai, China.[10] In 2014, TSAIA ranked second in the nation for all-cargo weight landed.[11]

[8] ADOT&PF. Airport Facts. (2015). http://www.dot.state.ak.us/anc/about/facts.shtml
[9] West Anchorage District Plan
[10] ADOT&PF. Ted Stevens Anchorage International Airport Wins Air Cargo Excellence Award. (2015). http://www.dot.state.ak.us/anc/business/communityRelations/pressReleases/2015/ADOTPF-Press-Release-ANC-ACE-A0ward.pdf

The facility has three runways and a variety of surrounding industrial parcels that benefit from easy airport access. The North Airpark has sufficient storage and movement space to accommodate current levels of freight traffic. Over 265 businesses/agencies currently lease space at TSAIA. TSAIA also currently offers potential for onsite industrial development to facilitate easy transfer to planes.

2.5.3 Alaska Railroad Corporation Anchorage Rail Yard

ARRC owns and operates a rail yard in West Anchorage to the northeast of TSAIA, which functions as a distribution hub to other modes including the Port of Anchorage and TSAIA. This facility offers connectivity between truck, rail, and water cargo. The rail yard connects to Seward in the south and Fairbanks in the north via Class II railroad lines. ARRC does not connect to any other rail lines in North America except by rail barge. Rail shares on overall tonnage are relatively low at fewer than ten percent of statewide tonnage based on 2012 Freight Analysis Framework data.

2.5.4 Joint Base Elmendorf-Richardson

The US Military is another major employment sector in the region. JBER is located in the MOA. JBER formed in 2010 when the Elmendorf Air Force Base combined with the Army's Fort Richardson. This 79,000-acre property, zoned for military use, employs over 13,000 members of the US Air Force, Army Reserve, and National Guard, as well as over 3,000 civilians.[12] Based on data from the US Transportation Command (USTRANSCOM), Fort Richardson is Alaska's second Alaska's third highest volume-generating Department of Defense Activity Address Code (DoDAAC), , moving 26% of the state's requisition volumes. Elmendorf Air Force Base (AFB) ranks third in the state, moving 21% of the state's requisition volumes. Elmendorf AFB receives the largest volume of commercial requisitions in the state in terms of commercial air traffic. Fort Richardson leads the DoDAACs in the state for waterborne movements, as 37% of containers are shipped through the base.

JBER generates traffic through the Port of Anchorage and its own onsite air facilities. About 100 containers per month move through JBER facilities consisting primarily of (1) clothes, food, and other goods moving to the Army and Air Force Exchange Service (AAFES) store on base and (2) class 9 commodities including equipment parts. Other major movements to and from JBER include transport of heavy equipment and materials for military exercises, as well as relocation of equipment and fleet to the contiguous states. JBER also receives freight via rail from Fort Wainwright in Fairbanks, AK.

Freight moving to and from JBER via the Port of Anchorage travels via military vehicles on private roads located on the base and a direct access road to the Port from JBER. When moving freight on single or double trailers via public roadways, the Defense Logistics Agency (DLA), which manages military supply and logistics, contracts with a local freight carrier. The bullets below summarize the types of freight that travel through JBER under DLA:

- Container Freight;
- Intermodal Freight;
- Automobiles (the DLA ships rolling stock for military exercises to the Lower 48);
- Frozen Storage (DLA primarily uses the Sysco warehouse and contractors to move);
- Chemicals (haz-mat materials moved through a subcontractor);

[11] CY 2014 ACAIS All-Cargo Data reported for Calendar Year 2014 http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy14-cargo-airports.pdf
[12] Joint Base Elmendorf-Richardson. Newcomer's Information. (2015). http://www.jber.af.mil/library/newcomers/index.asp

- Lumber Products;
- Raw Materials;
- Military Loads;
- Animal Feed;
- General Merchandise;
- Agriculture;
- Hazardous Materials;
- Petroleum;
- Furniture/Household Goods;
- Medical Products;
- Electronics/Computers; and
- Food Supplies (not only for military personnel and the AAFES store, but also for the schools and daycare centers on base).

JBER does not anticipate future growth at the facility. The military base currently has unused land that could be leased to the Municipality of Anchorage. As an example, the Anchorage Regional Landfill is leased to Anchorage, as the military is able to also use the landfill at no cost.

3 Logistics Patterns, Flows, and Modes

Building on the knowledge of core industries in the region, this section presents a summary of the travel patterns and freight flows of commodity movements by mode (i.e., water, air, truck, rail, and pipe) in the region. This information presents an understanding of how the region's multimodal freight system operates and integrates as commodities move between trade partners.

The Alaska Statewide Long Range Transportation Policy Plan (2008) estimated that freight volumes will reach 21 million tons by 2020. The 2040 Freight Analysis Framework (FAF) prepared by the Federal Highway Administration data suggests increases up to 74 million tons statewide (include within/to/from movements).

Transportation planners understand both the uncertainty in the forecast data and the imperative for planning infrastructure projects to maintain the current system and accommodate for this future growth potential. The information presented in Table 3 summarizes projects or programs identified in relatively recent plans reviewed in the background research conducted as part of Task 4 of this FMS including investment priorities within the next two decades.

Table 3: Potential Infrastructure Improvement Projects Related to Anchorage Freight

Plan	Facility	Improvement
Let's Get Moving 2030: Alaska Statewide Long Range Transportation Policy Plan, 2008	Seward Highway to Glenn Highway Connection	Capacity and safety improvements on the roads that connect the Seward Highway and Glenn Highway (Also in the 2035 AMATS Metropolitan Transportation Plan)
	Seward Highway in Anchorage	Widening
	Parks Highway between Anchorage and Fairbanks	Rebuilding subgrade and pavement (removing seasonal restrictions during ground thaw for truck/freight use)
	Pork MacKenzie	Development as a specialized bulk commodities exporter
	Knik Arm Crossing	Connecting Anchorage with Point Mackenzie by Road

Plan	Facility	Improvement
Alaska Statewide Transportation Improvement Program 2016 - 2019, 2015	Seward Highway Bridge	Bridge Rehab from MP 17 – 22.5 and from MP 25 – 36
	Seward Highway	Improvements on various segments: MP 99 – 105; MP105-115; 36th Avenue to 20th Avenue; MP 75-90 Road & Bridge Rehabilitation; Rehabilitations on Dimond Boulevard to Dowling Road; Dowling Road Interchange Rehabilitation; Reconstruction from O'Malley Road to Dimond Boulevard; Grade separated interchange at 36th Avenue
	Glenn Highway	Airport Heights to Hiland Road Pavement Preservation; Glenn Highway/Muldoon Road Interchange Reconstruction
	Knik Arm Crossing	Design and construct 2.5 miles of roadway behind the Port of Anchorage from the northern terminus south through Government Hill and connecting to the A/C couplet to serve as an alternative access to the Port and primary access to the planned Knik Arm Crossing; Design and construct a bridge across Knik Arm between Anchorage and the Mat-Su Borough and a connecting roadway between the northern terminus of the Port of Anchorage and the bridge, and a connecting roadway between the Point Mackenzie Road and the bridge.
	Anchorage Area Principal Arterial Pavement Resurfacing	Preventive Maintenance/ADA Compliance: Prioritization and construction of needed ADA improvements identified per audit.
	Road Weather Information System (RWIS)	Ongoing maintenance and operations of network, sites, and utilities
	Weigh-In-Motion Maintenance & Operations	Maintain, operate, and enhance the current network of weigh-in-motion equipment
Alaska International Airport System: Ted Stevens Anchorage International Airport Proposed Construction Projects, 2015	Taxiway Y and K Safety Area	Widen the safety and object-free areas of Taxiways Y and K to Aircraft Design Group (ADG) VI Standards (will meet or exceed current Federal Aviation Administration (FAA) taxiway design standard)
	Runway 7L/25R	Reconstruction Phase II – Reconstruction of the eastern portion of airfield pavement on Runway 7L/25R (will allow for the newer Group VI aircraft to utilize the runway)
2035 AMATS Interim Metropolitan Transportation Plan (MTP), 2015	Seward Highway to Glenn Highway Connection	New connection near the Ingra-Gambell Streets couplet and ramps to a new freeway that links Glenn and Seward Highways; 36th Avenue/Seward Highway Interchange Improvement from Tudor Road to 33rd Avenue; Seward Highway Midtown Congestion Relief between 33rd Avenue and Chester Creek
	Seward Highway Improvements	Widening to three lanes from Dimond to Dowling Rd and from O'Malley Rd to Dimond Blvd; Improvement of surface streets; Additional opportunities for modes of travel other than the automobile; Pedestrian overcrossing from Rabbit Creek Rd to O'Malley Rd
	Glenn Highway Improvements	Glenn Highway Corridor Study; Incorporation of park-and-ride lots and opportunities for modes of travel other than the automobile; Addition of a third highway lane in each direction between Hiland Road and Old Glenn Highway; Bridge Widening; Ramp Extensions; Various spot improvements; Implementation of HOV lanes; Traffic Management Systems
	Commercial Vehicle Information Systems and Networks (CVISN)	Continuing efforts to implement the CVISN throughout Anchorage
	At-grade crossings	Safety enhancements at key grade crossings at a minimum until grade separations can be completed
	ARRC projects	Port MacKenzie Rail Extension project; construction of additional track; realignment of track within the rail corridor; rolling stock rehabilitation, and signalization

Plan	Facility	Improvement
	Knik-Arm Crossing	(Same description as in the Statewide TIP) Two phases: (1) Add new bridge facility access across Knik Arm with associated roads connecting to the Anchorage roadway network and (2) add new connection from Government Hill tunnel to Ingra-Gambell Couplet over Ship Creek.
	Port Area Access Improvements	3rd Ave,6th Ave Couplet/E St Conversion Reconnaissance Study; C St/Ocean Dock Rd Access Ramp; Ingra-Gambell Couplet Extension - 3rd Ave to Whitney Rd; Muldoon Rd Interchange; 100th Ave Extension – Minnesota Dr to C St
	Other Projects Identified as "Road Projects that Enhance Freight Distribution"	Seward Hwy/92nd Ave Grade Separation; 92nd Ave/Academy Dr Extension - Brayton Dr to Abbott Rd; Business Blvd. Extension; Glenn Hwy/Farm Ave Partial Interchange; Davis St and Santa Maria Dr Realignment at Old Glenn Hwy; Seward Hwy/ O'Malley Rd Interchange; North Eagle River Interchange Capacity Study
Port of Anchorage Modernization	Port of Anchorage (General)	Replacement of Terminal 1, Terminal 2, Petroleum, Oil, and Lubricants (POL) Berth 1 fuel and cement berth, POL 2, and the demolition of Terminal 3. Stabilization of the northern extension.

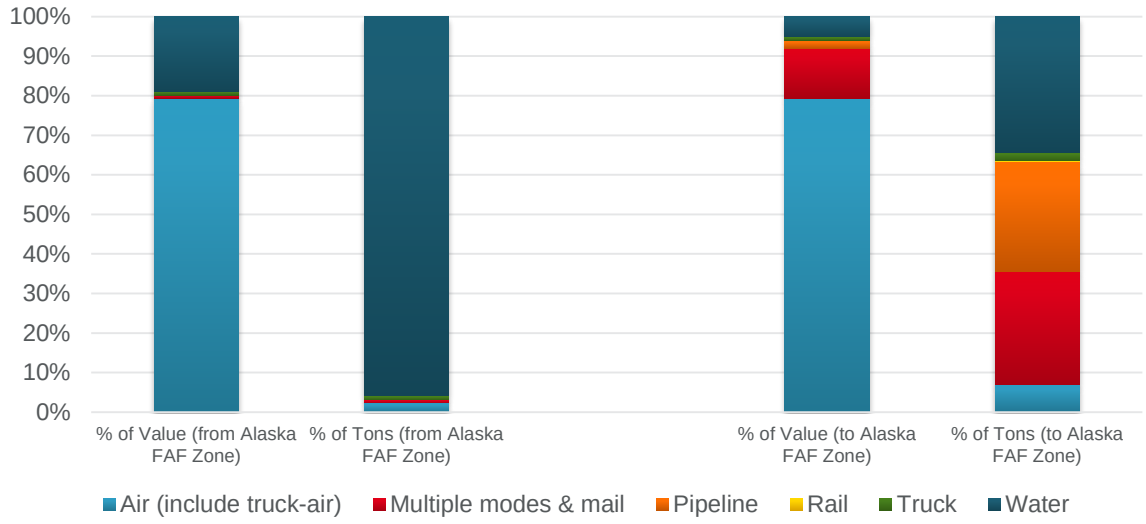
In addition to reviewing and assessing recommended projects from state and local plans, this analysis was used to summarize existing and forecasted conditions on the regional freight system to understand where freight transportation priorities will likely be focused in coming decades.

The FAF version 4 reflects the 2012 Commodity Flow Survey conducted as a part of the US Economic Census. This is the most up-to-date version of the data, so the data was used for statewide analysis in the FMS. It is important to note that the FAF data represents statewide flows and this data must also be reviewed with on-the-ground knowledge. Because Alaska is geographically separated from the 48 contiguous states and only 31% of the state's 15,178 miles of roadway are paved, mode split is not as truck- or rail-heavy as in other states.

According to the 2012 data, water and pipeline cargo comprise high percentages of the domestic mode share, 46% and 17% respectively. Air is the highest share of international imports (30%). Truck is also a significant international trade mode, with a 26% share of imports and 28% share of exports. This high percentage of international truck movement encompasses trade with Canada. For all movements collectively, waterborne cargo comprises the highest share. Figure 6 and 7 show the statewide 2012 commodity mode shares from the FAF4 dataset.

Figure 6: Alaska's 2012 Statewide Commodity Flows by Mode – Domestic/Import/Export[13]

Figure 7: Alaska's 2012 Commodity Value and Tonnage by Mode and Direction



[13] FHWA Freight Analysis Framework, http://ops.fhwa.dot.gov/FREIGHT/freight_analysis/faf/index.htm

The top commodities moving within the state in 2012 included ‘coal n.e.c.,’ ‘gasoline,’ and ‘gravel.’ The top commodity leaving the state was ‘crude petroleum,’ which constitutes about 95% of outgoing commodities. Finally, ‘crude petroleum,’ ‘base metals,’ and ‘mixed freight’ comprised the majority of incoming commodities. Of the over $236,000 million value of commodities moving within, from, and to the state, 32% of this value moved internally within Alaska, 41% was outbound from Alaska, and 27% was inbound to Alaska.

Because USDOT recently released the new version of FAF data (FAF4), there currently are no forecasts available with the updated 2012 CFS. The previous version of FAF (FAF3.4) was reviewed and used to support the forecasts for this analysis. It is important to recognize that there are slight differences in commodity structuring between the two versions but there is a difference in the underlying data. Therefore, direct comparisons between the base (2012) and future (2040) forecast years were not measured.

According to 2040 projections, water and truck cargo comprise high percentages of the domestic mode share, 33% and 46% respectively. Air is the highest share of international imports (64%), while water has the highest share of export movements (37%). For all movements combined, truck cargo comprises the highest share at 36% followed by waterborne cargo with a 32% share. Figures 8 and 9 show the 2040 mode share data based on the FAF3.4 estimates.

Figure 8: Alaska's 2040 Statewide Commodity Flows By Mode – Domestic/Import/Export[14]

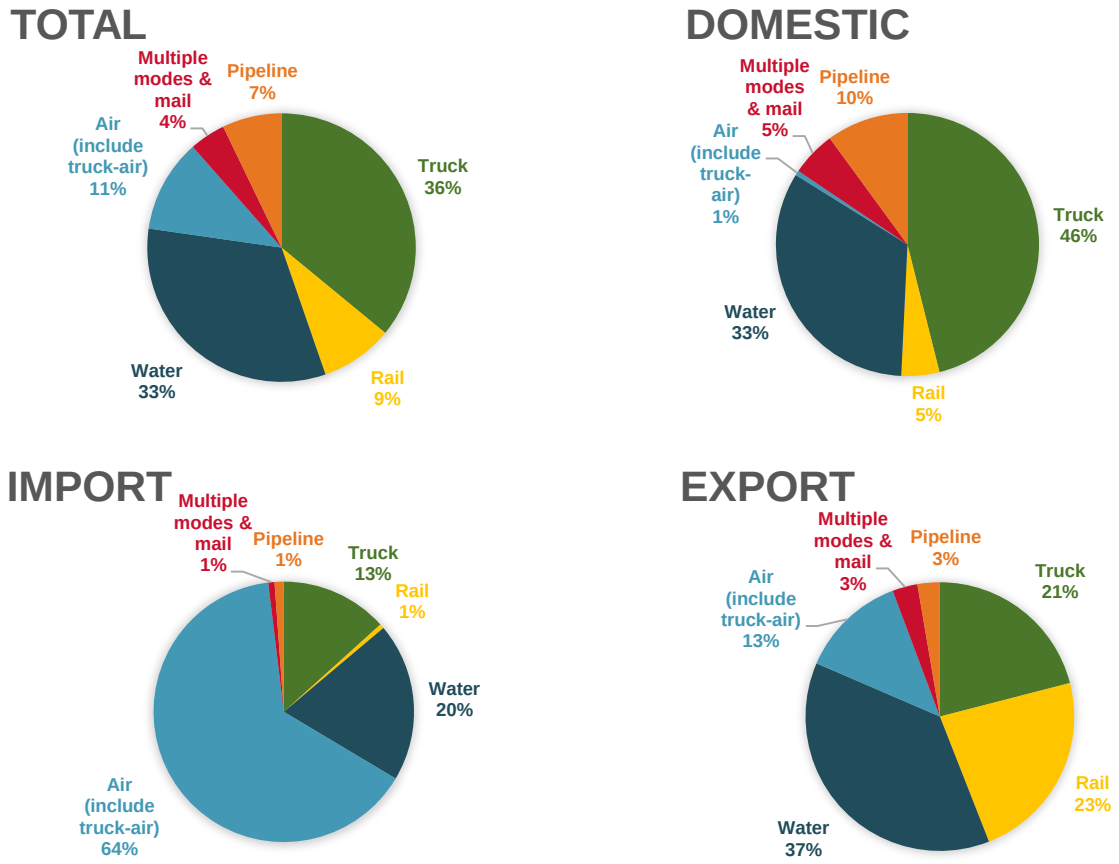
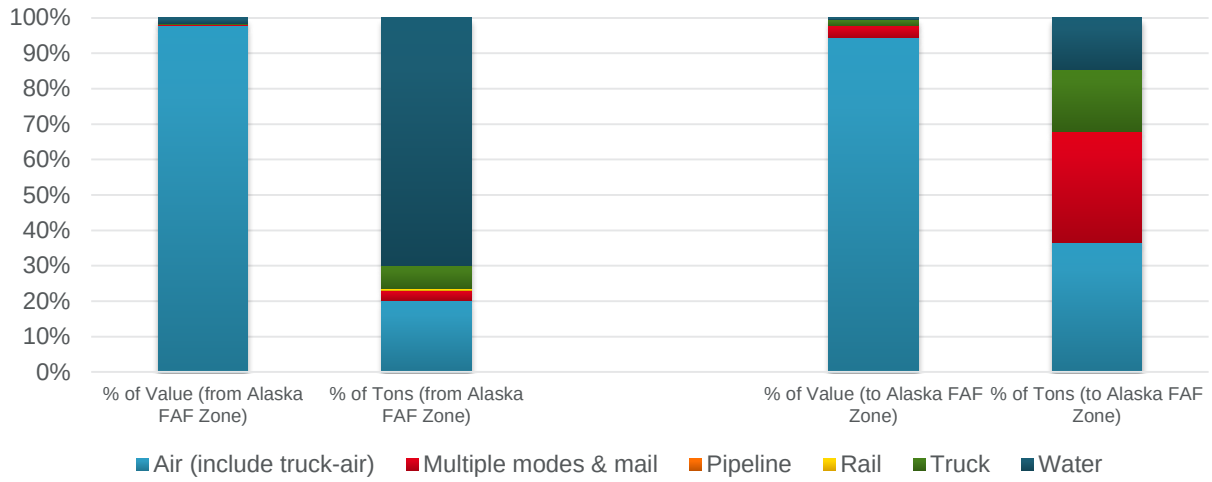


Figure 9: Alaska's 2040 Commodity Value and Tonnage by Mode and Direction, FAF



[14] FHWA Freight Analysis Framework, http://ops.fhwa.dot.gov/FREIGHT/freight_analysis/faf/index.htm

Each mode is presented and summarized in more depth in the following Sections for existing conditions and trends/forecasts.

3.1 Water Cargo

3.1.1 Existing Conditions

According to data from the US Army Corps of Engineers (USACE) records of waterway and port cargo movements, about 88% of water cargo flows in Alaska are domestic. About 77% of domestic flows exit Alaska for other parts of the US. Approximately 15% of Alaska's domestic flows are intrastate, leaving about 8% of domestic waterborne movements inbound to Alaska.

Over 12% of water movements in Alaska are foreign trips. Approximately 78% of these foreign trips move from Alaska to foreign countries, while the remaining 22% are inbound foreign cargo. Table 4 summarizes these 2013 annual movements at the Port of Anchorage as reported by the USACE.

Table 4: 2013 Alaska Statewide Water Cargo Data Flow Summary (Short Tons)

State Summary	From (Domestic)	To (Domestic)	From (Foreign)	To (Foreign)	Intrastate	Total
Alaska	28,246,000	3,171,000	3,740,000	1,044,000	5,398,000	41,599,000
Percentage	67.9%	7.6%	9.0%	2.5%	13.0%	

State Summary	Total Domestic	Total Foreign	Intrastate
Alaska	31,417,000	4,784,000	5,398,000
Percentage	75.5%	11.5%	13.0%

Exhibit 2 illustrates the Anchorage region's ports and waterways. The Port of Anchorage is the only major Port in the study area. Port MacKenzie, owned and operated by the Matanuska-Susitna Borough, is located across the Knik Arm. Nearby waterways classified as part of the USACE "Navigable Waterway Network" include the Susitna River northward to Susitna; the Cook Inlet providing access west out of the Anchorage region; and the Turnagain Arm to the east to Portage.

Seventy-four percent of the waterborne freight and 95 percent of all refined petroleum products sold in Alaska's Railbelt region arrive via the Port of Anchorage, making the Port a critical transportation infrastructure asset to the regional economy. Approximately 12% of the containers that enter the POA move north to Fairbanks via rail, and the remaining containers move via truck to their final destination.. Specifically, the Port of Anchorage plays an instrumental role in the distribution of cargo to rural communities throughout the state. The Port of Anchorage Cargo Distribution Patterns assessment also cites that 25% of cargo delivered to rural communities transships through the Port of Anchorage. The report identified Seattle as a major contributor to the volume of inbound cargo with about 75% of cargo coming from the Seattle area.

In terms of overall freight movements in Anchorage, USACE identifies 'all manufactured equipment/machinery' and 'petroleum and petroleum products' as the top commodities in transit. Looking further at petroleum movements, the 2011 Port of Anchorage Cargo Distribution Patterns

assessment cited that the Port of Anchorage receives an annual average of four to five petroleum tanker shipments, which the Port uses to store in onsite tank farms. In recent years, the number of petroleum tanker shipments has increased dramatically. In 2013, there were four tankers, 2014 saw 14 tankers, and 2015 had 32 tankers. The Port expects to receive approximately 25-27 tankers in 2016. Regions including Fairbanks, Mat-Su, and the North Slope receive a portion of this petroleum via truck shipments, while western and southeast Alaska regions receive shipments by barge.

Foreign imports/exports comprise just over 17% of Anchorage's freight market. South Korea is the most significant importer to Anchorage. The top commodities arriving in Anchorage from foreign origins include 'gasoline/jet fuel/kerosene' and 'building cement and concrete.' The top commodities leaving the Port for foreign destinations include 'fish,' 'petroleum pitches/coke/asphalt/naptha/solvents,' and 'forest products/lumber/logs/woodchips.' China, Singapore, South Korea, and Japan are the major recipients of foreign outbound commodities.

3.1.2 Trends/Forecasts

Total tonnage movements in Anchorage were relatively stable over the past decade, with a slight increase overall. The foreign percentage of cargo movement is also relatively consistent. The 2035 AMATS MTP suggests that cargo movements at the Port of Anchorage will most likely remain stable in coming decades, similar to the suggestions of the recent trends observed in the USACE data for the area and the data provided directly by the Port of Anchorage. Figure 10 summarizes the USACE relatively stable trends from 2006 to 2015. The data in Table 5 provided by the Port of Anchorage shows tonnage specific to the Port of Anchorage and shows shifts in commodities at the Port from 2006 to 2013).

Figure 10: USACE 2006-2013 Total Tonnage - Anchorage (Short Tons)

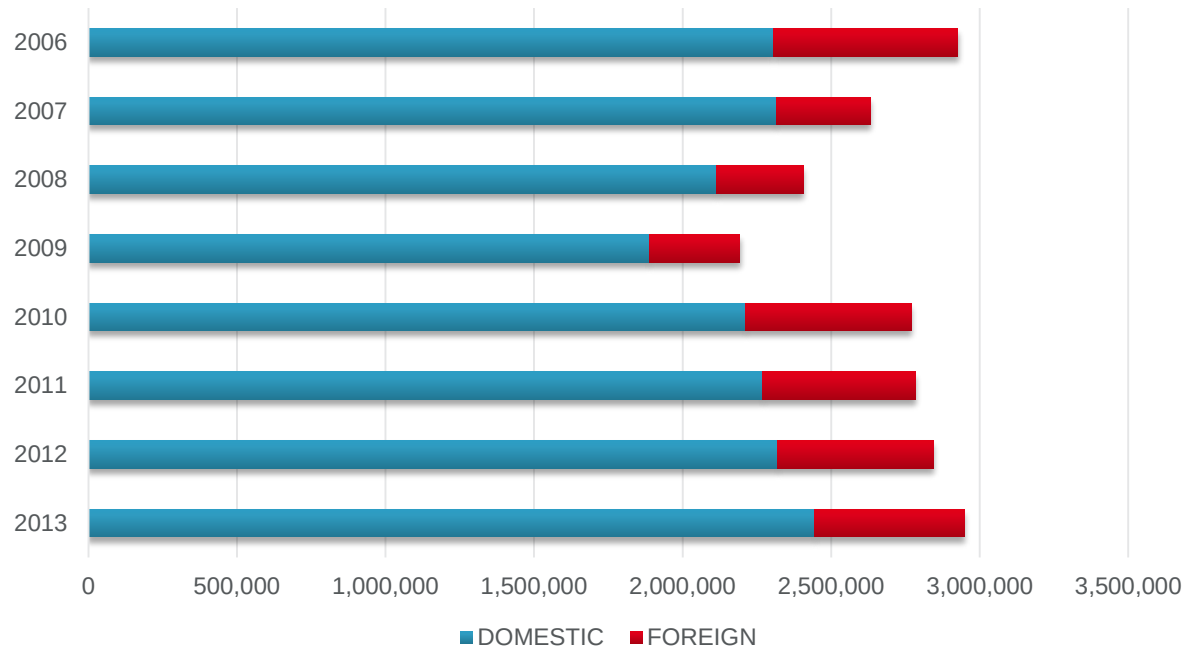


Table 5: Port of Anchorage Tonnage Trends by Commodity 2006-2015

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006

Dry Bulk Goods	126,737	140,684	119,271	119,939	118,280	109,228	81,494	116,789	124,089	134,921
Petroleum, NOS (vessel fueling)	7,013	2,031	2,615	1,454	2,052	1,660	2,032	2,648	2,618	2,888
Vans/Flats/ Containers	1,681,222	1,811,136	1,742,704	1,658,813	1,705,176	1,736,943	1,713,086	1,831,816	1,785,518	1,722,499
Vehicles	0	0	0	0	864	0	1,473	10,725	5,381	1,158
Petroleum, Shoreside	368,294	916,050	952,631	1,046,636	1,376,909	1,192,705	1,426,711	1,830,848	1,698,581	1,421,133
Petroleum, Rail Rack	0	0	0	0	0	0	0	0	0	76,266
Petroleum, Bulk-Dockside	1,592,317	580,343	586,041	829,900	931,931	922,426	573,352	577,236	699,727	968,684
Total	**3,775,584**	**3,450,243**	**3,403,261**	**3,656,741**	**4,135,211**	**3,962,962**	**3,798,148**	**4,370,061**	**4,315,913**	**4,327,549**

The information in the Ten Year Comparison show that variation in commodity tonnage across years is greatest for Shoreside Petroleum[15] and Bulk Dockside Petroleum. These tonnage values are inversely related. Year to year variation is minimal for Petroleum NOS and Vans/Flats/Containers. Dry Bulk Goods experienced a decrease in the years of the Great Recession but are now at levels similar to those of the earlier 2000s. The modernization of the Port of Anchorage will play a key role in maintaining a stable cargo market, and may also assist in attracting higher tonnage volumes into the future.

The 2011 Port of Anchorage Cargo Distribution Patterns assessment also noted that the Port is one of the only Alaskan facilities with the infrastructure to support bulk offloading for cement. This infrastructure consists of a vacuum and pump system that transfers the cement to storage tanks via pipeline. As a result of draft limitations, the existing bulk cement system limits inbound and outbound shipments to 24,000, which is just over half the average cement shipping vessel capacity of 40,000 tons. Suggested improvements for the Port to address this deficiency include increasing draft length and building cement silos on the backland of the Port to keep increased cement storage on site. Recently, a private company built a new cement storage facility at the Port. As of March 2016, there are no additional plans to construct additional cement storage facilities at the Port.

The Port of Anchorage delivers jet fuel to TSAIA via pipeline. As mentioned earlier, four fuel tanks are currently under construction at the Port. Space is available at the Port for additional fuel storage tanks to be built if they are needed. Future plans for the Port include two dedicated pool berths with offload headers at new petroleum docks to provide increased storage opportunities. This improvement would also allow the Port to handle a more diverse array of refined petroleum products.

US Customs and Border Control report border crossing data between the US, Mexico, and Canada through the North American Transborder Freight Data “Port and Commodity Data.” This information is available for the Port of Anchorage by exports and imports. The information in Tables 6 and 7 shows the amount of trade with both Canada and Mexico at the Port of Anchorage in US dollars by imports and exports, respectively.

The majority (67%) of imports arriving at the Port of Anchorage from Mexico/Canada fall under commodity code 27 – “Mineral fuels; mineral oils and products of their distillation; Bituminous substances; Mineral waxes.” About 11% of import value was for commodities under code 84 – “Nuclear reactors; boilers; machinery and mechanical appliances; parts thereof,” while another 7% fell under code 88 – “Aircraft; spacecraft; and parts thereof.”

[15] Note “Shoreside Petroleum” in this context refers to a type of delivery method.

The majority (51%) of exports leaving the country traveling to Mexico/Canada from the Port of Anchorage fall under commodity code 3 – "Fish and crustaceans; mollusks and other aquatic invertebrates." Another 32% of commodities leaving the Port of Anchorage for Mexico or Canada are within commodity code 26 – "ores; slag and ash." Third in NAFTA export ranking is commodity code 27 – "Mineral fuels; mineral oils and products of their distillation; Bituminous substances; Mineral waxes" at 10% of exports.

Table 6: Port of Anchorage NAFTA Import Commodities by Value (US Dollars)

Comm. Code	Commodity Description	2010	2011	2012	2013	2014
3	Fish and crustaceans; mollusks and other aquatic invertebrates	1,093,764	1,913,963	1,629,757	1,021,210	1,402,636
5	Products of animal origin; not elsewhere specified or included	18,880	0	0	0	0
10	Cereals	25,805	0	0	0	0
16	Preparations of meat; of fish; or of crustaceans; mollusks or other aquatic invertebrates	3,440	0	2,700	4,080	3,075
21	Miscellaneous edible preparations	9,490	0	0	0	0
23	Residues and waste from the food industries; Prepared animal feed	100,566	88,912	117,188	103,721	85,518
25	Salt; Sulfur; Earths and stone; Plastering materials; lime and cement	796,418	512,253	469,699	2,192,686	1,586,937
26	Ores; slag and ash	10,596	108,680	89,461	59,407	32,018
27	Mineral fuels; mineral oils and products of their distillation; Bituminous substances; Mineral waxes	66,627,222	55,412,700	98,402,490	93,497,416	157,396,299
28	Inorganic chemicals; Organic or inorganic compounds of precious metals; of rare-earth metals	122,257	102,894	355,208	357,744	447,758
29	Organic chemicals	0	1,950,012	3,449,729	4,051,116	3,083,191
30	Pharmaceutical products	0	6,941	0	3,240	0
31	Fertilizers	2,159,723	1,777,113	2,392,667	2,357,359	2,371,960
32	Tanning or dyeing extracts; Tannins and their derivatives; Dyes; pigments and other coloring matter	2,174	0	0	0	0
34	Soap; organic surface-active agents; washing preparations; lubricating preparations; prepared waxes	0	0	72,782	0	0
35	Albuminoidal substances; Modified starches; Glues; Enzymes	0	0	13,123	0	0
36	Explosives; Pyrotechnic products; Matches; Pyrophoric alloys; Certain combustible preparations	0	26,181	0	0	0
38	Miscellaneous chemical products	1,579,568	2,261,328	2,496,242	1,715,129	995,152
39	Plastics and articles thereof	67,670	49,762	58,130	141,973	431,174
40	Rubber and articles thereof	30,997	26,559	59,971	55,584	8,300
42	Articles of leather; Saddlery and harness; Travel goods; handbags and similar containers	37,248	1,154	13,691	1,388	4,970
43	Furskins and artificial fur; Manufactures thereof	2,270	53,100	50,832	39,106	98,312
44	Wood and articles of wood; Wood charcoal	3,625,314	3,461,193	3,396,526	5,033,170	6,036,839
48	Paper and paperboard; Articles of paper pulp; of paper or of paperboard	0	0	9,025	0	0
49	Printed books; newspapers; pictures and other products of the printing industry; Manuscripts	11,995	0	118,351	12,305	43,328
53	Other vegetable textile fibers; Paper yarn and woven fabrics of paper yarn	0	318	0	0	0
56	Wadding; felt and nonwovens; Special yarns; Twine; cordage; ropes and cables and articles thereof	350	0	6,573	31,119	9,200
57	Carpets and other textile floor coverings	0	0	3,639	0	0
59	Impregnated; coated; covered or laminated textile fabrics; Textile articles for industrial use	31,483	3,254	0	2,155	0
61	Articles of apparel and clothing accessories; knitted or crocheted	116,319	336	381	3,098	0
62	Articles of apparel and clothing accessories; not knitted or crocheted	0	312	711	3,138	0
63	Other made-up textile articles; Needle craft sets; Worn clothing and worn textile articles; rags	30,400	23,373	8,502	4,971	2,532
64	Footwear; gaiters and the like; Parts of such articles	0	0	4,920	952	0
65	Headgear and parts thereof	0	0	0	0	420
68	Articles of stone; plaster; cement; asbestos; mica or similar materials	0	24,713	28,035	0	0
70	Glass and glassware	0	21,691	0	25,577	7,133

Comm. Code	Commodity Description	2010	2011	2012	2013	2014
71	Natural or cultured pearls; precious or semiprevious stones; precious metals; articles thereof	32,339	1,544	28,570	26,880	20,300
72	Iron and steel	2,276	0	0	0	18,342
73	Articles of iron or steel	10,937,921	4,851,725	9,812,333	8,937,504	3,048,897
74	Copper and articles thereof	0	0	0	0	3,717
75	Nickel and articles thereof	0	0	0	0	4,760
76	Aluminum and articles thereof	14,025	32,050	14,958	4,969	0
79	Zinc and articles thereof	0	0	3,500	0	0
81	Other base metals; Cermets; Articles thereof	0	0	0	0	3,078
82	Tools; implements; cutlery; spoons and forks; of base metal; Parts thereof of base metal	69,985	36,669	50,636	21,000	66,136
83	Miscellaneous articles of base metal	4,607	7,207	23,569	66,219	9,058
84	Nuclear reactors; boilers; machinery and mechanical appliances; parts thereof	4,137,425	21,789,050	5,207,321	7,276,927	25,327,746
85	Electrical machinery and equipment and parts thereof; Sound recorders and reproducers	12,318,525	7,484,949	7,905,880	7,632,051	3,910,902
86	Railway or tramway locomotives; rolling stock and parts thereof; railway fixtures and parts thereof	0	7,600	9,242	0	3,589
87	Vehicles; other than railway or tramway rolling stock; and parts and accessories thereof	43,731	73,762	376,725	168,548	116,723
88	Aircraft; spacecraft; and parts thereof	21,794,914	13,493,014	722,730	5,333,952	15,457,773
90	Optical; photographic; cinematographic; measuring; checking; precision; medical instruments	2,118,974	2,222,255	11,90,067	3,820,694	6,275,135
94	Furniture; Bedding; mattress supports; cushions and similar stuffed furnishings; Lighting fittings	17,435	67,539	65,288	19,004	25,819
95	Toys; games and sports equipment; Parts and accessories thereof	0	0	5,000	4,375	0
97	Works of art; collectors' pieces and antiques	145,240	20,000	71,121	29,320	23,720
98	Special classification provisions	9,179,235	9,601,702	4,339,422	8,128,669	6,144.042
Total		137,320,581	127,515,808	143,076,695	152,187,756	234,506,489

Table 7: Port of Anchorage NAFTA Export Commodities by Value (US Dollars)

Comm. Code	Commodity Description	2010	2011	2012	2013	2014
1	Live animals	0	0	0	239,973	17,864
3	Fish and crustaceans; mollusks and other aquatic invertebrates	41,589,448	33,747,347	22,573,884	31,325,453	31,748,054
5	Products of animal origin; not elsewhere specified or included	0	0	16,692	0	0
25	Salt; Sulfur; Earths and stone; Plastering materials; lime and cement	0	0	15,229	0	0
26	Ores; slag and ash	0	0	0	0	19,999,325
27	Mineral fuels; mineral oils and products of their distillation; Bituminous substances; Mineral waxes	2,494,529	4,162,581	3,529,368	5,332,599	6,391,628
28	Inorganic chemicals; Organic or inorganic compounds of precious metals; of rare-earth metals	114,797	93,000	0	0	0
29	Organic chemicals	0	0	0	0	0
35	Albuminoidal substances; Modified starches; Glues; Enzymes	0	0	0	87,875	0
38	Miscellaneous chemical products	0	0	0	84,323	0
39	Plastics and articles thereof	0	0	0	0	8,202
40	Rubber and articles thereof	0	0	8,282	7,404	2,910
56	Wadding; felt and nonwovens; Special yarns; Twine; cordage; ropes and cables and articles thereof	0	32,766	0	0	0
63	Other made-up textile articles; Needle craft sets; Worn clothing and worn textile articles; rags	22,383	0	0	10,484	0
73	Articles of iron or steel	18,878	372,805	20,535	144,176	81,657
75	Nickel and articles thereof	0	3,557	16,409	0	0
76	Aluminum and articles thereof	0	0	0	0	0
82	Tools; implements; cutlery; spoons and forks; of base metal; Parts thereof of base metal	15,168	8,526	0	0	4,089
83	Miscellaneous articles of base metal	0	0	4,080	4,573	0
84	Nuclear reactors; boilers; machinery and mechanical appliances; parts thereof	4,663,373	1,901,123	952,261	145,492	2,269,769
85	Electrical machinery and equipment and parts thereof; Sound recorders and reproducers	5,952	0	52,752	7,593	0
87	Vehicles; other than railway or tramway rolling stock; and parts and accessories thereof	146,165	21,472	106,438	84,261	0
88	Aircraft; spacecraft; and parts thereof	127,531	854,152	131,225	281,764	51,527
90	Optical; photographic; cinematographic; measuring; checking; precision; medical instruments	1,031,275	688,716	117,769	441,739	1,686,525
94	Furniture; Bedding; mattress supports; cushions and similar stuffed furnishings; Lighting fittings	9,986	6,815	3,778	0	0
97	Works of art; collectors' pieces and antiques	0	0	0	0	0
98	Special classification provisions	0	0	165,236	0	0
Total		50,239,485	41,892,860	27,713,938	38,197,709	62,261,550

3.2 Air Cargo

3.2.1 Existing Conditions

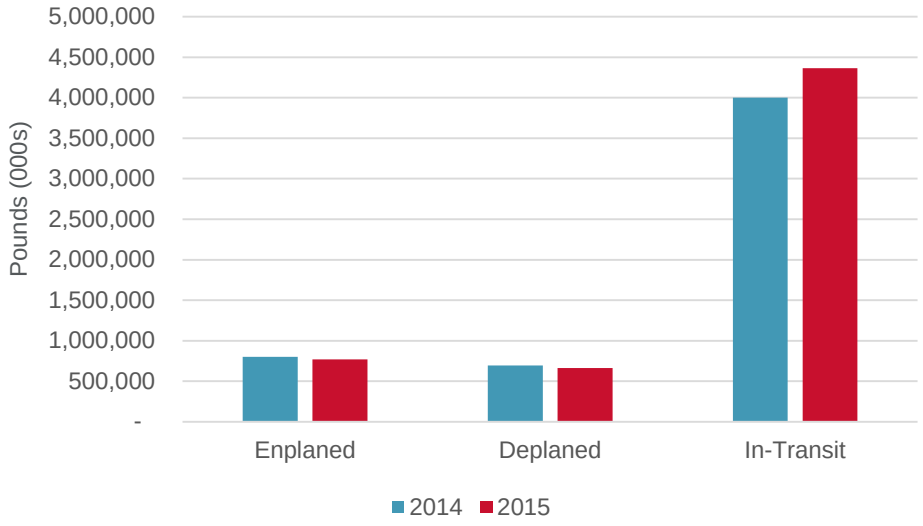
The AEDC's 2014 Air Cargo Related Economic Development Opportunity Assessment cited that about $2.1 billion in imports arrived in the state of Alaska via air shipments per year and about $4.5 billion in "native" exports depart from the state each year. 'Fish and other marine products' and 'natural resource products' were the top outbound commodities from the state. BTS cites that about 6% of Alaskan air cargo moves intrastate. Major domestic imports and exports move between Alaska and Kentucky (a UPS hub), Tennessee (a Fed Ex hub), and California (a hub for both UPS and FedEx, as well as an outlet for refinement of petroleum products).

Alaska is a unique environment for transportation, as various geological and environmental characteristics prevent direct movement via highway. Therefore, Alaska relies more heavily on air traffic than the lower-48. The 2014 TSAIA Master Plan Update cites that Anchorage is a cargo hub that connects communities by air throughout Alaska, not only moving people but also moving over 147.6 million pounds of cargo to over 90 Alaska communities in 2010.

Approximately 10% percent of freight entering the Anchorage region arrives via TSAIA. Air cargo inbound to TSAIA is often “express” cargo, indicating high-priority commodities. Commodities that arrive at the airport commonly move via truck to distribution centers on dedicated truck routes. As mentioned in the Section 2, TSAIA also has significant onsite storage and warehousing. The North Airpark facility includes various storage facilities that meet the airport’s current cargo needs.

Based on carrier reports from TSAIA, total cargo enplaned, deplaned, or in-transit through the airport totaled 5.8 billion pounds. The graph in Figure 11 illustrates the directionality of cargo for both 2014 and 2015. Most

Figure 11: Cargo Movements by Direction at TSAIA, 2014-2015



About three-fourths of TSAIA cargo is in-transit international movements, meaning that carriers stop through TSAIA to refuel while on international trips. Most of the remaining cargo is domestic movements either loading or unloading at TSAIA. The data in Table 8 shows these shares by direction.

Table 8: Cargo by International and Domestic Share, 2015

Direction	International	Domestic	Total	International % of Total	Domestic % of Total
Enplaned	1,864	769,522	771,385	0%	13%
Deplaned	2,927	661,767	664,695	0%	11%
In-Transit	4,310,040	54,450	4,364,490	74%	1%
Total	4,314,831	1,485,739	5,800,570		

The data in Table 9 lists the top carriers at TSAIA by directionality of movements. FedEx is highest in terms of weight loaded at TSAIA, and UPS is the leader in terms of weight unloaded at TSAIA. Note that UPS is second in terms of weight loaded and FedEx is second in terms of weight unloaded at TSAIA, indicating that these are the strongest carriers in terms of domestic cargo moved at TSAIA. For in-transit cargo, Polar Air Cargo Worldwide, Inc. and Cathay Pacific Airways move the

most weight through TSAIA. Korean Air Lines and China Airlines also create significant through movements at TSAIA.

Table 9: Top TSAIA Cargo Carriers by Direction, 2014-2015

Top 5 Enplanement Carriers	Pounds (000s)	Top 5 Deplanement Carriers	Pounds (000s)	Top 5 In Transit Carriers	Pounds (000s)
2014					
Federal Express	316,326	United Parcel Service	333,168	Cathay Pacific Airways	664,070
United Parcel Service	288,870	Federal Express	298,420	Polar Air Cargo Worldwide, Inc.	663,560
Northern Air Cargo	47,251	Alaska Airlines, Inc.	25,122	Korean Air Lines	447,086
Alaska Airlines, Inc.	44,497	Northern Air Cargo	10,090	China Airlines	443,310
Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	40,420	Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	5,634	Eva Airways Corporation	423,588
Other Carriers	64,946	Other Carriers	21,650	Other Carriers	1,358,692
2015					
Federal Express	302,563	United Parcel Service	320,479	Polar Air Cargo Worldwide	831,434
United Parcel Service	272,897	Federal Express	275,233	Cathay Pacific Airways	713,648
Northern Air Cargo	47,944	Alaska Airlines, Inc.	22,612	Korean Air Lines	463,685
Alaska Airlines, Inc.	46,293	Northern Air Cargo	13,100	China Airlines	449,112
Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	40,794	Tatonduk Outfitters, Ltd., Dba Everts Air Alaska	7,431	Atlas Air	381,708
Other Carriers	60,894	Other Carriers	25,840	Other Carriers	1,524,903

In addition to TSAIA, Merrill Field airport is a regional airport located just south of the Port and ARRC Rail Yard in downtown Anchorage. Due to its smaller size, Merrill Field has limited freight traffic, with FAA reporting less than 1,000 cargo tons moving through the airport each year. All air traffic is within Alaska, specifically moving to/from Beluga Airport (48% of total tonnage) and Tyonek Airport (38% of total tonnage). A small amount of air cargo moves between Merrill Field and Granite Point, Skwentna Airport, and Trading Bay. Eighty-six percent of 858 freight tons moved at Merrill Field in 2012 was outbound cargo according to FAA's T-100 data.

3.2.2 Trends/Forecasts

Anchorage's 2015 3-Year Economic Outlook document recognizes that the growing demand for domestic consumer goods will support air freight activity at TSAIA into the future. The TSAIA Master Plan Update cites an annual cargo tonnage growth rate of almost 3%, with significant increases projected for international air cargo. The Alaska Aviation System Plan notes an anticipated annual tonnage growth rate of 2.3% for TSAIA. The 2035 AMATS MTP also anticipates this gradual rise in air cargo at TSAIA, while the AEDC anticipates slightly higher growth in freight tonnage at a rate of 5% per year within the next three years.

TSAIA currently experiences a significant amount of through traffic between Asia and North America because of its prime location for aircraft refueling. Given the potential for aircraft fuel ranges to increase with improving technology in coming decades, TSAIA may begin to experience fewer through-movements in the future.

3.3 Highway Cargo

3.3.1 Existing Conditions

While Alaska is unique in predominance of water and air cargo movements, truck movements are still critical to the state's supply chain. The FHWA Office of Highway Policy Information identifies that there are almost 546,700 registered trucks in the state, which outnumbers the amount of registered passenger vehicles by almost three times.[16] Exhibit 3 shows major highway facilities including the following elements in the region:

- Roadway bridges;
- Travel Monitoring Analysis System (TMAS) data collection points identified in the NTAD used to count and analyze vehicle classifications and weights by the state DOT;
- The National Highway System, which includes Tudor Road, Minnesota Drive/Walter J Hickel Parkway, L Street, I Street, 5th Avenue, Seward Highway, and Glenn Highway, as well as Interstates A-1/A-3 including Glenn and Seward Highways; and
- The Strategic Highway Network (STRAHNET), which includes Seward Highway, Glenn Highway, and parts of E/W Loop Road/Ocean Dock Road as connectors to the Port of Anchorage; and
- The National Highway Freight Network (NHFN), which includes portions of 5th Avenue, 6th Avenue, I Street, Tudor Road, Minnesota Drive, and L Street, as well as Glenn and Seward Highways.

The 2035 AMATS MTP indicates that there are high levels of truck traffic on all arterial streets in Anchorage. Truck traffic percentages have been relatively stable over the past two decades, with major freight roadways in Anchorage cited through the background study include:

- Glenn Highway;
- Seward Highway;
- Minnesota Drive;
- International Airport Road;
- Tudor Road;
- Spenard Road;
- Industrial Street;
- Postmark Drive;
- C Street; and
- Northern Lights Boulevard.

[16] FHWA Office of Highway Policy Information. Highway Statistics Series. https://www.fhwa.dot.gov/policyinformation/statistics/2012/mv1.cfm

To access the Port of Anchorage, double-loads must use Ocean Dock, Whitney, and Post Roads.[17] Single load trucks can also use A Street and 3rd Avenue for Port access.[18] Port traffic generates a significant amount of trucks on downtown streets. Access problems at the Port stem from the lack of a direct connection to the highway system. Other operational truck routing concerns relate to fact that there is only one entrance to the Port and Ocean Dock Road/C Street, one of the major access points, contains a railroad crossing on. Roads critical for distribution from the Port of Anchorage include Glenn Highway, Seward Highway, International Airport Road, Minnesota Drive, and Tudor Road. Ships arrive at the Port on Sundays and Tuesdays, rendering these days of the week some of the heaviest for truck traffic.

To access TSAIA cargo facilities, trucks generally use Postmark Drive. Other commonly used truck routes to TSAIA include Lake Hood Drive, International Airport Road, Old International Airport Road, Raspberry Drive, Jewel Lake Drive, and Spenard Drive. Northern Lights Boulevard is not identified as a truck route because it passes through residential areas but experiences significant truck traffic. Double loads are limited to New Seward Highway, Walter J Hickel Parkway, and Muldoon Street in terms of north-south access. For east-west access, Double loads must primarily use, Glenn Highway/5th Avenue, Tudor Road, International Airport Road, and Port Road. Exhibit 4 shows State and MOA defined truck routes, double routes, secondary truck routes, and critical last mile connectors to intermodal facilities in the region.

Weight restrictions in the Municipality of Anchorage are dependent on weather and ground temperature. Weight restrictions serve to minimize damage on the roadway system, during the spring breakup. From March through early May, legal axle loads over 10,000 GVW (Gross Vehicle Weight) must limit loads to 75% of maximum axle load.

Based on origin-destination data provided by American Transportation Research Institute (ATRI), the zones identified as critical truck freight attractors/generators in Anchorage include the following facilities (1) the zones containing TSAIA, (2) the zones containing the Port of Anchorage, (3) the zones containing the ARRC rail yard, and (4) the zones containing the major distributors just north of 3rd Avenue.

Figures 12 and 13 illustrate the trips generated by and attracted to each ATRI traffic analysis zone (TAZ) in the region. Figure 14 shows to and from trips combined to illustrate total trips for each TAZ in the Anchorage network.

[17] Municipality of Anchorage. Approved Routes for Reasonable Access within the Municipality of Anchorage Double Loads. http://www.muni.org/Departments/traffic/Documents/Doubles%20Route.pdf

[18] Municipality of Anchorage. Downtown Truck Routes. http://www.muni.org/Departments/traffic/Documents/Downtown%20Truck%20Routes.pdf

Figure 12: Truck Trips Generated by TAZs, 2014

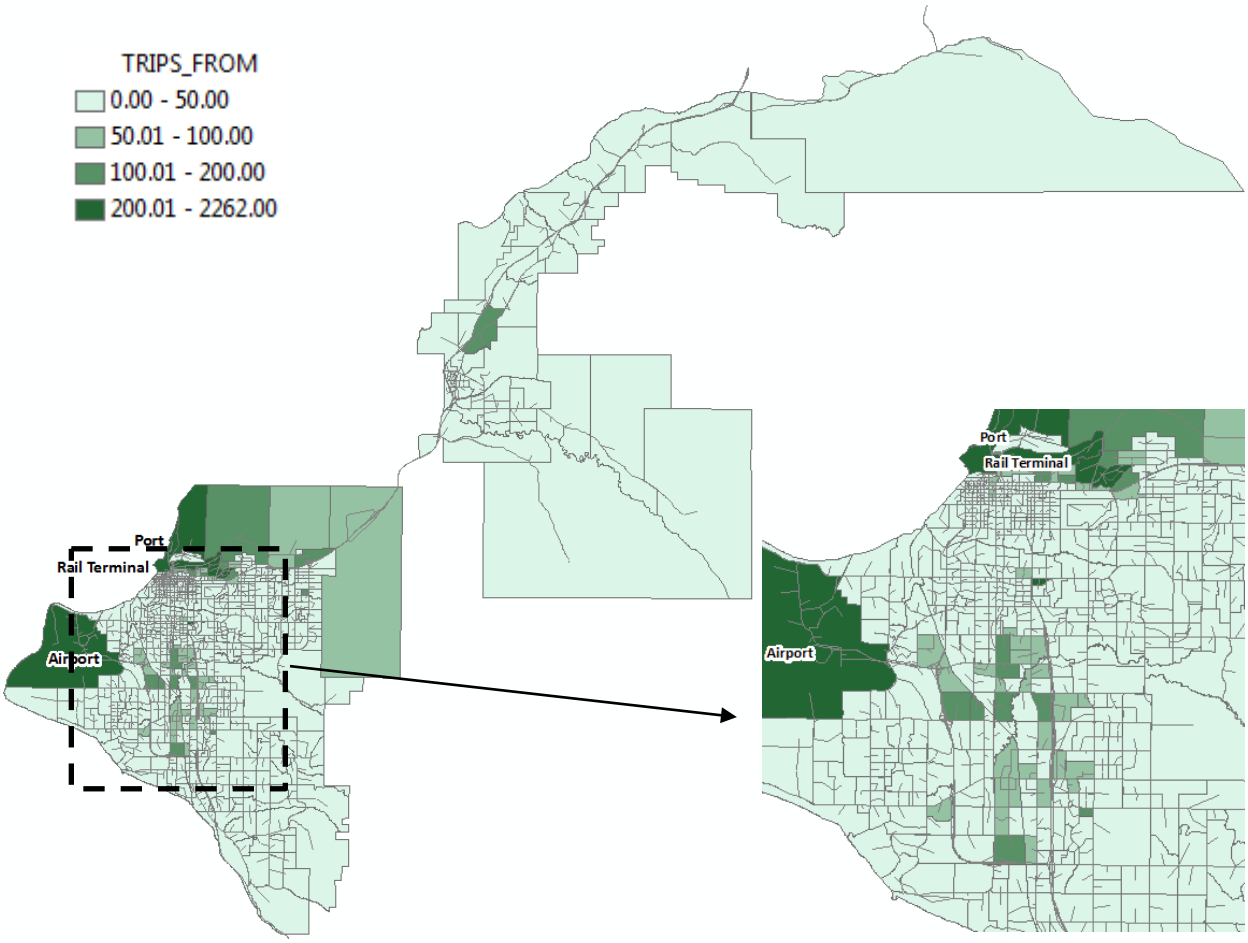


Figure 13: Truck Trips Attracted to TAZs, 2014

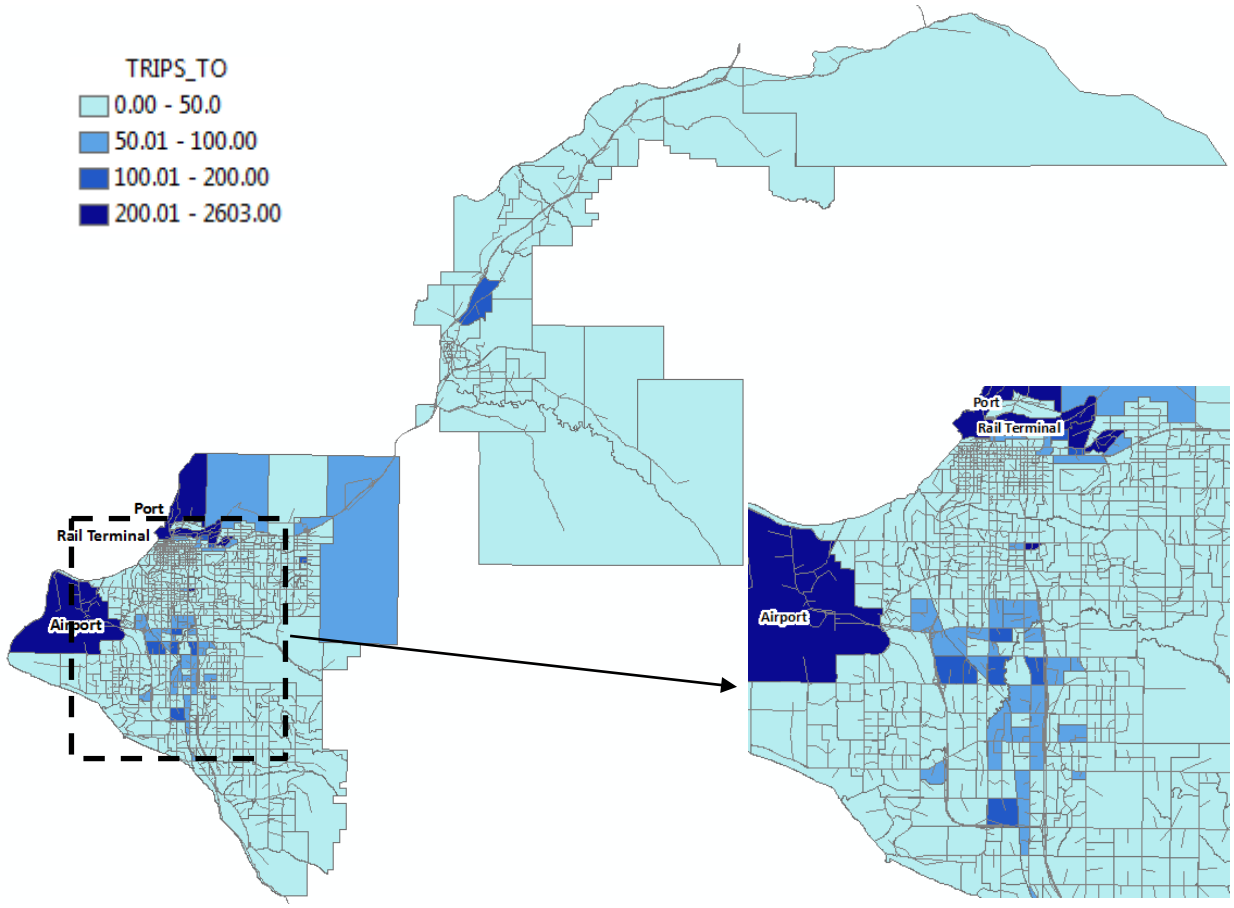
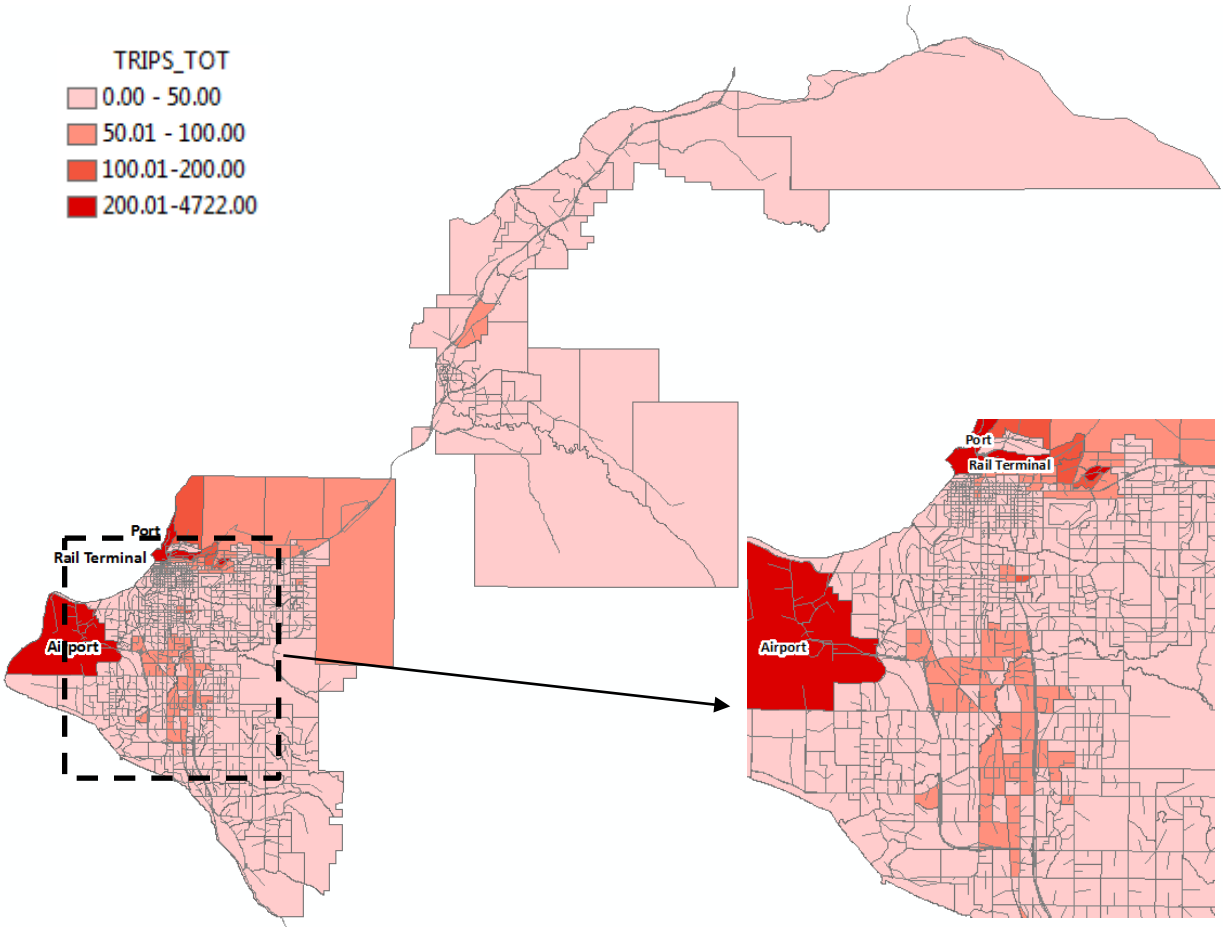


Figure 14: Total Trips To/From TAZs, 2014



As shown in Table 10, data from the 2035 AMATS MTP presents the additional class counts, in Average Annual Daily Truck Traffic (AADTT), reported for trucks in the region. Ocean Dock Road (near the Port), Whitney Road (at C Street just south of the Port), and Seward Highway (at Potter Marsh) show the highest truck roadway percentages. The other high truck-volume roadways are either near intermodal or industrial sites – or on major facilities in the region.

Table 10: 2009 Average Daily Truck Counts from MOA & DOT&PF

Location	Single AADTT	Combination AADTT	% of AADT
Ocean Dock Road, Port of Anchorage	268	454	38%
Whitney Road, East of North C Street	239	115	31%
Seward Highway, at Potters Marsh	825	184	11%
Glenn Highway, East of Airport Heights	3,037	499	8%
International Airport Road, East of Fairbanks	536	19	8%
Tudor Road, West of Patterson Street	1,481	235	7%
Seward Highway, South of 76th Avenue	3,015	291	7%
O'Malley Road, East of Seward Highway	388	11	5%
Arctic Blvd., South of 76th Avenue	189	23	5%
Minnesota Drive, North of Dimond Blvd.	1,539	135	5%
Dimond Blvd., East of Arctic Blvd.	609	20	4%
Debarr Road, East of Wintergreen Street	455	18	4%
Northern Lights Blvd., East of LaTouche St.	802	20	4%
Eagle River Road, East of Caribous Street	120	6	3%

The truck counts provided in Table 11 present truck counts from 2014, which are more up to date than those provided for 2009 but include different count locations. The observations from 2014 show that the highest truck volume percentages were near the Port (3rd Avenue in Downtown Anchorage) and in South Anchorage (De Armoun Road and Alyeska Highway).

Table 11: 2014 Average Daily Truck Counts from MOA & DOT&PF[19]

Location	Single AADTT	Combination AADTT	%AADT
Alyeska Highway, Girdwood	291	38	11%
Dearmoun Road, Anchorage	568	32	11%
Old Seward Highway, Anchorage	332	97	5%
O'Malley Road, Anchorage	534	251	7%
Rabbit Creek Road, Anchorage	317	46	5%
Hillside Drive, Anchorage	120	16	6%
Elmore Road, Anchorage	670	612	10%
Jewel Lake Road, Anchorage	458	44	4%
International Airport Road, Anchorage	602	48	5%
Minnesota Drive, Anchorage	932	539	4%
Wisconsin Street, Anchorage	748	145	9%
3rd Avenue, Anchorage	892	399	12%
Debarr Road, Anchorage	314	24	2%
Providence Drive, Anchorage	96	23	3%
Eagle River Road, Eagle River	170	85	7%

Of the five Weight-In-Motion (WIM) locations in the region with data acquired, analyzed, and presented in Table 12, only one station showed an average truck percentage over 7%. This station

[19] Classifications 5,6,7 considered "Single" Unite Vehicles; Classifications 8+ considered "Combination" Vehicles

is the two-lane Ocean Dock Road near the Port of Anchorage (CDS route 134344 MP 0.3) with a truck percentage of 47%. This facility is also noted in the 2035 MTP counts.

Table 12: WIM Data Summary for Anchorage Stations (365 Days)

Location	Total Crossing		Total Trucks	Average Daily		AADTT	% of all vehicles		Truck%
	Med	Heavy		Med	Heavy		Med	Heavy	
Ocean Dock Rd (Port of Anchorage), CDS route 134344 MP 0.3 (2 lanes)	91,420	225,390	316,810	250	618	868	14%	34%	47%
New Seward Hwy, Highway 1, CDS route 130000 MP 122.0 (4 lanes)	969,429	97,994	1,067,423	2,656	268	2,924	7%	1%	7%
Glenn Hwy, Highway 1, CDS route 135000 MP 9.1 (truck lane on far right only)	309,917	127,455	437,372	849	349	1,198	3%	1%	4%
Minnesota Dr (Anchorage), CDS route 134300 MP 3.0 (5 lanes)	422,776	74,485	497,261	1,158	204	1,362	3%	1%	4%
Tudor Road, (Anchorage) CDS route 133899 MP 5.0 (4 lanes)	186,673	42,698	229,371	511	117	628	3%	1%	3%

According to the Jason's Law Truck Parking Survey published in August 2015, Alaska has about 85 truck parking spaces per daily 100,000 miles of combination truck vehicle miles of travel, which is in the lower distribution of all states in terms of commercial vehicle parking. The state reported a total of 179 truck spaces statewide. All were private facilities. The report also identified that shoulder parking is a significant issue in the state.

3.3.2 Trends/Forecasts

According to the Turnagain Arm Comprehensive Plan, the Portage-Whittier Tunnel due west of the city of Whittier connects Portage and Whittier via Portage Glacier Road and allows for ease of freight access to industrial land in the Portage Valley. This infrastructure has the potential to increase truck freight transport to Portage Valley from Anchorage.

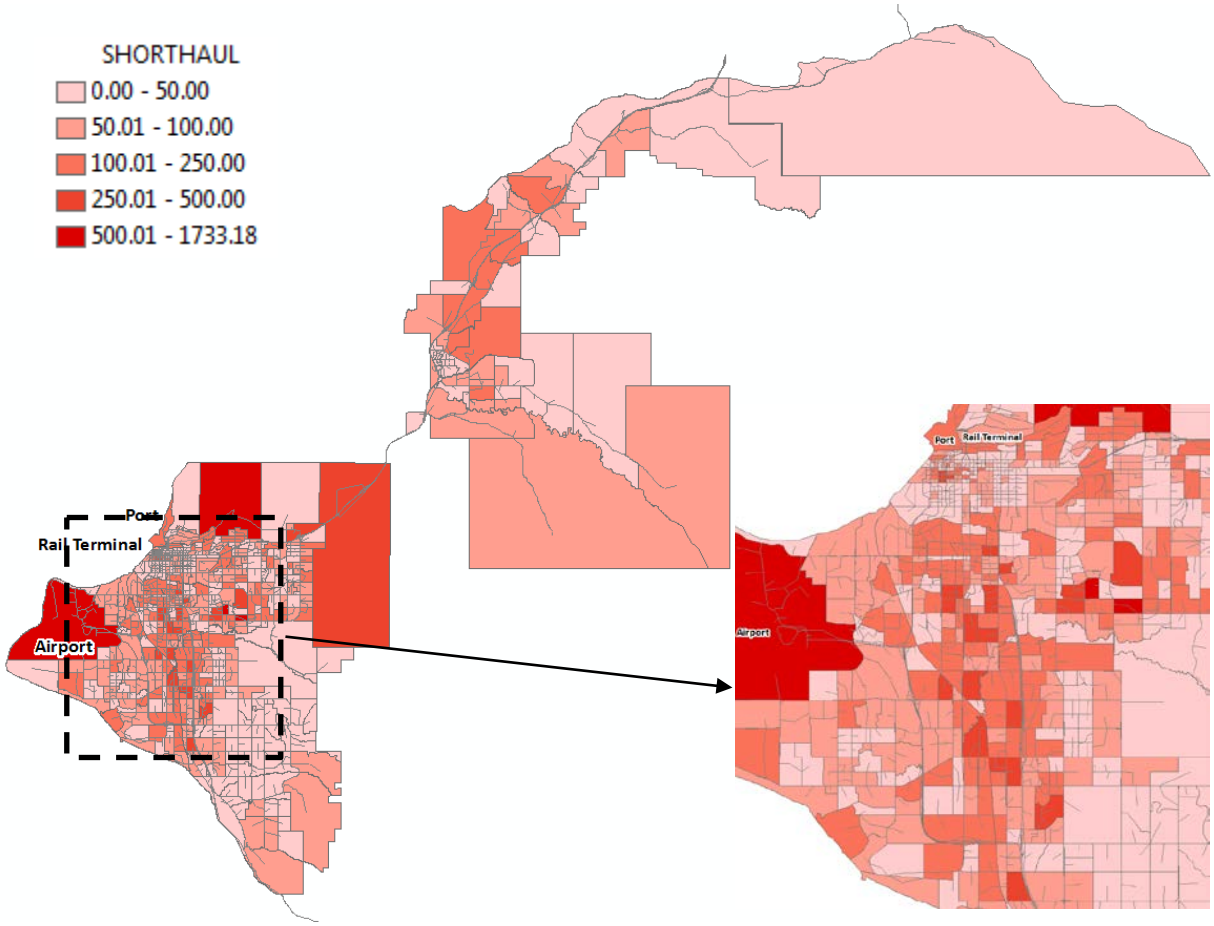
At the time of the Freight Mobility Study, the AMATS regional travel demand model was still in the update and development process. Because the model was not available for application, data underlying the travel was used to develop future freight movement estimations for both short haul and long haul trips. These sources include FHWA's Quick Response Freight Manual (QRFM) II short haul estimation methodology and ATRI's long haul truck GPS data. The following 2040 forecast year estimates resulted from a pivoting, factoring, and calibrating process using these data sources. Note that for modeling purposes, the number of trips to and from each TAZ are balanced. Therefore, results are shown in total trips to and from each TAZ.

The short haul commercial vehicle model is developed to represent the number of light and medium trucks in the region making shorter trips. Future year short haul commercial traffic for the AMATS model use commercial vehicle trip rates adapted from the QRFM II and FHWA's report, "Accounting for Commercial Vehicles in Urban Transportation Models." Short haul commercial vehicles include the following vehicle types: Commercial Passenger Vehicles, Freight Vehicles, and Services Vehicles. The information in Table 13 summarizes the top five short haul movement areas for 2040. Figure 15 illustrates 2040 short haul truck trips.

Table 13: 2040 Short Haul Truck Traffic (Top 5 TAZs by Number of Trucks)

Traffic Analysis Zone (TAZ)	Daily Short Haul Trucks To/From
TSAIA (Multiple TAZs)	1,733
JBER & Warehouse (TAZ 57)	824
Alaska Native Medical Center Hospital (TAZ 528)	761
Providence Hospital (TAZ 58)	650
Dimond Center (TAZ 138)	381

Figure 15: 2040 Estimated Short Haul Truck Trips



Short haul trips most commonly involve TSAIA movements and freight movement associated with medical facilities. JBER also attracts/generates significant short haul movements.

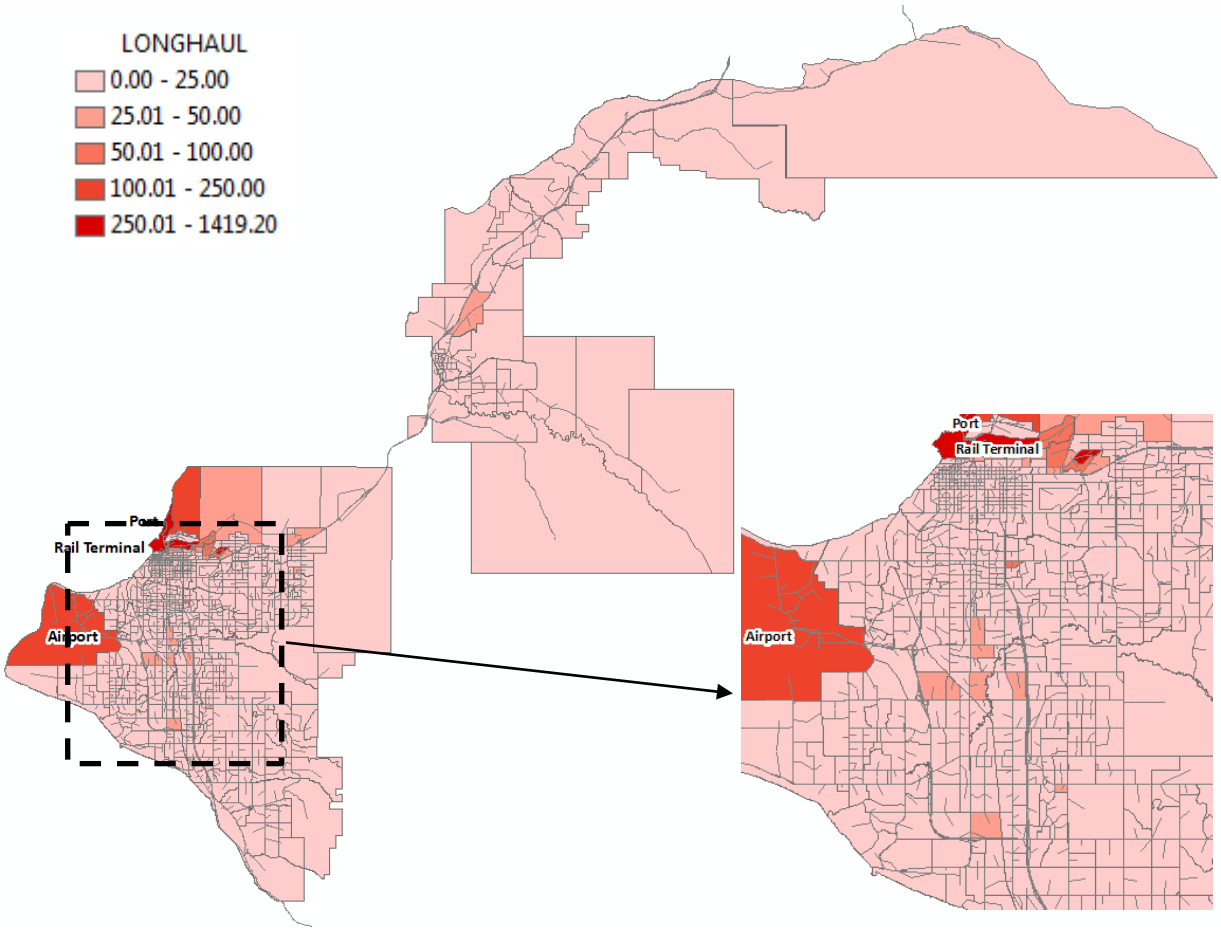
The long haul commercial vehicle model is developed to represent the number of medium and heavy trucks making longer trips to/from/within the region. ATRI provided GPS locations of trucks operated by its member companies in the Anchorage region for the months of March, June, August and November in 2014. The data in Table 14 shows future year long haul truck top TAZs by daily truck

traffic. The map of the AMATS TAZ structure provided in Figure 16 illustrates the future 2040 long haul TAZ movements.

Table 14: 2040 Long Haul Truck Traffic (Top 5 TAZs by Number of Trucks)

TAZ	Daily Long Haul Trucks To/From
Port of Anchorage (Multiple TAZs)	725
Industrial Area W of Downtown/Various DCs/Lynden Transport (TAZ 63)	706
ARRC Terminal (Multiple TAZs)	439
Portion of Port Connected to JBER – Petroleum Movements (TAZ 369)	213
TSAIA (Multiple TAZs)	136

Figure 16: 2040 Estimated Long Haul Truck Trips



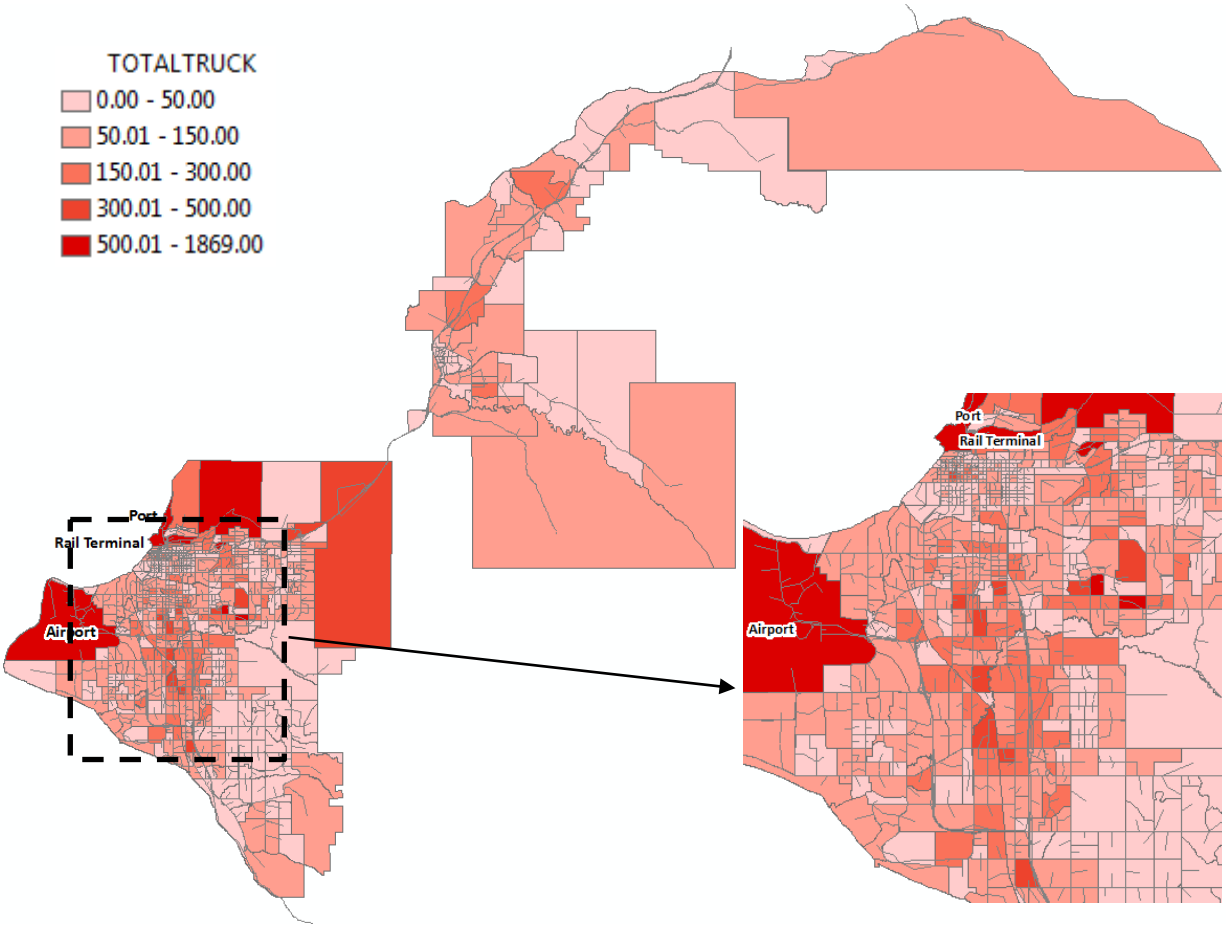
Long haul movements generally involve the Port of Anchorage and industrial districts. Port-related cargo requires heavier vehicles than that of other local movements. TSAIA has long haul trips, but not as frequently at short haul trips. The data in Table 15 summarizes 2040 truck trips for both short and long haul purposes. TSAIA, the Port of Anchorage, and JBER are the top three TAZs for overall

trips. Industrial districts and medical facilities comprise the remaining top TAZs for freight movement. Figure 17 illustrates the movements of all truck trips by 2040.

Table 15: 2040 Truck Traffic (Top TAZs by Number of Trucks)

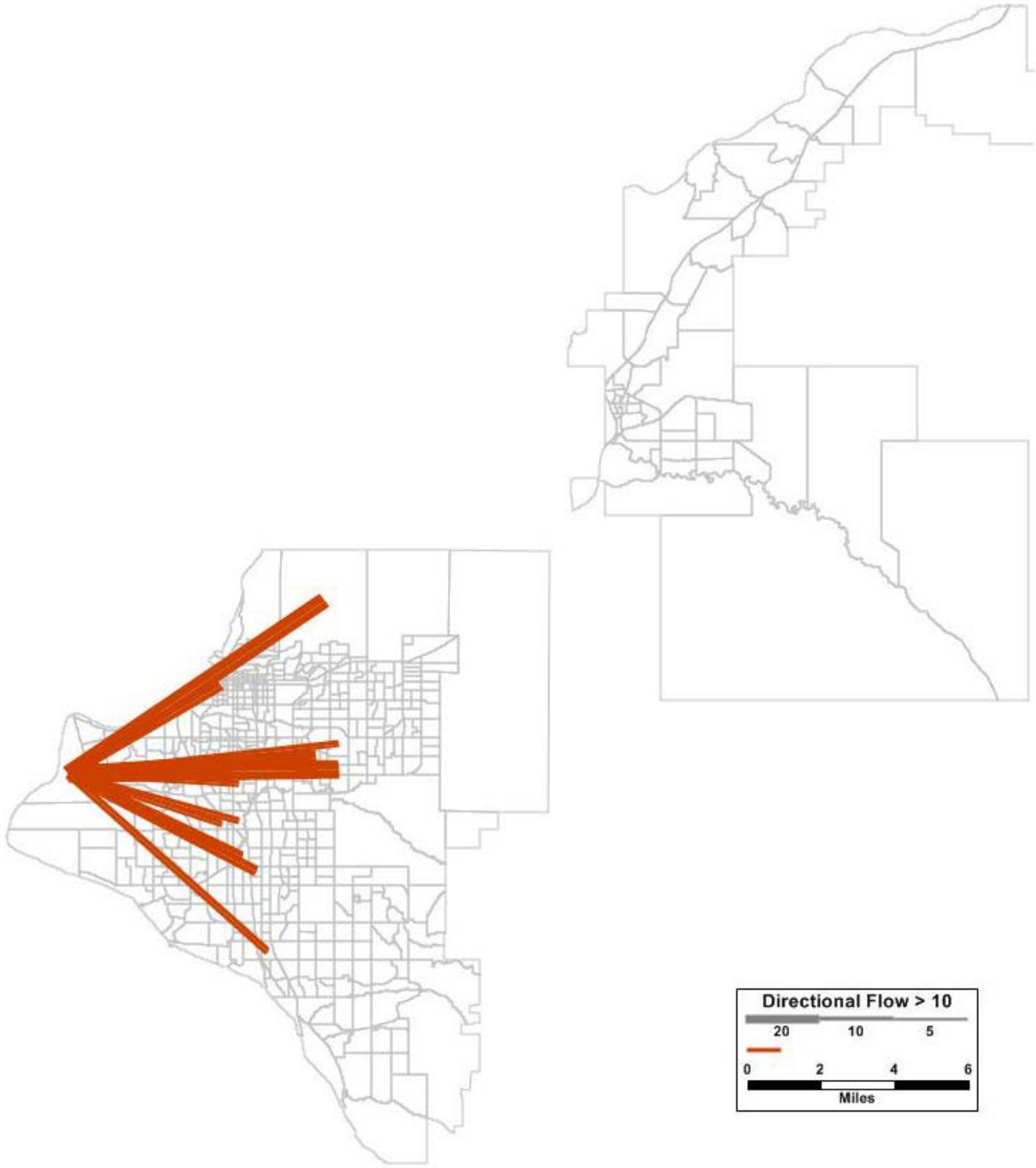
TAZ	Daily Trucks to/from
TSAIA (Multiple TAZs)	1,869
Port of Anchorage (Multiple TAZs)	930
JBER & Warehouse (TAZ 57)	850
Industrial Area W of Downtown/Various DCs/Lynden Transport (TAZ 63)	797
Alaska Native Medical Center Hospital (TAZ 528)	770
Providence Hospital (TAZ 58)	652
ARRC Terminal (Multiple TAZs)	516
Dimond Center (TAZ 138)	394
JBER & US Post Office *(TAZ 40)*	390
Various DCs (TAZ 134)	379

Figure 17: 2040 Estimated Total Truck Trips To/From TAZs



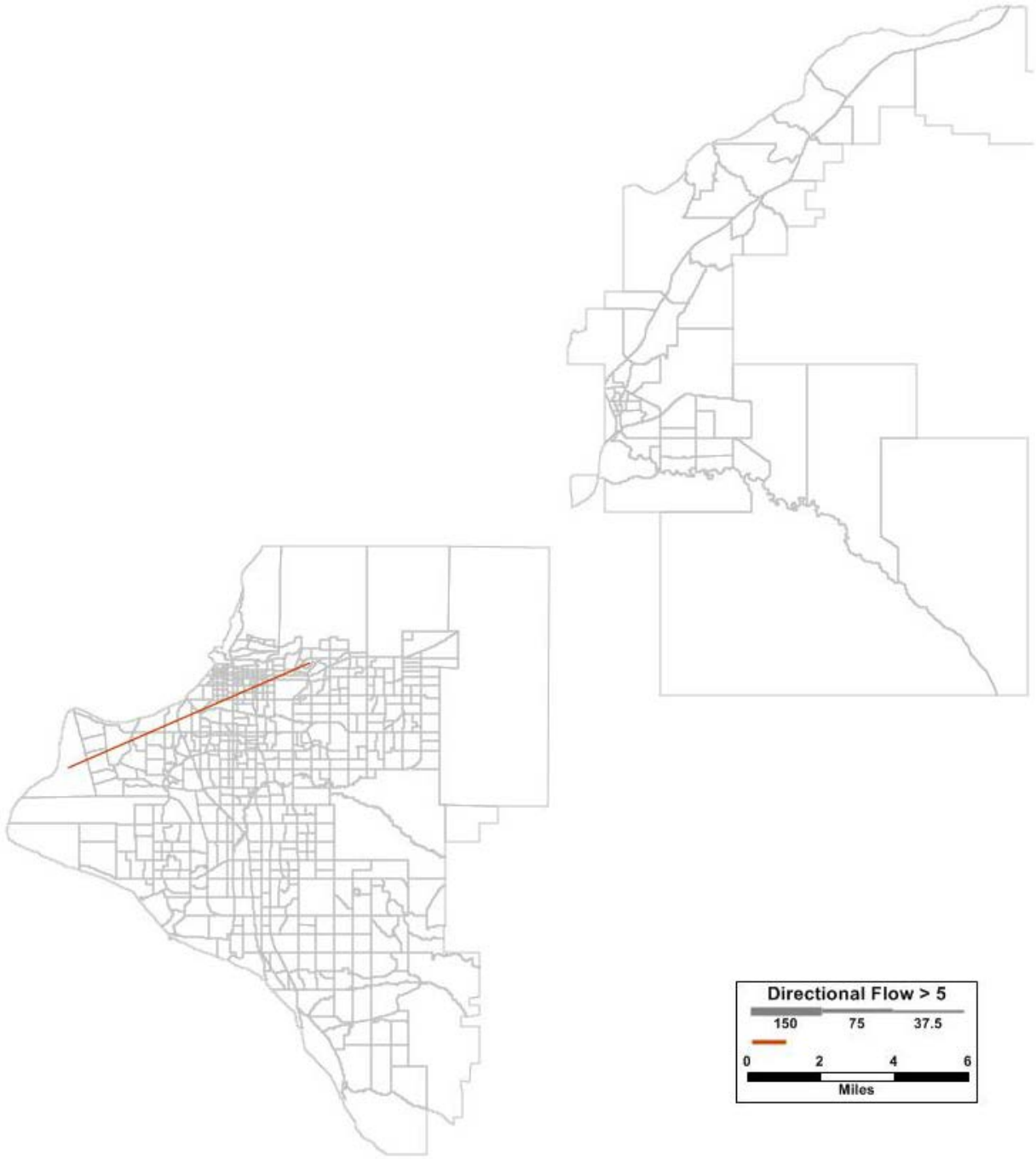
The desireline maps in Figures 18 through 20 show the estimated 2040 movements to and from TSAIA in further detail for short haul, long haul, and combined short/long haul trips.

Figure 18: 2040 Short Haul Truck Movements To/From TSAIA



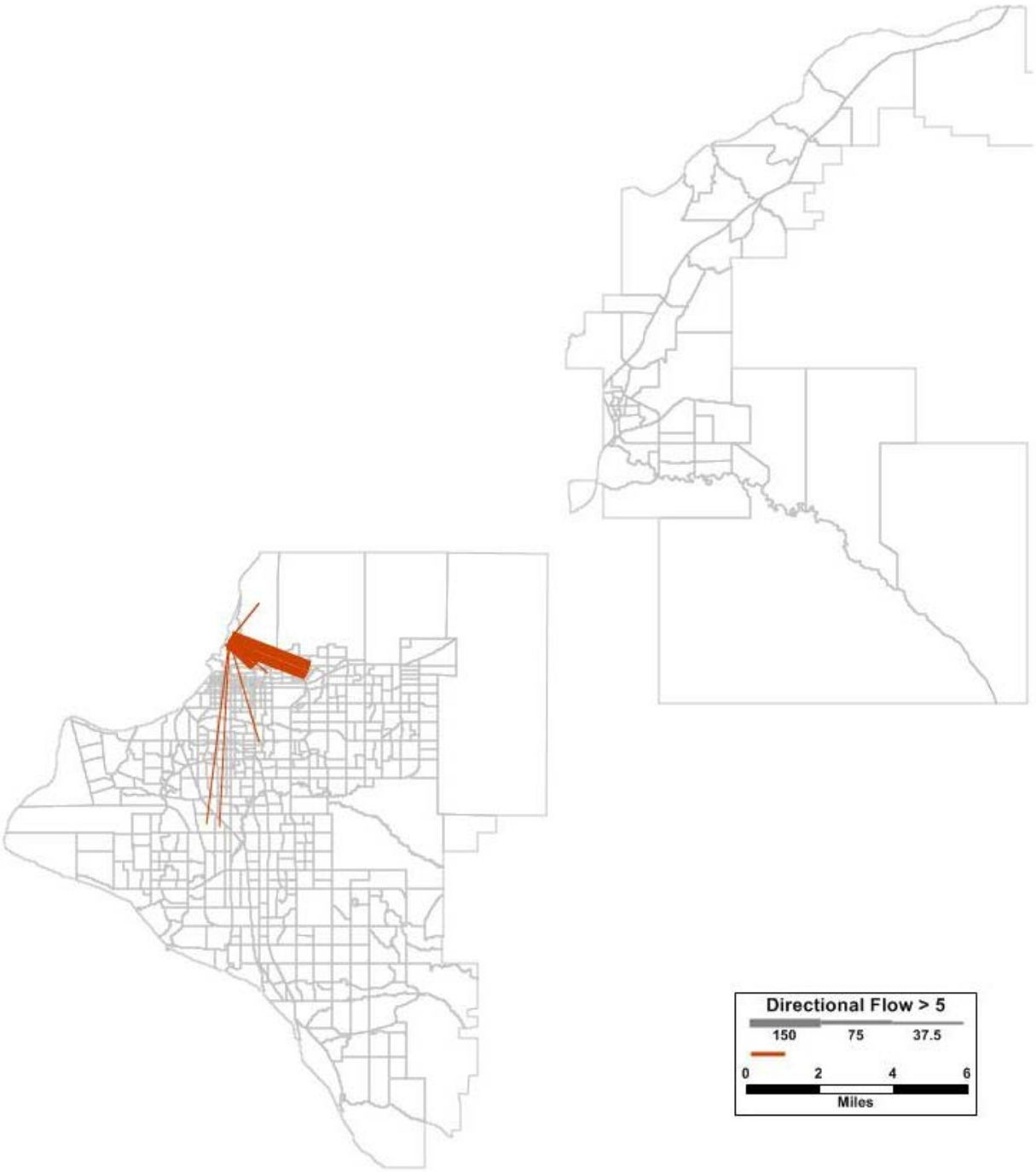
Estimated short haul movements from TSAIA show significant volumes on roadways within the Anchorage Bowl. Common origins/destinations include the Port of Anchorage, JBER, and industrial districts, as the desirelines show movements primarily to these areas.

Figure 19: 2040 Long Haul Truck Movements To/From Airport



Long haul movements to and from TSAIA are less common, as aircraft do not generally move the large-scale cargo that require heavy trucks. The only major movement estimated for 2040 is from TSAIA to an industrial area in the northern portion of Anchorage.

Figure 20: 2040 Long Haul Truck Movements To/From Port of Anchorage



The 2040 truck forecasts did not predict any major short haul movements to or from the Port of Anchorage, as this area often requires medium to heavy vehicles to move larger amounts of tonnage. As Figure 20 shows, long haul truck movements to and from the Port generally access industrial districts, including the same major industrial district areas that supported long-haul movements from TSAIA. Figure 21 shows short haul truck movements estimated between all TAZs, predicting extensive movement to and from TSAIA, JBER, industrial districts, and medical facilities. Figure 22 shows long haul truck movements estimated between all TAZs.

Figure 21: 2040 Short Haul Truck Movements To/From All TAZs

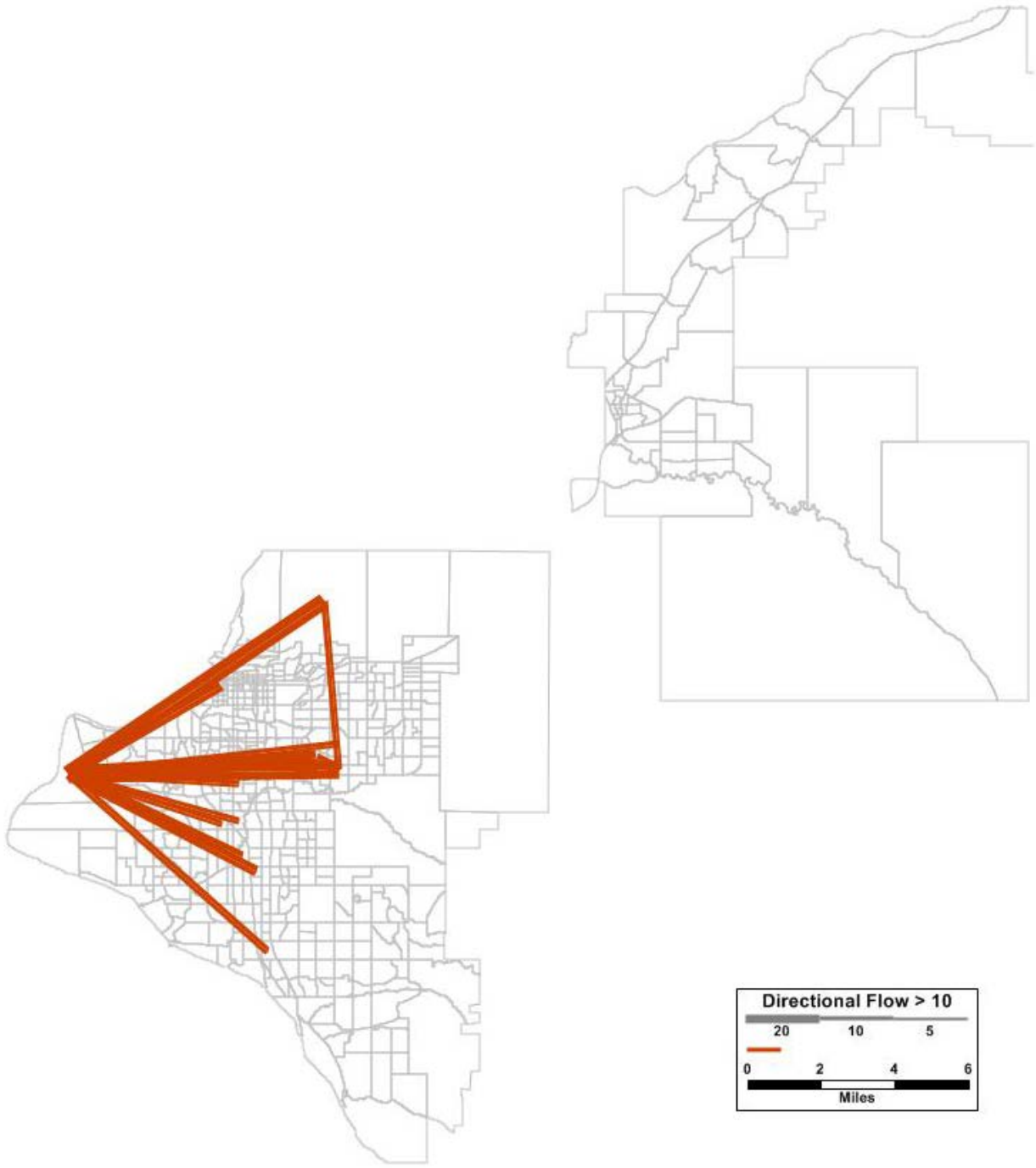


Figure 22: 2040 Long Haul Truck Movements To/From All TAZs

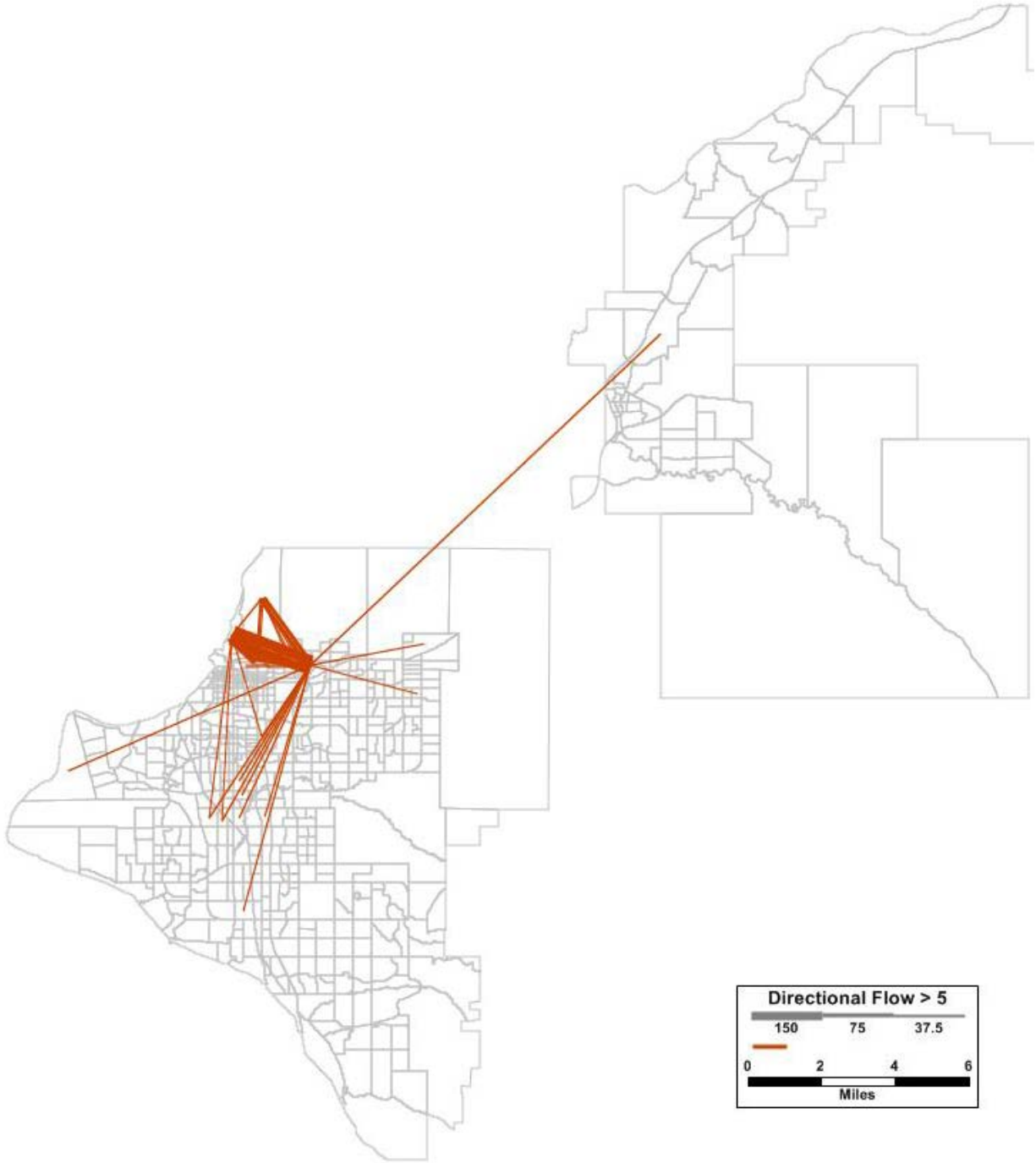
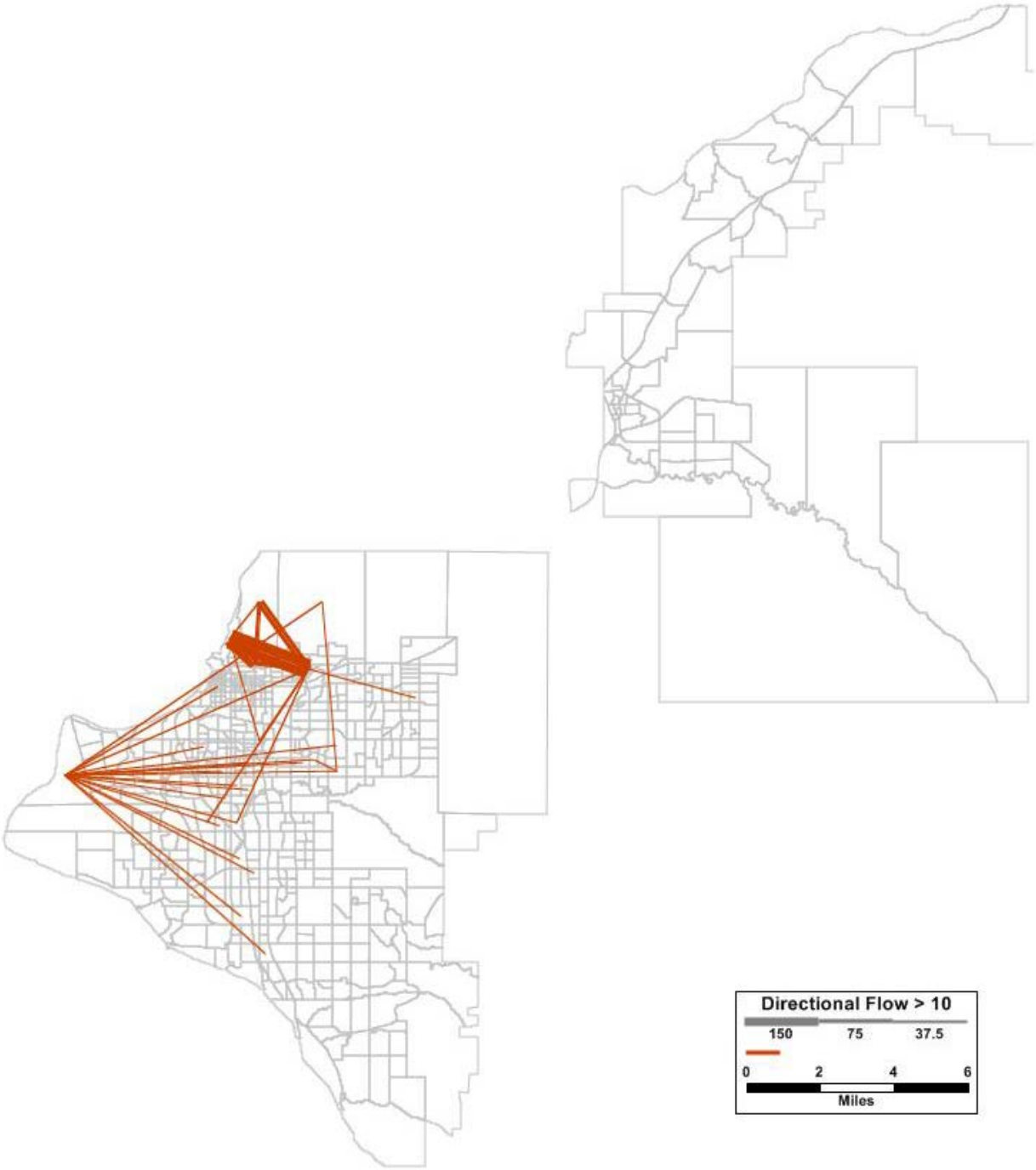


Figure 23 shows the combined short and long haul truck movement estimates to and from all TAZs in the region, suggesting that predicted major truck traffic patterns depend heavily on short haul trips to and from TSAIA and long haul trips to and from the Port of Anchorage.

Figure 23: 2040 Short and Long Haul Truck Movements To/From All TAZs



3.4 Rail Cargo

3.4.1 Existing Trends

ARRC is the only railroad provider in the region, operating over 650 miles of passenger and freight rail track throughout the state. In 2015, ARRC reported that over 10,000 loads of container freight were moved in and out of Anchorage. The volume moves through Whittier Harbor. The AMATS 2035 MTP cites that the majority of commodities moved via rail consisted of 'gravel,' 'coal,' 'petroleum,' 'military shipments,' and 'general cargo containers.' For example, of the 5.5 million tons moved in Alaska in 2009, 3.9 million were 'gravel' or 'coal.' (The Congestion Management Process Update and Status of the System Report from 2015 also identified a 50% overall tonnage share of 'gravel' cargo.)

As described above in Section 3.1, the Port of Anchorage received large amounts of tonnage for distribution throughout the Railbelt via rail. The Port of Anchorage Cargo Distribution Patterns Report from 2011 identifies 'fuel' and 'cement' as the primary commodities moved by rail throughout the state, indicating that these may be some of the commodities leaving the Port via ARRC's lines.

ARRC reported that the main rail traffic in Anchorage includes petroleum trains between Fairbanks and Anchorage (a 356-mile distance) and gravel trains between Mat-Su Valley and Anchorage (a 40 –mile distance). Export coal primary moves via ARRC lines between Healy, Seward, and Fairbanks.[20]

3.4.2 Trends/Forecasts

Tonnage for bulk resource product commodities remains relatively stable. Petroleum volumes, on the other hand, observed decreases in tonnage in recent years. For example, petroleum tonnage dropped from 2.5 million tons in 2005 to 1 million tons in 2013. Overall tonnage moved by rail is on the decline. The Congestion Management Process Update and Status of the System Report from 2015 notes a peak in rail tonnage in 2005.

ARRC indicates interest in opportunities in markets such as gravel, coal export, trailers, bulk commodity items, and long haul operations to Fairbanks, the Lower 48, and Prudhoe Bay. ARRC also noted interest in increasing development of Birchwood Industrial Park located between Birchwood and Eagle River to support gravel operations.

The Turnagain Arm Comprehensive Plan cites the opening of the Portage-Whittier Tunnel as an opportunity for ARRC to increase efficiency in Portage Valley. The plan notes that cargo imported at Whittier was often sorted and reloaded in Anchorage. However, ARRC could potentially offer this service with a greater level of efficiency in Portage for shipment south, reducing dependence on ARRC facilities in Anchorage. As of March 2016, the ARRC continues to sort and reload rail cars from Whittier as needed in Anchorage and has no plans to change this operation.

[20] Alaska Railroad. Freight Services. (2015). https://www.alaskarailroad.com/Portals/6/pdf/pr/2015_05_19_Freight_Business_FS_PR.pdf

3.5 Pipeline

3.5.1 Existing Conditions

According to 2012 FAF3.4 data, pipeline constituted about 16% of overall freight tonnage in Alaska. The majority of pipeline movements occurred within the state of Alaska, constituting 27% of all intrastate movements. In terms of domestic imports, pipeline brought in about 28% of overall import tonnage. The Anchorage area included two major pipeline facilities:

- Nikiski Alaska Pipeline – Moves from the ARRC Anchorage Rail Yard out to the west carrying liquefied natural gas; and
- Beluga Gas Pipeline – Moves through JBER up to Knik River, paralleling Glenn Highway, carrying natural gas.

The area also includes two identified “Alternative Fuel” points identified by the Department of Energy (DOE), indicating fueling facilities that offer fuels other than gasoline. Exhibit 5 shows this pipeline-related infrastructure.

3.5.2 Trends/Forecasts

FAF3.4 2040 forecasts show that pipeline will account for 7% of overall statewide mode share. When broken down by direction, pipeline accounts for 10% of all domestic movements, 1% of all foreign imports, and 3% of all foreign exports.

4 Safety & Security Issues

Safety and security issues are becoming more prominent in regional freight mobility. Freight involves large-scale shipments using various modes of the region's transportation system. Safety is paramount to ensure that large containers or vessels of costly and/or potentially hazardous materials arrive at their destinations on time and intact. Security is also a major concern as these shipments cross (international, U.S.) borders, each with different regulations and protocol. This section presents a summary of safety and security issues of the system as well as major intermodal facilities in the region by transportation mode.

4.1 Water Cargo

Current security measures at the Port of Anchorage are in full compliance with 2014 Maritime Transportation Security Act standards. The Port implemented a Port-wide security plan in 2006 that remains in-place. The Port has a security screening facility and provides security training for all staff. Additionally, any person entering the site must present a government photo identification card to enter. Staff members additionally require "proximity access card" and a "Transportation Worker Identification Card." These access precautions serve to protect the Port on a daily basis.[21]

Further, the Port has contracted with an on-site security firm to perform services, including an average of 20 armed officers. The Department of Homeland Security deemed the Port of Anchorage as a "regionally significant" facility, which includes Port receipt of federal funding for security operations.[22]

4.2 Air Cargo

TSAIA maintains compliance with Transportation Security Administration (TSA) standards and has US Customs security on site.. The airport also has Aircraft Rescue and Fire Fighting (ARFF) services on site per FAA requirements. The airport has no major facility or security related incidents recorded in the recent past.

TSAIA also recently contracted with an energy firm to implement an Electrical Preventative Maintenance (EPM) and National Fire Protection Association (NFPA) 70E Compliance Program. This Program includes a review of the airport's electrical distribution systems, incident energy analysis, arc flash hazard assessments, schedule maintenance, airport staff training, and energy-related incidents to enhance safety measures at the airport.[23]

In the event of a major emergency, JBER's air facilities offer an alternative to TSAIA. For example, during the 1964 earthquake, Elmendorf Airfield continued to move freight while TSAIA was unable to move cargo.

[21] Port of Anchorage. Safety & Security. (2015). http://www.portofanc.com/operations/safety-security/
[22] Port of Anchorage. Facilities. (2015). http://www.portofanc.com/operations/facilities/
[23] NPC Energy Services Provides EPM and 70E Compliance Solutions for Ted Stevens Anchorage Int'l Airport. (2015). http://npcesllc.com/npc-energy-services-provides-epm-and-70e-compliance-solutions-for-ted-stevens-anchorage-intl-airport/

4.3 Highway Cargo

The AK DOT&FP conducts inspections on commercial vehicles for safety, size, and weight. These inspections occur at weight stations, select roadside locations, at terminals, and when vehicles are stopped. The inspectors utilize ASPEN inspection reporting software to keep record of these inspections. In addition to inspections, DOT&PF supports a cooperative industry and public education awareness program to ensure that both drivers and other road users understand risks and responsibilities associated with commercial vehicle navigation.[24] In terms of vehicle security, systems and technology vary by carrier.

The Fatality Analysis Reporting System (FARS) summarizes motor vehicle crashes resulting in fatal injury data by year. Additionally, the National Highway Traffic Safety Administration (NHTSA)'s Alaska Crash Map shows the geographic locations of these incidents in the region with a user-friendly online interface. This online map was used as the basis for obtaining and linking case numbers to the vehicle type information for this analysis.

FARS includes records by vehicle body type, including all different truck types. Table 16 summarizes the two fatality-resulting crashes (from 2011 to 2013) identified in the Anchorage area that involved a commercial vehicle. Figures 24 and 25 show the locations of these crashes as identified on the NHTSA Alaska Crash Map.

Table 16: 2011-2013 Truck Incidents Resulting in Fatalities in the AMATS Study Area

Case Number	20030	20005
Year	2012	2013
Fatalities	1	1
Month	September	January
Hour	8:00AM	5:00PM
Body Type	Truck/Tractor	Standard Pickup
Jack Knife	Yes	No
Gross Vehicle Weight Rating	26,001 lbs or More	10,001 lbs - 26,000 lbs
Vehicle Configuration	Truck Tractor/Semi-Trailer	Single-Unit Truck (2 axles, GVWR 10,000+ lbs.)

[24] DOT&PF MSCVE 2014 Commercial Vehicle Safety Plan. http://dot.alaska.gov/mscve/assets/webdocs/2014CVSP.pdf

Figure 24: Location of Crash #20030 per the NHTSA Alaska Crash Map

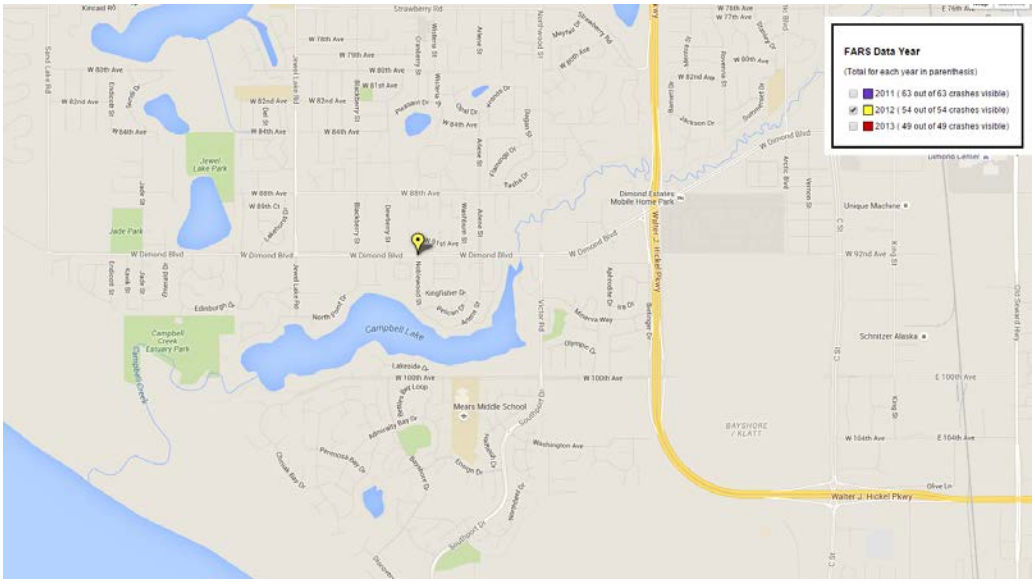
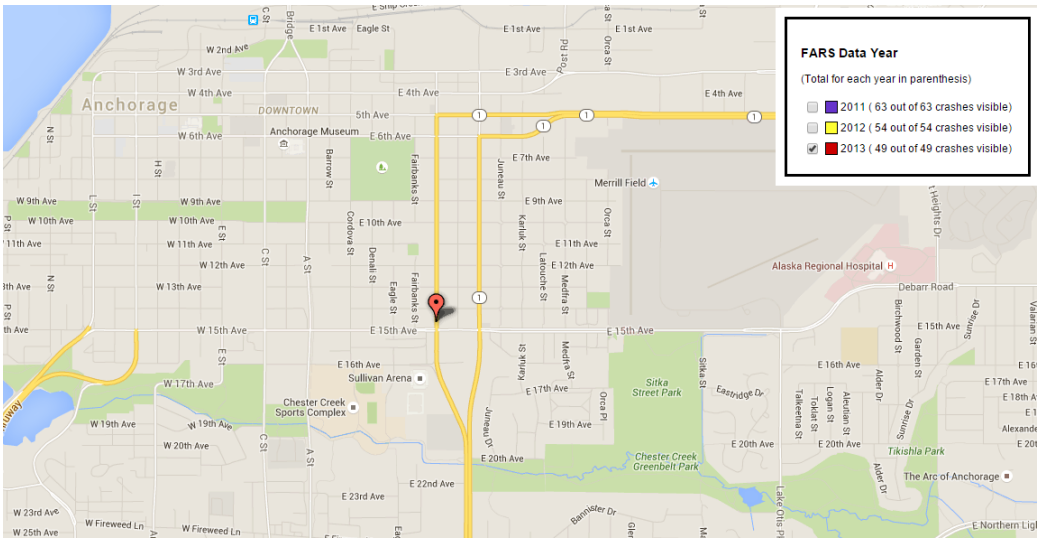


Figure 25: Location of Crash #20005 per the NHTSA Alaska Crash Map



The DOT&PF Measurement Standards & Commercial Vehicle Enforcement Data summarizes motor vehicle crashes throughout the state. The DOT&PF Measurement Standards & Commercial Vehicle Enforcement Data summarizes motor vehicle crashes throughout the state. The information in Table 16 summarizes crashes by type for the Anchorage Bowl area. Note that “Non-Federally Reportable Crashes” indicate that the vehicle was not towed and no one involved in the crash was injured and killed. The majority of crashes in the region are non-federally reportable.

The number of crashes per year was not consistent over the 2009 through 2014 observations. Years 2009 through 2011 experienced higher levels of crashes with an average of about 140 per year. Years 2011 and 2012 show significantly fewer crashes, with about 50 per year. 2014 shows an increase up to 110 truck crashes, still not as high as the 2009 through 2011 datasets. It is unclear why this substantial variation in crashes occurred in the reporting period.

The majority of these crashes occur in more dense and higher volume locations. There are few fatalities on the network (the highest being two fatalities in 2014). There is no significant correlation between the locations of the fatalities recorded on the system.

Table 17: DOT&PF Crash Data Summaries, 2009 - 2014

Crash Type	2009	2010	2011	2012	2013	2014
Non-Federally Reportable	119	111	126	37	23	77
Resulting in Tow	14	18	9	7	26	25
Resulting in Injury	8	13	10	4	5	6
Resulting in Fatality	0	0	0	1	1	2
Total	141	142	145	49	55	110

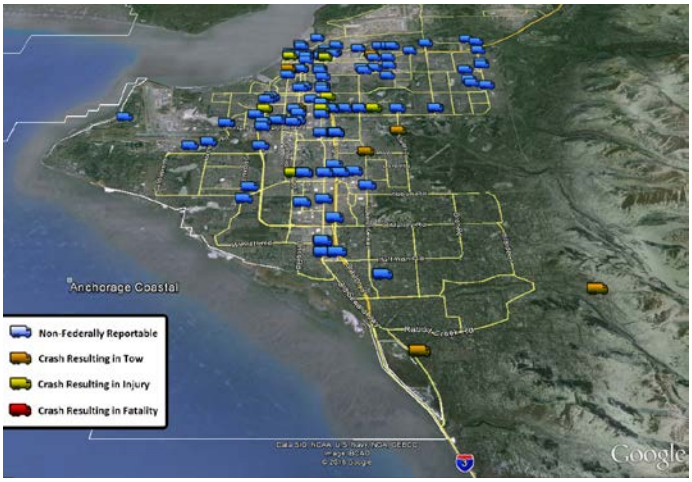
The maps in Figure 26 illustrate commercial vehicles crashes in Anchorage from 2009 through 2014.

Figure 26: 2009 - 2014 Commercial Vehicle Crash Maps[25]

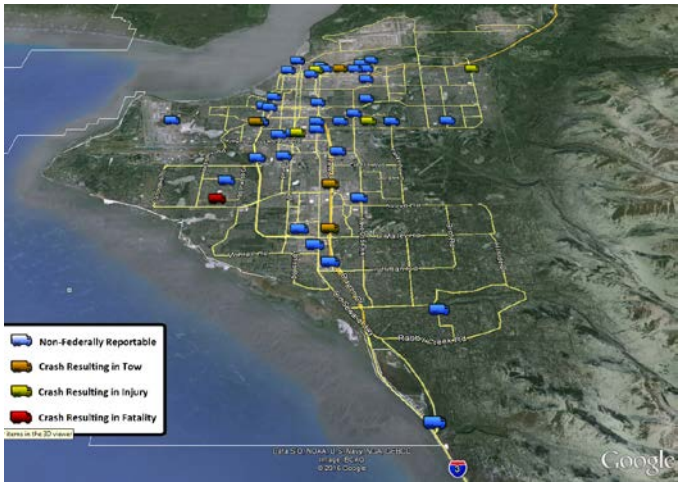
2009

2010

2011



2012



2013

2014

[25] DOT&PF: MSCVE

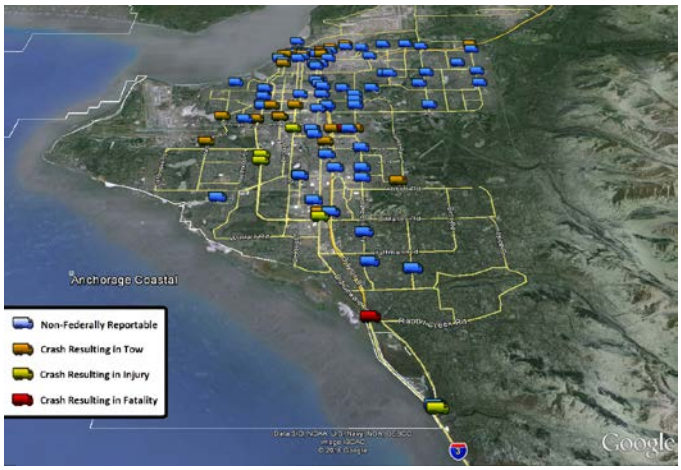
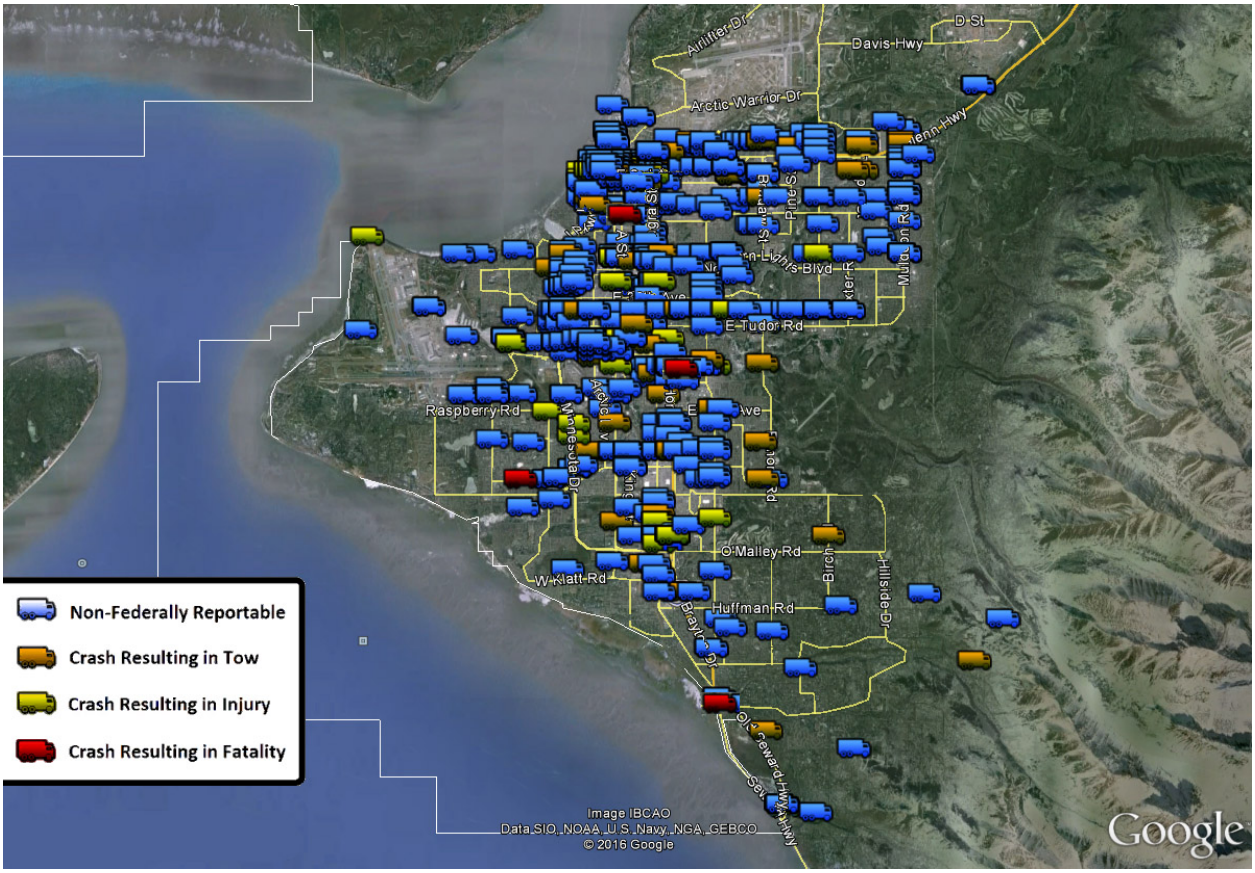


Figure 27 shows all of the commercial vehicle crashes in one map to show consistent areas of crash incidents. Non-federally reportable crashes are the least impactful and generally occur on lower speed roadways. Crashes that result in towing, injuries or fatalities generally occur on higher speed facilities. Crashes are more prevalent in more dense areas.

Figure 27: 2009 - 2014 Commercial Vehicle Crash Map - All



DOT&PF Measurement Standards & Commercial Vehicle Enforcement datasets also provide details on the characteristics of the crash, lighting conditions, and weather conditions; however this information is only available on the statewide level. Statistics for these crash details are not available

for the AMATS area alone. The data in Table 18 summarize commercial vehicle crashes by lighting conditions, and Table 19 summarizes commercial vehicle crashes by weather conditions statewide. The majority (77%) of 2014 crashes occurred in daylight, with only 14% occurring in dark lighted areas and 5% in dark areas. About one fifth of 2014's crashes occurred in adverse weather conditions.

Table 18: Alaska Light Conditions for 2014 CMV Crashes

Light Conditions	% Commercial Vehicle Crashes
Daylight	77%
Dark Lighted	14%
Dark Not Lighted	5%
Dawn	2%
Dusk	1%
Other/Unknown	1%

Table 19: Alaska Weather Conditions for 2014 CMV Crashes

Weather Conditions	% Commercial Vehicle Crashes
No Conditions	69%
Rain	10%
Snow	10%
Fog	1%
Dirt/Gravel	1%
Cross Winds	1%
Other/Unknown	8%

In addition to crash-related concerns, bridge vertical and horizontal clearances were examined on the NHS to identify areas of concern along heavily trafficked roadways. Eight of the 56 bridges on the NHS have clearances between 14.5 and 22 feet in height. The remainder of bridges have 22-foot or higher vertical clearances. FHWA Safety regulations recommend vertical height clearances between 14 to 16 feet.[26] All bridges in the region are within this standard as shown in Exhibit 6. The eight structures with the shortest clearances include:

- C St UC At O'Malley eastbound, O'Malley Road Carried – Vertical Clearance (VC): 14.5 Feet;
- C St UC At O'Malley westbound, O'Malley Road Carried – VC: 14.5 Feet;
- Peters Creek UC - southbound, Glenn Highway Carried – VC: 14.8 Feet;
- West 100th Avenue, UC northbound, Minnesota Dr. N.B. Carried – VC: 16.2 Feet;
- Campbell Cr Minnesota Drive, southbound, Minnesota Dr. S.B. Carried – VC: 18.8 Feet;
- Campbell Cr Minnesota Drive, northbound, Minnesota Dr. N.B. Carried – VC: 18.8 Feet;

[26] FHWA. Vertical Clearance. (2015). http://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/chapter3/3_verticalclearance.cfm

- Airport Spur, Minnesota Drive Carried – VC: 18.8 Feet; and
- Anchorage Port Access, Loop Rd/C Street Carried – VC: 22 Feet.

4.4 Rail Cargo

The Federal Railroad Safety Act (FRSA) provides security for national railroad operations by mandating employee protections, regulating hazardous safety/security conditions, providing a process through which to report security problems to the Department of Homeland Security, and enforcing these regulations.[27] This legislation is applicable to all carriers through the AMATS region.

The use of rail to move bulk and/or hazardous materials diverts this traffic off of the highway system. ARRC reports that their annual movement of materials such as petroleum, gravel, and coal via railcar removes over 300,000 dump and tank trucks from the road each year in Alaska, with an estimated vehicle miles traveled reduction of 34.7 million miles. This movement of these goods from truck to rail has helped provide a more secure environment on a rail fixed guideway.

In October 2015, US Congress extended the deadline for installation of positive train control (PTC) on "each entity providing regularly scheduled intercity or commuter rail passenger transportation" to 2018. PTC involves the use of GPS technology and a system database to manage, monitor, and operate train movements on a system. PTC will increase safety on the railway system by avoiding collisions, monitoring speeds, and reducing user error.[28] ARRC's PTC implementation strategy includes two phases:

- Phase 1 includes implementation of a Computer-Aided Dispatch (CAD) system, which authorizes train movements and restricts speeds. This system involves "Centralized Traffic Control" and "dark-territory Track Warrant Control." Phase 1 is complete.
- Phase 2 is underway. Phase 2 includes an office segment (developing a server for validating directives from railroad authorities), a locative segment (equipping the locomotives with all necessary hardware/software for PTC), a wayside segment (installing devices along the tracks to communicate with the locomotives/dispatch offices), a communications segment (upgrades to communication system/towers/stations), and systems integration (integrating/ testing the system and developing a safety plan).

The total cost of statewide PTC implementation is $158 million. To-date, over two-thirds of the project were financed. ARRC expects that the project will be complete by the December 31, 2018 deadline.[29]

ARRC is also involved in Operation Lifesaver, a non-profit program to provide outreach and education about rail safety. In 2013, ARRC cosponsored a $26,000 Operation Lifesaver grant to run a Summer Rail Safety Campaign that reached over 12,000 residents in Alaska and included public ad space to increase safety and awareness of rail traffic. ARRC also engages in TrackWatch, another public outreach campaign to increase community awareness regarding rail safety and security. Members of the public can inform rail professionals of environmental, security, or other hazards.

[27] United States Department of Labor. Federal Railroad Safety Act 49 U.S.C. §20109. http://www.whistleblowers.gov/acts/frsa.html
[28] Senate Finance Committee. Positive Train Control: Alaska Railroad Status. http://www.legis.state.ak.us/basis/get_documents.asp?session=28&docid=14927

[29] Alaska Railroad. Positive Train Control. (2015). https://alaskarailroad.com/sites/default/files/akrr_pdfs/2015_03_26_Positive_Train_Control_FS_PROJ.pdf

To upkeep tracks from overgrowth, ARRC complies with Alaska Department of Environmental Conservation (ADEC) standards for an "integrated vegetation management plan." ARRC contracts with a vegetation control specialist to ensure track beds and rail yards remain a standard of operation.

The ARRC tracks have 63 at-grade rail crossings in Anchorage. Exhibit 6 depicts these at-grade crossings using data from the 2015 NTAD. Eleven crossings do not have signs or signals (all of which are specified on "residential property") 8 have signals or signage, and the remaining are unspecified. The 2035 AMATS MTP identified the following crossings of concern due to higher volumes in these locations: C Street, Arctic Boulevard, Dowling Road, and International Airport Road/Jewel Lake Road.

To increase awareness of the importance of right-of-way for rail-side protection, ARRC used six-foot blue posts in 200-foot increments to delineate the right-of-way boundary through Anchorage. The markings were installed in 2011 and run from Potter north to Elmendorf. ARRC is considering expanding the length of these markings, as ARRC noted that right-of-way is a common problem where property owners build too close to the track.

In consideration of rail facilities in mountainous areas, ARRC conducts research and continues to improve its precautions for avalanche or similar landslide occurrences. ARRC collaborates with Alaska Department of Transportation and Public Facilities (DOT&PF), U.S. Forest Service, National Weather Service, and other public safety organizations to collect data on these occurrences and to establish snow-clearing equipment and explosive delivery systems for incident management.[30]

In terms of rail infrastructure, ARRC data is not publicly available to assess the existing conditions of rail tracks, facilities, and bridges.

4.5 Pipeline

The Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates national pipeline safety and security. PHMSA supports the enforcement of the Pipeline Safety Act of 2011 and the HAZMAT Safety Improvement Act of 2012. PHMSA reports no significant pipeline incidents in the past decade.[31] No extraordinary safety or security concerns related to pipeline infrastructure exist in Anchorage. Pipelines require extensive maintenance and security due to the volatile nature of the contents carried.

[30] Alaska Railroad. Safety & Security. (2015). https://www.alaskarailroad.com/sites/default/files/akrr_pdfs/2015_02_19_Safety_Security_FS_PR.pdf
[31] PHMSA. Pipeline Incident 20 Year Trends. http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends

5 Bottlenecks, Level of Service & Capacity Issues

Bottlenecks can occur anywhere on the freight system: choke points along heavily-traveled corridors, intermodal transfer locations, or last-mile of delivery. Bottlenecks may be the result of a lack of capacity on the freight system or they could stem from operational issues unrelated to infrastructure. Bottlenecks of any type present major threats to the regional freight system as a constraint to on-time delivery. This section presents an analysis of the current and potential future bottlenecks in Anchorage, which will be critical to identifying system needs later in the FMS related to both infrastructure and operations/maintenance by mode.

5.1 Water Cargo

In terms of waterborne cargo, current bottlenecks result from infrastructure-related deficiencies. For example, cement off-loading capacity currently falls short of average vessel capacity by 16,000 tons. Private investment at the Port, specifically the inclusion of the additional 40,000-ton cement storage facility, will help to resolve this infrastructural bottleneck.

Another example is the need for additional petroleum storage. According to the Southcentral Alaska Ports Freight and Fuel Analysis conducted in April 2015 more than one quarter of all refined petroleum products used in Alaska through the Port of Anchorage's valve yard and over its docks. The Port is also a critical outlet for aviation gas for Alaska including aviation gas, commercial jet fuel, and military jet fuel. It will be critical to have the proper storage available to meet future statewide energy needs.

The ongoing Port modernization will address various infrastructure age and maintenance issues that currently cause delays or impedances. For example, a consistent 35-foot draft at the terminal and additional berth spaces will increase the Port's operating capacity to accommodate both current and potentially new customers. Increased intermodal access will also help to prevent water transport delays at the Port.

5.2 Air Cargo

As identified in the Alaska International System: TSAIA Proposed Construction Project report, TSAIA is undergoing a variety of improvements to address current bottlenecks. This includes utility repairs, improved access to hangers, airfield taxi area widening, airfield pavement reconstruction, and parking area reconstruction. Improvements made to airfield taxi and runway pavements are being designed to address dimensional concerns and to meet Aircraft Design group VI Standards.

In terms of intermodal movement at TSAIA, the Air Cargo Related Economic Development Opportunity Assessment identified limited direct cargo movements between air and rail modes within Alaska. This report cited air connectivity to other modes as of great concern for future freight movements in the state, as increased connectivity would allow for more efficient freight movement.

5.3 Highway Cargo

Highway-related concerns range from infrastructure to operational issues. Items of concern in the region include congestion at intermodal facilities (last-mile delays at the Port of Anchorage and TSAIA) and lack of available truck parking.

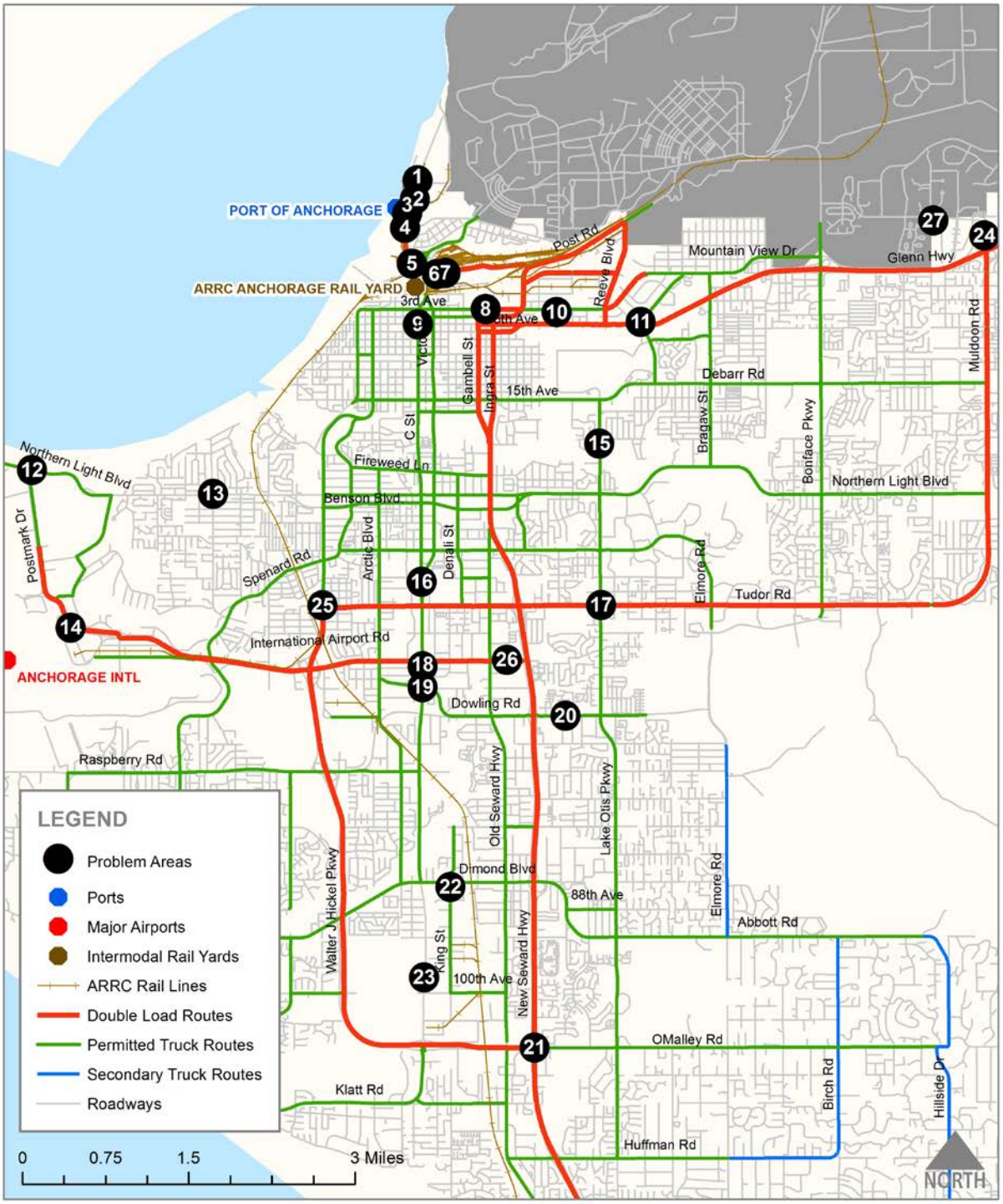
Queuing at the Port of Anchorage and access issues through downtown Anchorage present problems for trucks moving cargo and commodities to and from the Port. The C St/Ocean Dock Access Ramp is identified as a long term project in AMATS's 2035 MTP Update. This project would function as both an infrastructural and safety improvement for the bridge but is not in the pipeline for implementation until the time period from 2024 through 2035. The Ship Creek Bridge also provides the only connection for trucks to access the Port and ARRC from the downtown area, which also offers the potential to create bottlenecks across Ship Creek.

In 2009, the Municipality of Anchorage identified 27 "problem locations" for freight movement in the Anchorage Bowl area. Of these 27 problem areas, eight had recently implemented projects to aid in resolving the congestion. These problem areas, illustrated in Figure 28, include the following:

1. Ocean Dock Road access and crossing from Port to Terminal Road;
2. Ocean Dock Road and Terminal Road Intersection;
3. Ocean Dock Road alignment near Port entrance;
4. Ocean Dock Road RR crossings(s);*
5. North C Street and Ocean Dock Road Intersection (multiple RR Crossing);
6. Whitney Road (size, turning movements, no shoulders, trail/pedestrian/fishing concerns);
7. School Bus storage area (use not ideally suited, some compatibility concerns);
8. 3rd Avenue & Ingra/Gambell improvements (connects to the Ship Creek/Port Area);
9. C Street & 5th/6th Avenue Intersections - (turning movements);*
10. 3rd Avenue: Post Road and Reeve Blvd. (capacity improvements);*
11. Industrial Area circulation and access concerns;
12. Postmark Drive and Point Woronzof/W. Northern Lights Intersection (stop signs, tight intersections, left and right turns);
13. West Northern Lights Boulevard & Wisconsin Street Intersection;*
14. International Airport Road & Postmark Drive, (on/off ramp intersection, multiple stops);*
15. Lake Otis Pkwy: Debarr Rd to Northern Lights Blvd, (capacity concerns/4 lane transition to 3 at Chester Creek);
16. C Street: Tudor Rd to 36th Avenue Northbound (capacity concerns);
17. Tudor Rd at Lake Otis Pkwy Intersection improvements (capacity congestion);
18. C Street at International Airport Road Intersection (turning movements);
19. C Street at Potter & at 64th Intersections (turning movements);*
20. Dowling Road: New Seward Hwy to Lake Otis Pkwy (capacity and turning movements);*
21. New Seward Highway at O'Malley Interchange;
22. King Street at Dimond Blvd Intersection (turning movements);
23. C Street Extension to O'Malley;*
24. Access off of the Glenn Highway from Muldoon Road. (capacity development for freight),
25. Tudor Road & Minnesota Drive;
26. International Airport Road extension to the New Seward. T.I.P. recommended, and
27. Best Buy\Kohl's\Muldoon Post Gate (access improvements).

*Represents a completed project as of 2009.

Figure 28: Freight Problem Area Locations, 2009



The potential construction of the Knik Arm Crossing will support improved freight mobility on the highway system by providing easier access to the Port MacKenzie area. This will help to alleviate freight traffic movements using the Glenn Highway to and from the Railbelt area.

The 2035 AMATS MTP recognized that there is no alternative route to the Glenn Highway if a traffic incident occurs. Non-recurring delay caused by incidents or accidents is an area of on-going concern for trucks moving through the region. The potential incorporation of the Knik Arm Crossing into the system will help to provide an alternative for long-distance trips traveling north from downtown Anchorage. However, there remains a need for a parallel or redundant highway facility that provides an alternative to Glenn Highway as a contingency plan for incident management. Note that in the event of a major emergency, the use of military frontage roads may be applicable.

The limitation of WIM data to only five stations in the region is an issue in terms of supporting data for use in regional freight analysis. Increased truck counts maintained by either the DOT&PF will be helpful for performance measurement and future freight planning studies.

5.4 Rail Cargo

Rail cargo bottlenecks may be operational or infrastructural. Operational concerns exist at the Port of Anchorage and similar intermodal centers, where cargo movement relies on tight schedules. For example, when freight exits the Port of Anchorage via rail, the track functions as the loading area. This loading process may foster delays based on scheduling and loading crew member availability. Additionally, ARRC noted that some of the most significant delays to operation are related to truck traffic through downtown Anchorage at rush hour. Delays in truck arrival time affect loading and departure times.

Infrastructural bottlenecks exist where the actual build of the railway impedes freight movement. As shown earlier in Exhibit 6, there are a high number of at-grade crossings in the region, which not only impact safety of the overall transportation system, but also constrain efficient rail operations.

5.5 Pipeline

Both current and expected future bottleneck, level of service, and/or capacity issues were not identified in the pipeline network.

6 Fuel & Energy Issues

The cost of fuel influences the movement of goods both in overall tonnage moved (e.g., if the cost of moving commodities increases with fuel costs, then the amount of commodities shipped reduces) and mode choice (e.g., when the cost of moving commodities on a given mode requires higher fuel costs, then the amount of commodities shipped may reduce or shift to a different mode). Fuel and energy trends were reviewed and assessed to identify the key issues related to fuel economy and the impact of goods movement in the region.

Figure 29 illustrates gasoline price trends by all sellers over the past 30 years in Alaska reported by the Energy Information Administration (EIA). Gas prices were stable in Alaska until the late 2000s. After a dramatic spike in 2008, due to the Great Recession and other influences, prices decreased but remain unstable. Figure 30 presents all sales and deliveries of gasoline by prime supplier in Alaska from 1980 to 2015. Gasoline sales have remained stable in Alaska, ranging from 600 to 800 thousand gallons per day, over the past three decades.

Figure 29: Alaska Total Gasoline through Company Outlets Price by All Sellers (Dollars per Gallon), 1984 to 2012

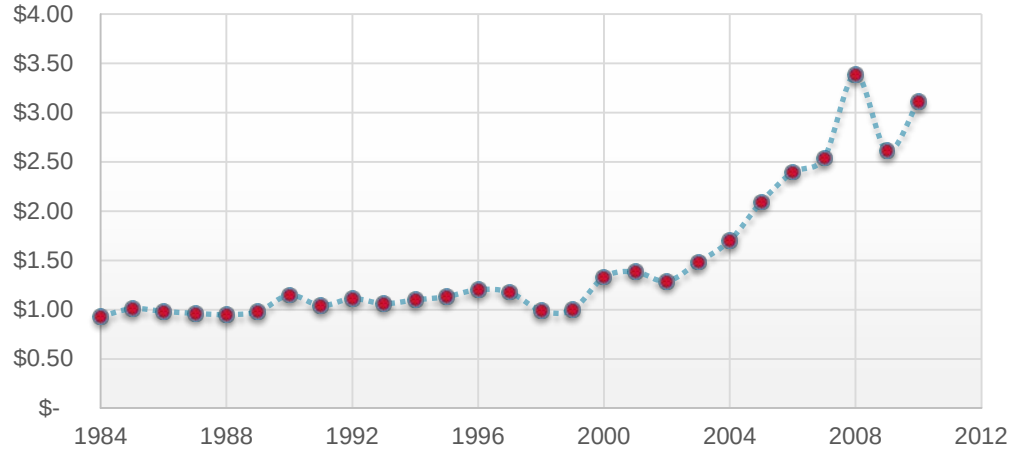


Figure 30: Alaska Total Gasoline All Sales/Deliveries by Prime Supplier (Thousand Gallons per Day), 1980 to 2015

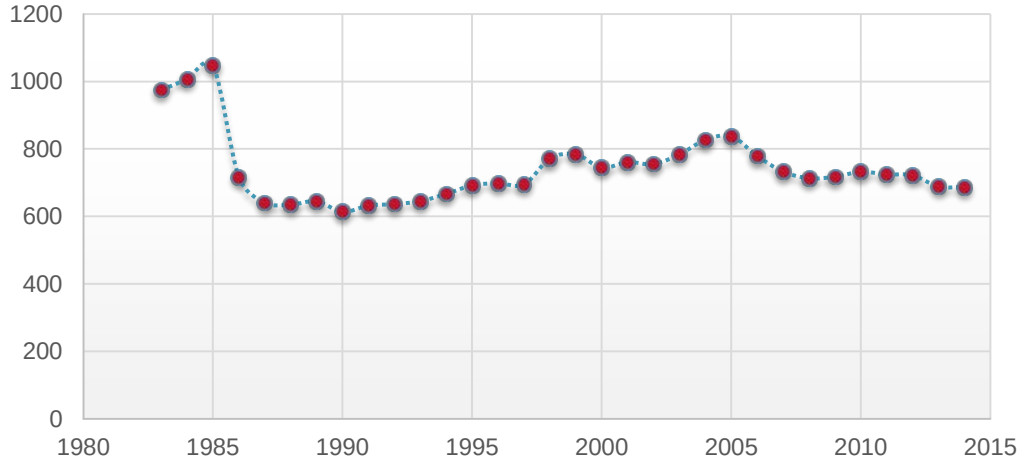
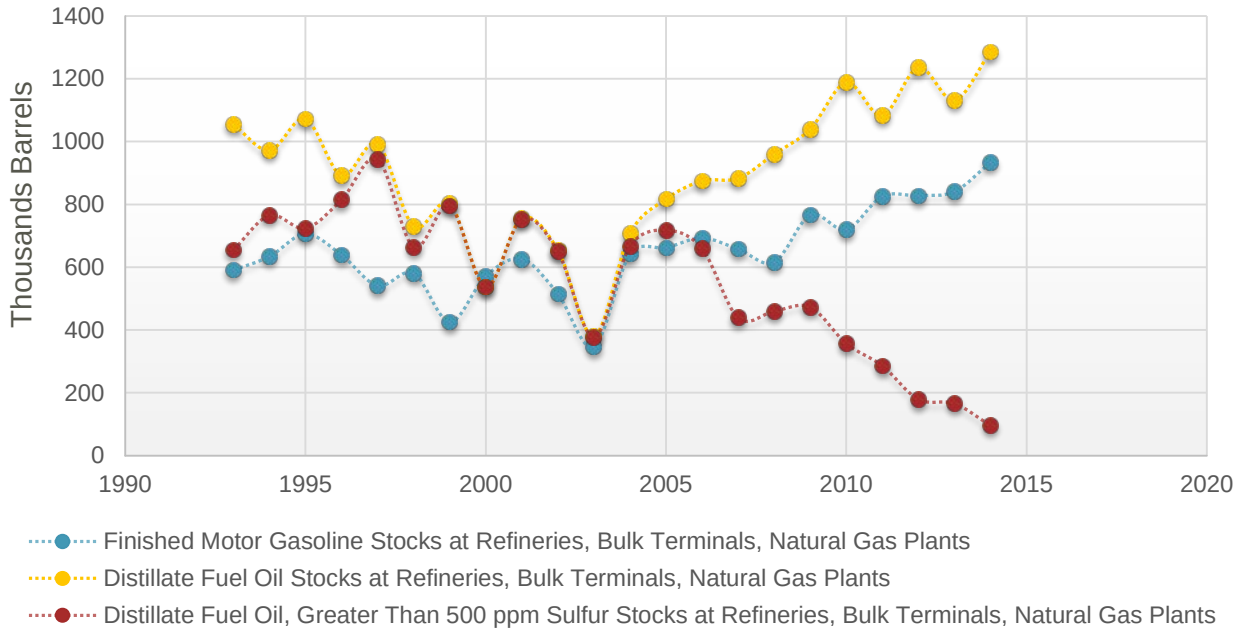


Figure 31 illustrates the variation in stocks at refineries, bulk terminals, and natural gas plants since the early 1990s in Alaska, by fuel type. All fuel stocks hit a low in the early 2000s, but distillate fuel oil stocks at refineries increased significantly and finished motor gasoline stocks increased moderately in the following 15 years (2000 to 2014). Distillate fuel oil with over 500 ppm sulfur began to phase out in Alaska starting in 2005. These figures show that Alaska has had relatively stable gas prices and a substantial fuel stock over time to 2014.

Figure 31: Alaska Stocks at Refineries, Bulk Terminals, and Natural Gas Plants



7 Information & Energy Strategies

Given the issues identified above for bottlenecks, level of service, and capacity, safety and security, and fuel and energy, this section presents a review of the potential information and energy strategies that may help mitigate freight transportation system infrastructure and operational issues in the region and to provide potential considerations for recommendations in later tasks of the AMATS FMS.

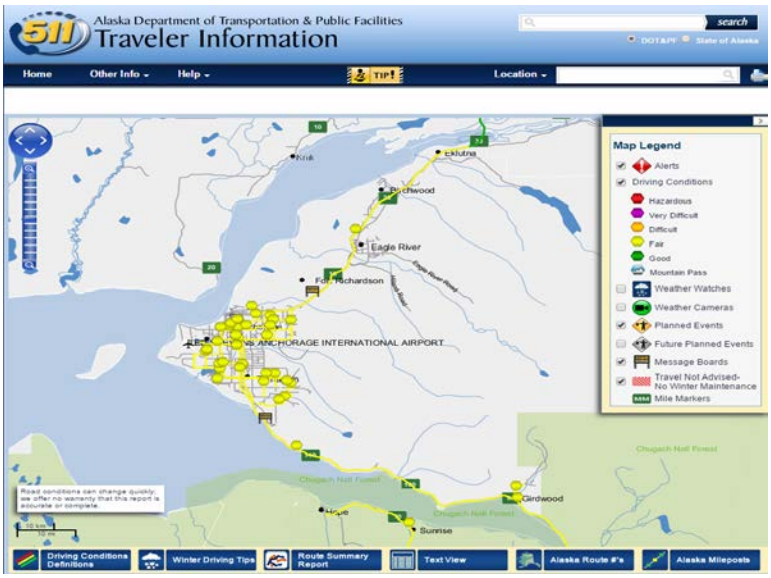
7.1 Intelligent Transportation Systems

In 2005, the DOT&PF initiated an effort to update the Alaska Iways or Intelligent Transportation System (ITS) Architecture. ITS technology is helpful to travelers by providing real-time travel and weather information and helping agencies make operations and maintenance assistance more efficient, and helping travelers know when and how to avoid congestion or poor travel conditions.

The Road Weather Information System (RWIS) maintained and operated by DOT&PF is a component of Iways. RWIS includes a network of meteorological and pavement sensors located along the highway system. These stations provide the DOT&PF, regional agencies, and the traveling public alike with observations for forecasts. RWIS is specifically effective in identifying the need for deploying snowplows or anti-icing/de-icing chemicals on the highways.

As another part of Iways, the DOT&PF and regional agency partners developed a program called the 511 Traveler Information Program to relay real time information about highway system performance to the traveling public and managing agencies. Alaska has the 511 Traveler Information Program, which provides real-time information both online and through smartphone applications. The system provides information including specific roadway warnings, atmospheric information, pavement conditions, as well as wind and temperature conditions. Users can also view current and planned events that may impact roadway system performance. Figure 32 illustrates the 511 Traveler Information interface in Anchorage.

Figure 32: Screenshot of 511 Traveler Information Program[32]



[32] ADOT&PF. 511 Traveler Information. (2015). http://511.alaska.gov/alaska511/mappingcomponent/index

The 2015 Implementation Plan Update to the 2005 Anchorage Regional ITS Architecture identified the near- and medium-term projects in Table 17. Long-term plans will depend on cash flow and funds available. Data archive service improvements will help maintain an awareness of commercial vehicle traffic in the region and help system management and future planning endeavors. Improvements for arterial management, traveler information, and roadway maintenance and construction will serve to improve traffic flows and reduce truck travel time. Additionally, Highway-Rail Intersection (HRI) Warning Systems and maintenance vehicle priority will improve safety for highway freight movements. Transit operation improvements may affect movements on the supply chain by attracting choice riders and thus moving passenger vehicles from the highway, particularly along the Glenn Highway/Seward Highway corridor.

Table 20: 2015 Anchorage Regional ITS Architecture Update Projects

Term	Archive Data Services	Arterial Management	Traveler Information	Roadway Maintenance and Construction	Transit Operations
Near (0-3Y)	Data Archive Investigation (assessment of data archiving to promote multi-agency sharing)	Traffic Operations Center (identify needed functions, configurations, implementation plan)	Highway-Rail Intersection (HRI) Warning Systems (implement near highway-rail intersections	Signal Priority for Maintenance Vehicles (allow maintenance vehicles priority in addition to transit)	Transit Technology Refresh (MOA transit onboard technology updates)
	Common GIS (support of the common MOA GIS platform)	Closed Circuit Television (expand the coverage of cameras in MOA)			Multi-modal Trip Planner (involves smartphone app and organization coordination)
	Shared Traffic Database (shared database for traffic data)	Traffic Signal Controller Upgrade (upgrade signal controllers)	Traveler Information Website (display real-time data sources available/ proposed)	RWIS Data Sharing (share RWIS information with Maintenance staff for action)	Transit Signal Priority (additional locations)
	Integration with DOT&PF Traffic and Roadway Conditions Entry System (reduces reporting time)	WiFi/Bluetooth Detection for Travel Time (design and implement pilot study)			Fare Payment (recharge their transit accounts on-line and/or through a smartphone app)
Mid (3-5Y)	Data Archive Implementation (implement the outcome of the data archive investigation)	None	Parking Management (provide parking occupancy and availability information)	None	Intelligent Transit Stops (kiosks, real-time info, alternate routes)
			Advanced HRI Warning Systems (integrate positive train control with HRI systems near highway-rail intersections)		
Long (5Y)	Dependent on Funding/Cash Flow				

As part of the Alaska Iways Architecture Update, the DOT&PF released the IT Project Implementation Plan for the Glenn Highway Corridor in 2008. The plan covered the 10-year period from 2008 through 2018 and provided guidance on institutional coordination and technical integration of ITS in support of the Glenn Highway from downtown Anchorage north to Matanuska-Susitna.[33] The study identified the following as "desired improvements" specific to commercial vehicles:

- **Permitting Information:** provide electronic access of commercial vehicle permitting information to avoid delay;
- **Commercial Vehicle Safety Checks:** include stop points for vehicle being weighed and inspected; and
- **Hazardous Materials Tracking:** track hazmat trucks to ensure that if an incident occurred, emergency responses would be followed immediately and tracked suspicious activity.

As part of the Alaska Iways Architecture Update, the DOT&PF also released an IT Project Implementation Plan for the Seward Highway Corridor in 2008. Similar to the Glenn Highway Corridor plan, the Seward Corridor plan describes institutional coordination and technical integration of ITS along Seward highway from downtown Anchorage to Town of Girdwood from 2008 through 2018. The study identified the following as "desired improvements" specific to commercial vehicles:

- **Customized Commercial Vehicle Operations Information:** provide traveler information specifically relevant to commercial vehicles, including weight/speed restrictions, constructions/weather updates, permit requirements, and weigh station information.

Recommendations for each plan were categorized as short term (0 to 3 years for completion), midterm (3 to 5 years for completion), and long term (5 to 10 years for completion). The recommendations drawn from these corridor studies overlapped in many areas, as they each relate back to the statewide ITS update plan. The following bullets list the recommendations by timeframe for both the Glenn Highway and Seward Highway plans:

Short Term (Estimated Completion 2011):

- Bridge Scour Monitoring and Retrofit Project;
- Geographic Information Systems (GIS) Development Project;
- Weigh-in-Motion Equipment Project;
- Highway Data Equipment Acquisition and Installation Project;
- Intelligent Transportation Systems Implementation Project;
- Intelligent Transportation Systems Operations and Maintenance Project;
- Maintenance Management System Project;
- Traffic Control Signalization Program;
- ITS Automated Operating System Project;
- Anchorage Integrated Roadnet (Phase 2) Project;
- People Mover Fleet Improvement and Support Equipment Project;
- Transit Management Information Systems Project;
- Wideband Multi-media Mobile Emergency Communications Pilot Project (Specific to Glenn Highway Corridor);

[33] ADOT&PF. Alaska Iways Architecture Update. (2008). http://dot.alaska.gov/iways/documents/GlennHwy-Corridor-ITS-Plan.pdf

- Glenn Highway Corridor: MP 5 – Parks Highway Interchange, ITS Project (Specific to Glenn Highway Corridor); and
- Seward Highway (Anchorage to Girdwood) ITS Project (Specific to Seward Highway Corridor).

MIdterm (Estimated Completion 2013):

- Incident Management Plan;
- Environmental Sensor Station Study and Expansion;
- Camera Planning Study and Expansion;
- Dynamic Message Sign Planning Study and Expansion;
- Assessment and Feasibility of Public/Private Partnerships;
- Traffic Speed Sensor Planning and Implementation;
- Fog Detection and Warning System Planning Study and Deployment (Specific to Glenn Highway Corridor);
- Highway Advisory Radio Planning Study and Expansion (Specific to Seward Highway Corridor); and
- Avalanche Risk Assessment Study and Countermeasure Deployment (Specific to Seward Highway Corridor).

Long Term (Estimated Completion 2018):

- Variable Speed Limit Initiative;
- Regional Traffic Management Center Initiative; and
- Lane Control System Initiative (Specific to Glenn Highway Corridor).

Given the amount of time since the publication of the Glenn and Seward Highway Corridor ITS implementation plans in 2008, the short- and mid-term projects are completed or are close to completion. Long-term projects are programmed to be implemented by 2018.[34] Future improvements may consider the permitting and hazardous material tracking as a freight consideration, as well as implementation of ITS on other major facilities in the region.

The 2035 AMATS MTP describes Anchorage's progress in deploying the Commercial Vehicle Intelligent Systems Network (CVISN), which utilizes electronic weigh-in motion systems, automated vehicle classification count stations, motor carrier safety inspection data exchange, electronic oversize or overweight permit processing, and wayside safety detection and warning systems.

7.2 Energy Strategies

Given the uncertainty behind fuel prices and availability, it is important for AMATS to constantly assess ways to reduce dependency on fuel. There are various techniques outlined by the US Environmental Protection Agency and by the FHWA to help reduce emissions in everyday transportation. The following bullets outline different strategies that may be applicable to Anchorage to help reduce freight travel and resulting vehicle emissions:

- **ITS and Commercial Vehicle Information Systems:** The addition of additional ITS technology in Anchorage will help make trucking more efficient. As travel time for trucks decreases, so will the need for fuel.

[34] Alaska Department of Transportation and Public Facilities. Alaska Iways Architecture Update (2008). http://dot.alaska.gov/iways/documents/GlennHwy-Corridor-ITS-Plan.pdf

- **Automation Technology:** Given the high level of investment in ITS improvements and enhancements on the Anchorage system, the region is increasing equipped to accommodate automated vehicle travel. Robust information systems infrastructure helps to pave the way for commercial vehicle automation and platooning. These types of automated technology will assist in reducing fuel by decreasing travel time through operational efficiency.
- **Low Emission/Electric Trucks:** While setting regional or statewide requirements for vehicle emissions standards is a challenging and lengthy regulatory process, AMATS does have the opportunity to encourage and incentivize the use of lower emissions vehicles and potentially electric vehicles as the technology continues to improve. Additionally, Federal programs also exist to support the reduction of freight vehicle emissions. For example, the Smartway Truck Initiative administered by the FHWA and EPA assists businesses in enhancing the fuel economy of truck fleets to encourage sustainable supply chains. Over the past decade, SmartWay partners helped to reduce consumption by over 120 million barrels of oil, prevent emission of over 51 million metric tons of CO2, and lower fuel expenditures by over $16 billion.[35]
- **High-Efficiency Freight Facilities:** Energy improvements should include a review and assessment of freight facilities. Measures to reduce on-site fuel and energy uses include a range of strategies including anti-idling regulations, the use of LED lighting, to the use of fuel efficient vehicles and on-site machinery.
- **Waterways:** Maritime and inland waterway shipments require less fuel. Alaska is already a leader in maritime freight movement. Maintaining high percentages of freight moving by water and encouraging mode shifts to waterborne cargo, given the capacity increase at Port of Anchorage, will help reduce dependency on fuel.[36]
- **Clustering Industrial/Transport Facilities:** Reducing the overall net energy used in the development of a facility or during the life-cycle of an improvement is an initiative that the MOA and AMATS should support.
- **Aircraft:** According to a report recently published by the California Environmental Protection Agency, “opportunities exist to move [the air transport] sector toward a 90 percent reduction in NOx and an 80 percent reduction in GHG emissions.”[37] Aircraft technology is on the rise. As mentioned in this report, the increase of fuel economy on new air fleets will reduce through-traffic at TSAIA. These improvements overall, however, will be paramount to reducing the industry’s dependence on jet fuel.

Anchorage is a very fuel-reliant region, given high amounts of petroleum and jet fuel coming into the Port of Anchorage. By reducing the need for fuel where possible and integrating technology both for travel demand management and vehicle/vessel fuel economy, the region may be able to reduce the reliance on fuel imports.

[35] US EPA. SmartWay. http://www3.epa.gov/smartway/
[36] US Department of Energy. Freight Transportation Demand: Energy-Efficient Scenarios for a Low-Carbon Future. (2013). http://www.nrel.gov/docs/fy13osti/55641.pdf
[37] California Environmental Protection agency Air Resources Board. Sustainable Freight: Pathways to Near-Zero Emissions. (2015). http://www.arb.ca.gov/gmp/sfti/Sustainable_Freight_Draft_4-3-2015.pdf

8 Key Conclusions & Next Steps

A summary of the key trends critical for consideration in the continued development of the AMATS FMS are presented below:

- **Population and Economic Growth:** The AMATS region is likely to experience moderate increases in population and employment over the next few decades. Manufacturing will most likely remain a very small sector in Anchorage, so the region will continue to depend on imports to support future growth and markets. Mining and retail trade show recent climbs in employment, indicating the potential to increase freight movements/demand in the region. The location of the Port of Anchorage and TSAIA near key distribution centers in the region indicates that Anchorage will remain a strong transportation distribution center for Alaska. The presence of JBER offers a relatively consistent economic driver in the region; however, uncertainty related to future troop reductions could impact the local population, employment, freight patterns, and ultimately the state's funding allocation for transportation.
- **Land Use Development:** The land use analysis shows that industrial facilities often cluster together, particularly for near major freight generators including the Port of Anchorage, ARRC Rail Yard, and TSAIA, as demonstrated in the three new industrial reserve land use areas. The review of local agency plans identified the importance of coordinated land use planning, emphasizing industrial clusters to prevent industrial development from impacting residential or similarly sensitive residential oriented land uses.
- **Port of Anchorage Modernization:** The modernization effort at the Port of Anchorage may enhance the Port's ability to attract new clientele and additional growth. The modernization project would maintain a 35-foot draft with the capability of safely going to 45 feet when necessary, which will ensure large vessel access at the Port. Replacing both petroleum and cargo terminals will improve the Port's resiliency. Enhancing facilities to prepare for seismic events also strengthens the safety and security aspects of the Port. The incorporation of modernized technology and operational efficiency measures would also render the Port more competitive. Discussions of an "Industrial Center" near the Port would help to consolidate freight movement in the region. Recent tonnage trends at the Port are stable and are expected to remain stable for the near future. The Port of Anchorage modernization project will develop a safe and efficient Port facility for commercial use that is able to meet today's needs and accommodate future growth if and when it occurs.
- **TSAIA Growth:** TSAIA is an economic driver in Alaska and the region, employing a significant number of local residents. TSAIA continues to be in the top five airports in the world (and second in the US) for air cargo movements and receives recognition for its operations. TSAIA will continue to function as a through-point for international air travel as current fuel economy requires a mid-point stop. TSAIA would benefit from increased fuel storage to assist in peak travel times. Recent TSAIA improvements brought the facility beyond current standards. Additional tenants would help to attract additional business at the airport. Anticipated growth in tonnage at the Port ranges from 2-5% annually.
- **Highway Project Improvements:** Future year truck estimations show a significant increase in overall truck movements. Most long haul traffic stems to and from the Port and most short haul traffic involves TSAIA, industrial districts, and medical facilities. Highway infrastructure projects including the suggested improvements to Seward and Glenn Highways and the Knik Arm Crossing will help regional improve congestion and reduce freight bottlenecks. Focusing

on last-mile connections near intermodal facilities and around existing and potential industrial clusters will be critical to maintaining swift operations at these key freight generators and attractors. Addressing the current freight problems areas is also necessary to improve overall freight movement in Anchorage. Delayed truck arrival times can consequently cause bottlenecks at intermodal facilities including ARRC terminals, the Port, and TSAIA.

- **Freight Rail Growth:** ARRC operates as a critical link from the Port of Anchorage to other areas in the region and state from Seward up to Fairbanks. The potential growth in freight rail movement will potentially help divert truck traffic off the road, specifically hazardous materials. ARRC indicates interest in opportunities in markets such as gravel, coal export, trailers, bulk commodity items, and long haul operations to Fairbanks, the Lower 48, and Prudhoe Bay. ARRC also noted interest in increasing development of Birchwood Industrial Park located between Birchwood and Eagle River to support gravel operations. Increased use of rail to move bulk or heavy-weight commodities may help minimize truck congestion. The high number of at-grade crossings in the region may pose a concern for both rail and truck operations as well as transportation system safety.
- **Pipeline Trends:** Pipeline infrastructure in the area is currently sufficient. No major capacity or safety concerns are anticipated over the next two decades.
- **Fuel and Energy Trends:** Current fuel stocks in Alaska appear sufficient into the future. However, fuel availability and prices have been historically volatile in the region and have significant impacts on the freight market. AMATS cannot predict and prepare for future fuel pricing shifts, but the agency can encourage reduced dependency on fuel. Consideration of energy-reduction strategies and highway ITS systems will help to reduce fuel consumption as a method of reducing dependency.

The next steps in the development of the AMATS FMS will include a deeper analysis of trends using the regional travel model and a subsequent analysis of the strengths, weaknesses, opportunities, and threats (SWOT) analysis to be performed later in Task 6. These findings will ultimately be used to help identify deficiencies in the local and regional freight transportation system. The identification of deficiencies will ultimately inform the recommendations for projects, policies, and programs of the FMS.

Exhibit 1: Major Freight Generators

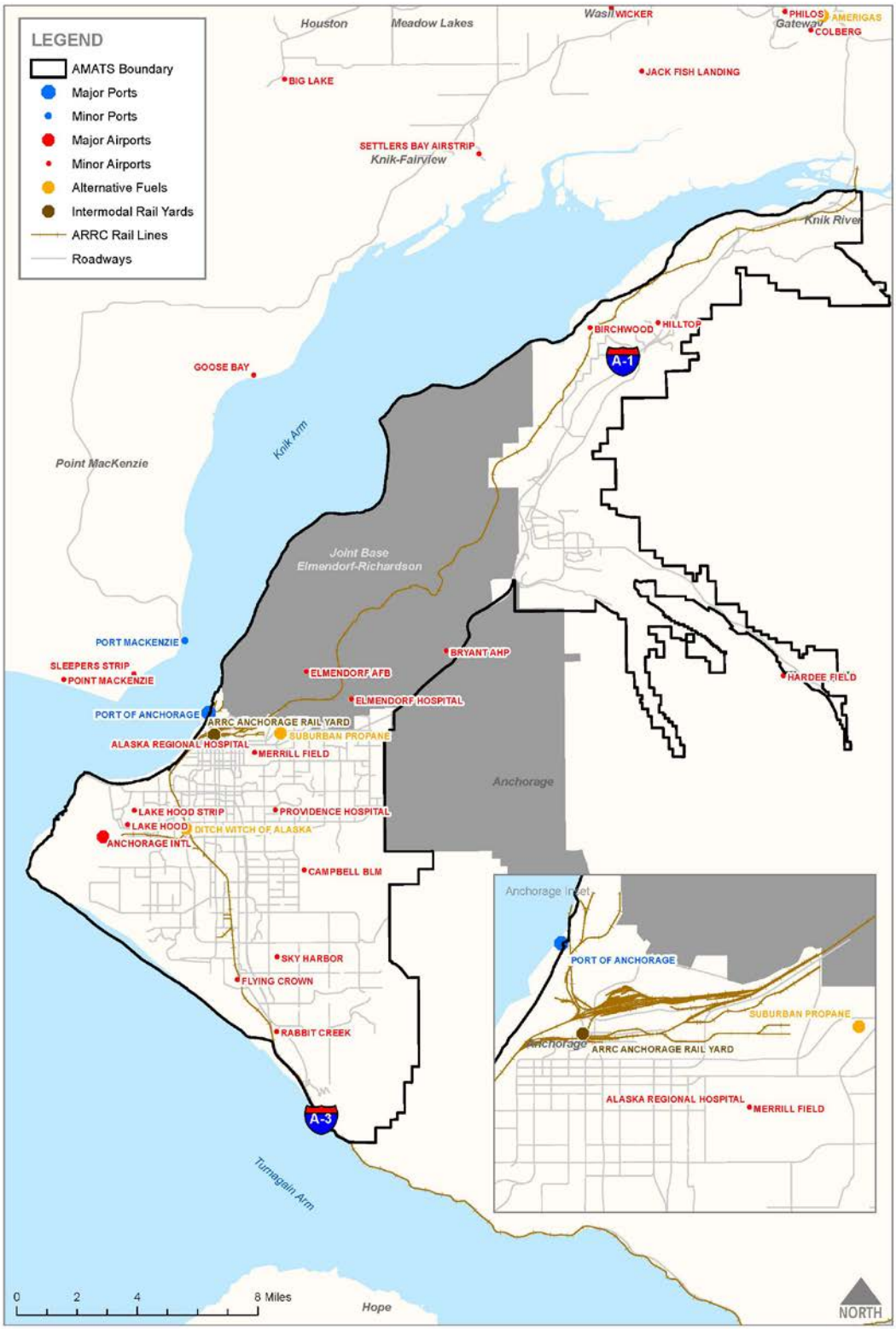


Exhibit 1: Major Freight Generators

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

Exhibit 2: Water Cargo Facilities

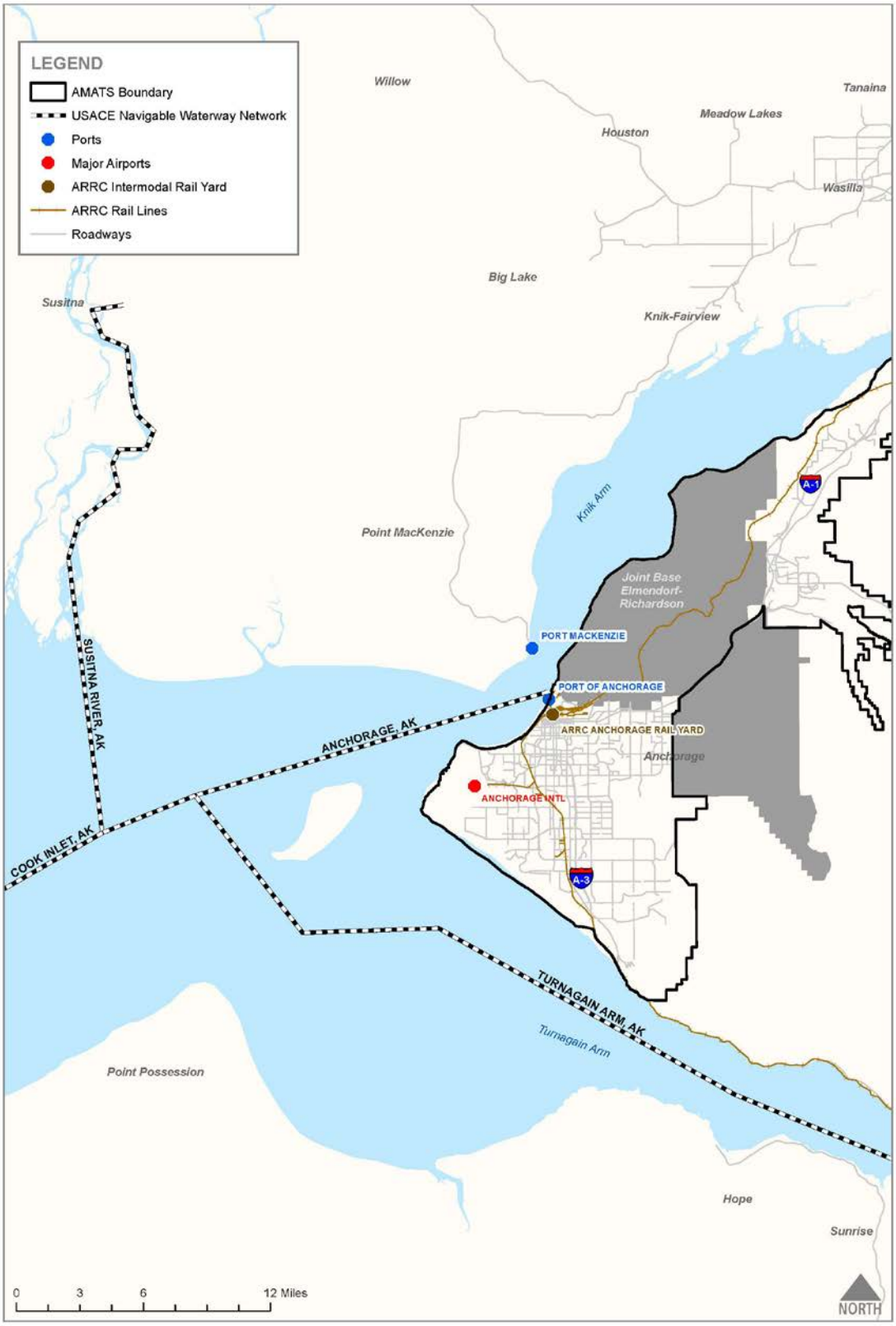


Exhibit 2: Water Cargo Facilities

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

Exhibit 3: Highway Facilities

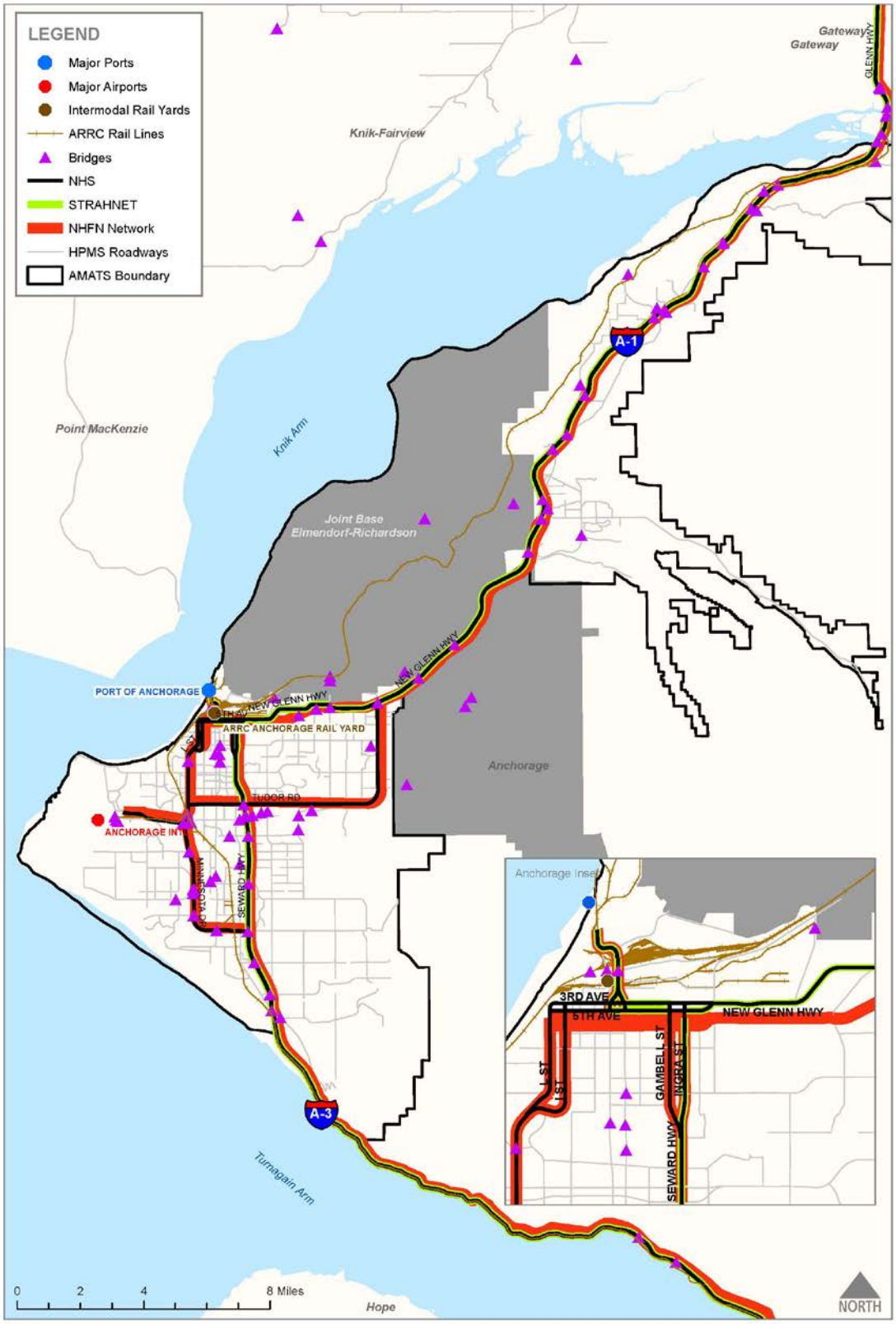


Exhibit 3: Highway Facilities
Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

Exhibit 4: Local Freight & Oversized Routes

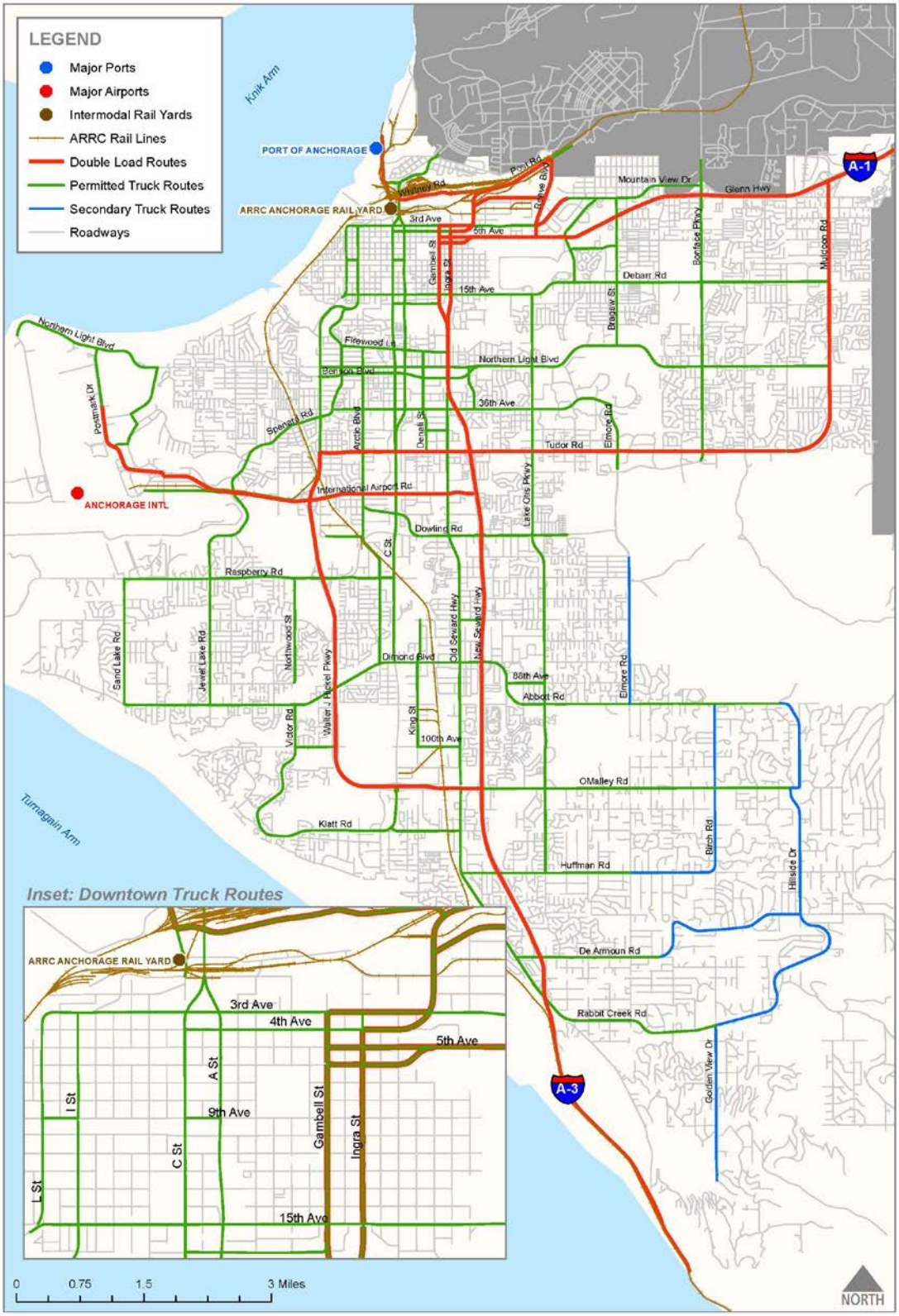


Exhibit 4: Local Freight & Oversized Routes

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

Exhibit 5: Pipeline Facilities

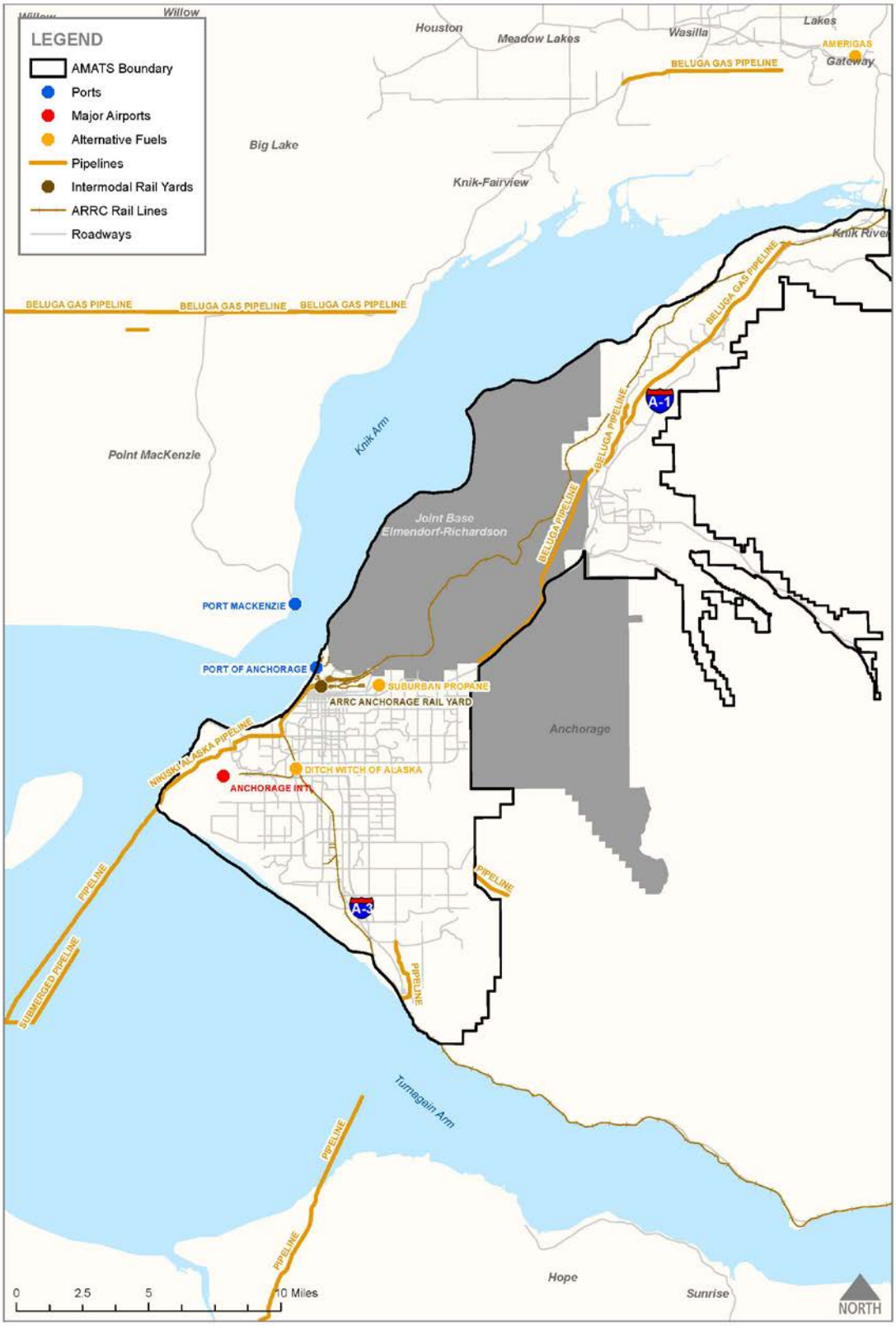


Exhibit 5: Pipeline Facilities

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

Exhibit 6: Bridge Clearances

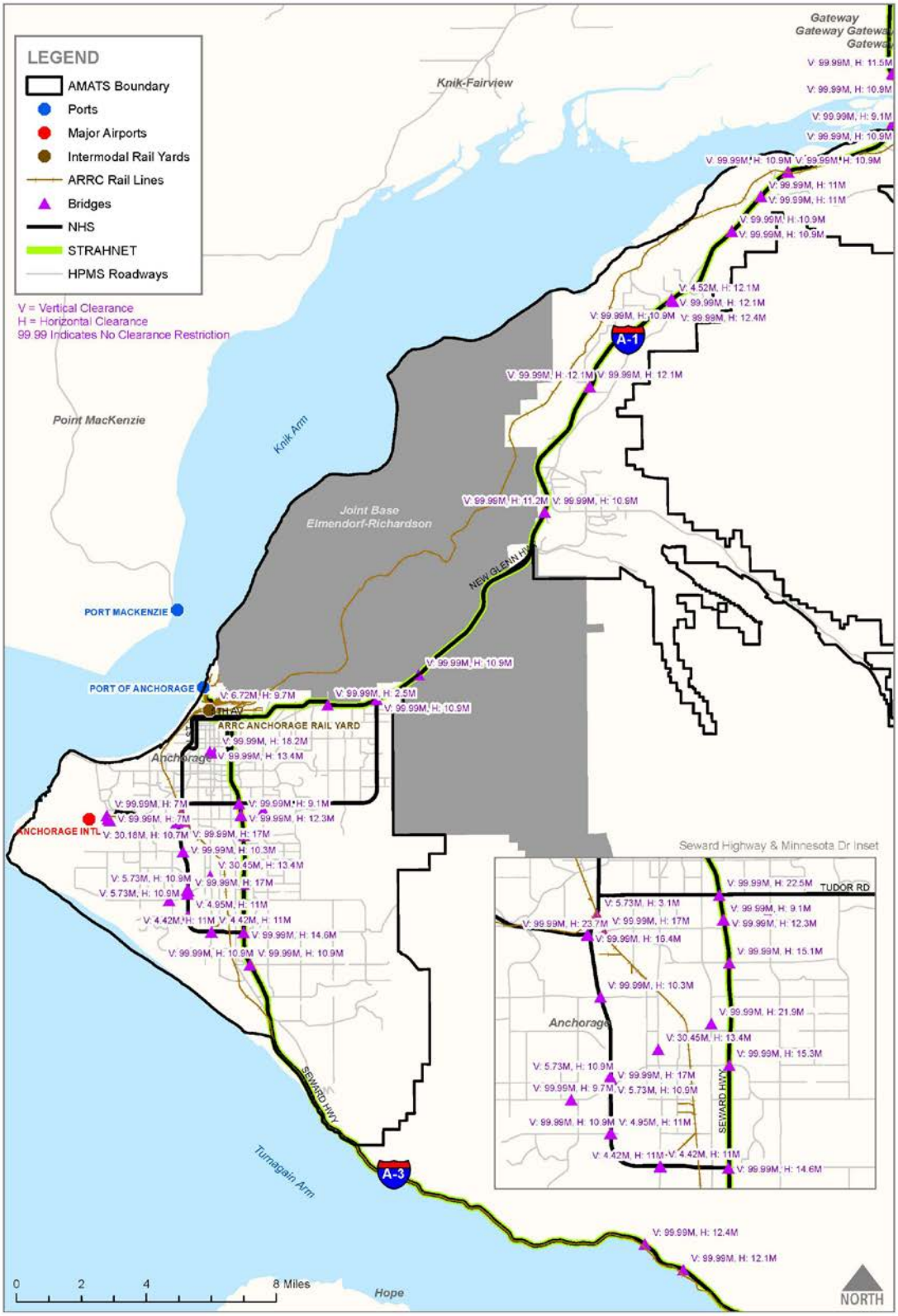


Exhibit 6: Bridge Clearances

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

Exhibit 7: At–Grade Crossings

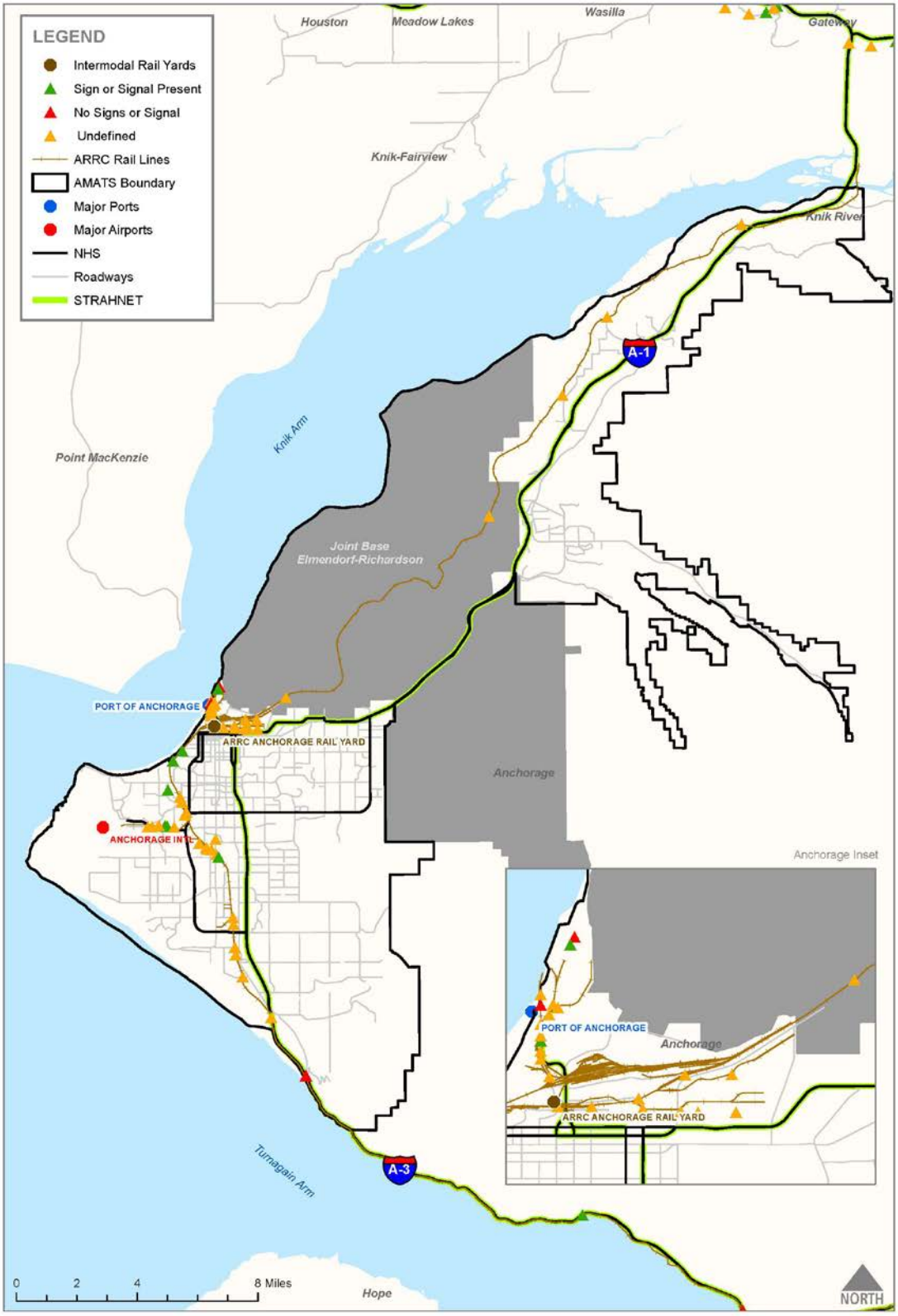


Exhibit 7: At-Grade Crossings

Data: Shapefiles from Municipality of Anchorage/National Transportation Atlas Database

Task 6.4 Freight Trends and Forecasts

AMATS Freight Mobility Study

Prepared for

AMATS

Prepared by

RSG with HDR

Anchorage, AK
March 15, 2016

Contents

Tables

Figures

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1 Introduction

The following memorandum describes freight forecasts for the Anchorage Metropolitan Area Transportation Solutions (AMATS) Freight Mobility Study (FMS) study area using two primary forecast resources. The following bullets outline these forecast methodologies as they appear in this document:

- All Modes: Federal Highway Administration's (FHWA) Freight Analysis Framework (FAF)
- Highway Cargo: Combined Methodology Using ATRI Data and the AMATS Travel Demand Forecast Model

2 All Modes

The FAF version 4 reflects the 2012 Commodity Flow Survey conducted as a part of the US Economic Census. This is the most up-to-date version of the data, so the data was used for statewide analysis in the FMS. Freight movement data is reported in FAF for water, air, highway, rail, and pipeline modes.

It is important to note that the FAF data represents statewide flows and this data must also be reviewed with on-the-ground knowledge. Because Alaska is geographically separated from the 48 contiguous states and only 31% of the state's 15,178 miles of roadway are paved, mode split is not as truck- or rail-heavy as in other states.
According to the 2012 data, water and truck cargo comprise high percentages of the domestic mode share, 46% and 30% respectively. Air is the highest share of international imports (30%). Truck is the highest share of international exports (28%). This high percentage of international truck movement encompasses trade with Canada. For all movements collectively, waterborne cargo comprises the highest share. The data in Table 1 summarizes these flows by mode.

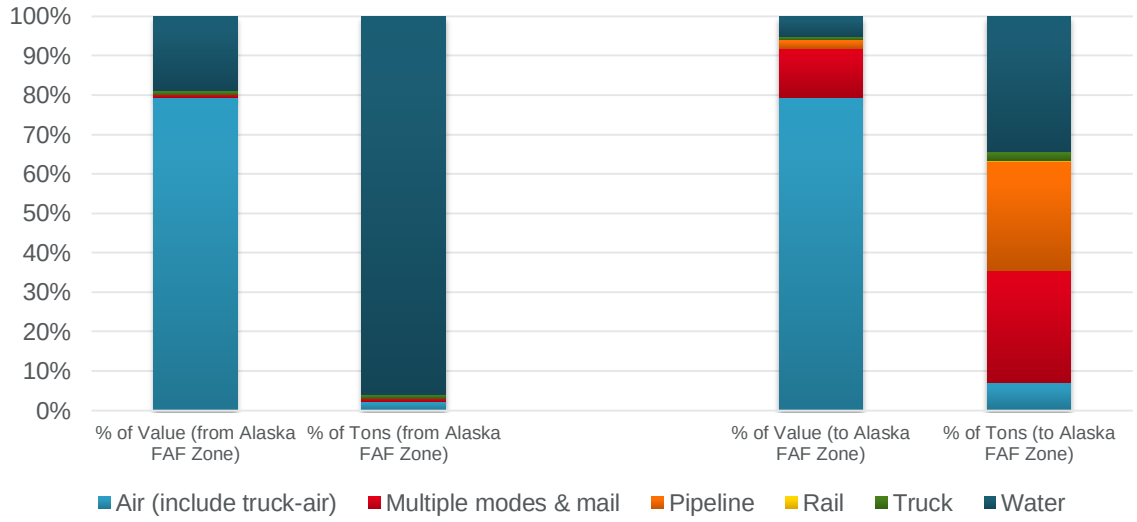
Figure 1 and Figure 2 show the 2012 mode share data based on the FAF4 estimates.

Table 1: 2012 Alaska Freight Flows by Mode (KTons)

Trade	Mode	Within AK	From AK	To AK	Total	Mode Share
Domestic	Truck	18,154	231	123	18,508	29.5%
	Rail	3,099	3	-	3,102	4.9%
	Water	310	26,555	2,181	29,046	46.3%
	Air (include truck-air)	108	15	68	191	0.3%
	Multiple modes & mail	111	133	991	1,235	2.0%
	Pipeline	8,731	-	1,907	10,638	17.0%
	Total	**30,513**	**26,937**	**5,270**	**62,720**	**100%**
Imports	Truck	800	25	13	838	26.2%
	Rail	236	1	19	256	8.0%
	Water	488	1	55	544	17.0%
	Air (include truck-air)	349	603	21	973	30.4%
	Multiple modes & mail	9	6	160	175	5.5%
	Pipeline	418	-	-	418	13.0%
	Total	**2,300**	**636**	**268**	**3,204**	**100%**
Exports	Truck	1,022	12	14	1,048	27.9%
	Rail	636	1	1	638	17.0%
	Water	226	71	133	430	11.4%
	Air (include truck-air)	126	29	399	554	14.7%
	Multiple modes & mail	3	84	818	905	24.1%
	Pipeline	183	-	-	183	4.9%
	Total	**2,196**	**197**	**1,365**	**3,758**	**100%**

Figure 1: Summary of 2012 Statewide Freight Flows By Mode – Domestic/Import/Export

Figure 2: 2012 Value and Tonnage by Mode and Direction



The top commodities moving within the state in 2012 included ‘coal n.e.c.,’ ‘gasoline,’ and ‘gravel.’ The top commodity leaving the state was ‘crude petroleum,’ which constitutes about 95% of outgoing commodities. Finally, ‘crude petroleum,’ ‘base metals,’ and ‘mixed freight’ comprised the majority of incoming commodities. Of the over $236,000 million value of commodities moving within, from, and to the state, 32% of this value moved internally within Alaska, 41% was outbound from Alaska, and 27% was inbound to Alaska. Table 2 describes commodities by direction.

Table 2: 2012 Top Commodities by Direction (KTons) to/from Alaska

Top Commodities	Within	%	Top Commodities	From	%	Top Commodities	To	%
Coal-n.e.c.	7,867	22%	Crude petroleum	26,489	95%	Crude petroleum	3,405	49%
Gasoline	5,752	16%	Electronics	313	1%	Base metals	827	12%
Gravel	4,454	13%	Meat/seafood	237	1%	Mixed freight	697	10%
Fuel oils	3,279	9%	Articles-base metal	144	1%	Gasoline	217	3%
Live animals/fish	2,773	8%	Textiles/leather	96	0%	Other foodstuffs	171	2%
Nonmetal min. prods.	2,433	7%	Misc. mfg. prods.	58	0%	Nonmetal min. prods.	166	2%
Coal	2,333	7%	Furniture	56	0%	Machinery	151	2%
Logs	1,536	4%	Machinery	55	0%	Basic chemicals	145	2%
Waste/scrap	715	2%	Mixed freight	48	0%	Meat/seafood	143	2%
Meat/seafood	416	1%	Wood prods.	36	0%	Electronics	110	2%
All Commodities	**35,008**	100%	**All Commodities**	**27,768**	100 %	**All Commodities**	**6,904**	100 %

Because USDOT recently released the new version of FAF data (FAF4), there currently are no forecasts available with the updated 2012 CFS. The previous version of FAF (FAF3.4) was reviewed and used to support the forecasts for this analysis. It is important to recognize that there are slight differences in commodity structuring between the two versions but there is a difference in the underlying data. Therefore, direct comparisons between the base (2012) and future (2040) forecast years were not measured.

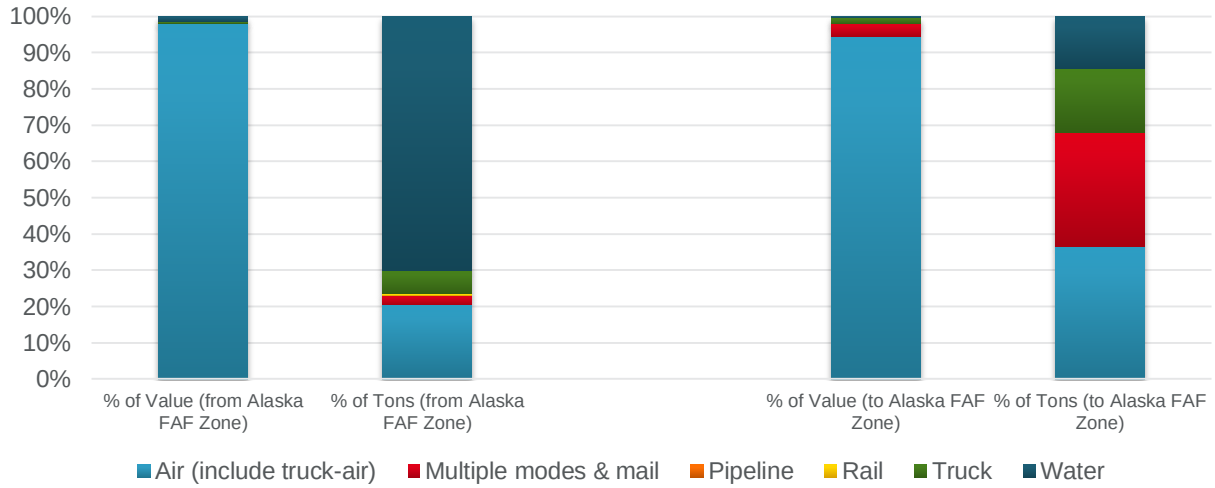
According to 2040 projections, water and truck cargo comprise high percentages of the domestic mode share, 33% and 46% respectively. Air is the highest share of international imports (64%), while water has the highest share of export movements (37%). For all movements combined, truck cargo comprises the highest share at 36% followed by waterborne cargo with a 32% share. The data in Table 3 summarizes these flows by mode. Figures 3 and 4 show the 2040 mode share data based on the FAF3.4 estimates.

Table 3: 2040 Alaska Freight Flows by Mode (KTons)

Trade	Mode	Within AK	From AK	To AK	Total	Mode Share
Domestic	Truck	20,252	828	731	21,811	46.1%
	Rail	2,197	14	-	2,211	4.7%
	Water	1,167	13,630	874	15,671	33.1%
	Air (include truck-air)	211	16	46	273	0.6%
	Multiple modes & mail	124	673	1,811	2,608	5.5%
	Pipeline	4,756	-	-	4,756	10.0%
	Total	**28,706**	**15,162**	**3,461**	**47,329**	**100%**
Imports	Truck	346	686	155	1,187	13.3%
	Rail	37	0	13	50	0.6%
	Water	1,339	417	3	1,758	19.7%
	Air (include truck-air)	-	5,757	2	5,759	64.5%
	Multiple modes & mail	7	6	56	69	0.8%
	Pipeline	102	-	-	102	1.1%
	Total	**1,829**	**6,866**	**229**	**8,924**	**100%**
Exports	Truck	3,285	326	271	3,882	21.0%
	Rail	4,185	80	2	4,268	23.1%
	Water	1,008	5,840	78	6,926	37.4%
	Air (include truck-air)	-	3	2,367	2,370	12.8%
	Multiple modes & mail	245	112	202	559	3.0%
	Pipeline	497	-	-	497	2.7%
	Total	**9,220**	**6,361**	**2,921**	**18,502**	**100%**

Figure 3: Summary of 2040 Statewide Freight Flows By Mode – Domestic/Import/Export

Figure 4: 2040 Value and Tonnage by Mode and Direction



The top commodities predicted to move within the state in 2040 included ‘crude petroleum’ ‘gravel,’ and ‘coal.’ The top commodity leaving the state are forecasted as ‘crude petroleum,’ which constitutes about 42% of outgoing commodities – which is significantly less tonnage than in 2012 when crude petroleum comprised 95% (26,489 ktons) of outbound commodities. FAF estimates that ‘metallic ores’ and ‘machinery’ will comprise higher percentages of the state’s outbound tonnage in 2040. Finally, ‘coal-n.e.c.,’ ‘machinery,’ and ‘mixed freight’ comprised the majority of incoming commodities.

Table 4: 2040 Top Commodities by Direction (KTons) to/from Alaska

Top Commodities	Within	%	Top Commodities	From	%	Top Commodities	To	%
Crude petroleum	5,961	15%	Crude petroleum	11,801	42%	Coal-n.e.c.	1,367	21%
Gravel	5,754	14%	Metallic ores	5,753	20%	Machinery	756	11%
Coal	4,614	12%	Machinery	2,156	8%	Mixed freight	591	9%
Nonmetal min. prods.	2,973	7%	Coal-n.e.c.	1,451	5%	Chemical prods.	395	6%
Fuel oils	2,935	7%	Electronics	1,161	4%	Meat/seafood	387	6%
Gasoline	2,646	7%	Live animals/fish	928	3%	Nonmetallic minerals	381	6%
Waste/scrap	2,403	6%	Nonmetal min. prods.	770	3%	Precision instruments	320	5%
Logs	2,284	6%	Fuel oils	631	2%	Nonmetal min. prods.	306	5%
Coal-n.e.c.	2,261	6%	Textiles/leather	453	2%	Articles-base metal	225	3%
Live animals/fish	1,897	5%	Plastics/rubber	336	1%	Electronics	222	3%
All Commodities	39,755	100%	All Commodities	28,389	100%	All Commodities	6,611	100%

3 Highway Cargo

Future truck freight movements for the Anchorage region were derived using information from the AMATS regional travel model. The current AMATS regional travel demand-forecasting model is in the process of being updated and enhanced. One of the main enhancements to the model is the development of a set of commercial vehicle models based upon the American Transportation Research Institute (ATRI) data and a state-of-the-practice non-goods movement commercial vehicle model. The commercial vehicle model for AMATS consists of two models designated by commercial vehicle trip type: (1) the long haul model component derived from ATRI truck GPS data and (2) the short haul model component derived from the commercial vehicle research done by FHWA. The short haul commercial vehicle model was developed to represent the number of light and medium trucks in the region making shorter trips, and the long haul commercial vehicle model was developed to represent the number of medium and heavy trucks making longer trips to/from/within the region.

At the time of writing this report for AMATS freight plan future freight trends, the AMATS travel demand model was not fully completed and validated. However, future year (2040) estimated long haul and short haul tables resulted from a pivoting, factoring and calibrating process (described below) were prepared for use in the Freight Mobility Study analysis. The future year truck origin/destination (OD) tables explained in this report are the OD tables that will ultimately be used for the highway assignment step of the model. They were developed using ATRI base year truck tables.

3.1 Base Year Data

Based on origin-destination data provided by ATRI, the zones identified as critical truck freight attractors/generators in Anchorage in 2014 include the following facilities (1) the zones containing TSAIA, (2) the zones containing the Port of Anchorage, (3) the zones containing the ARRC rail yard, and (4) the zones containing the major distributors just north of 3rd Avenue.

Figures 5 and 6 illustrate the trips generated by and attracted to each ATRI traffic analysis zone (TAZ) in the region for 2014. Figure 7 shows to and from trips combined to illustrate total trips for each TAZ in the Anchorage network.

Figure 5: Total Trips Generated at TAZ (Leaving TAZ), 2014

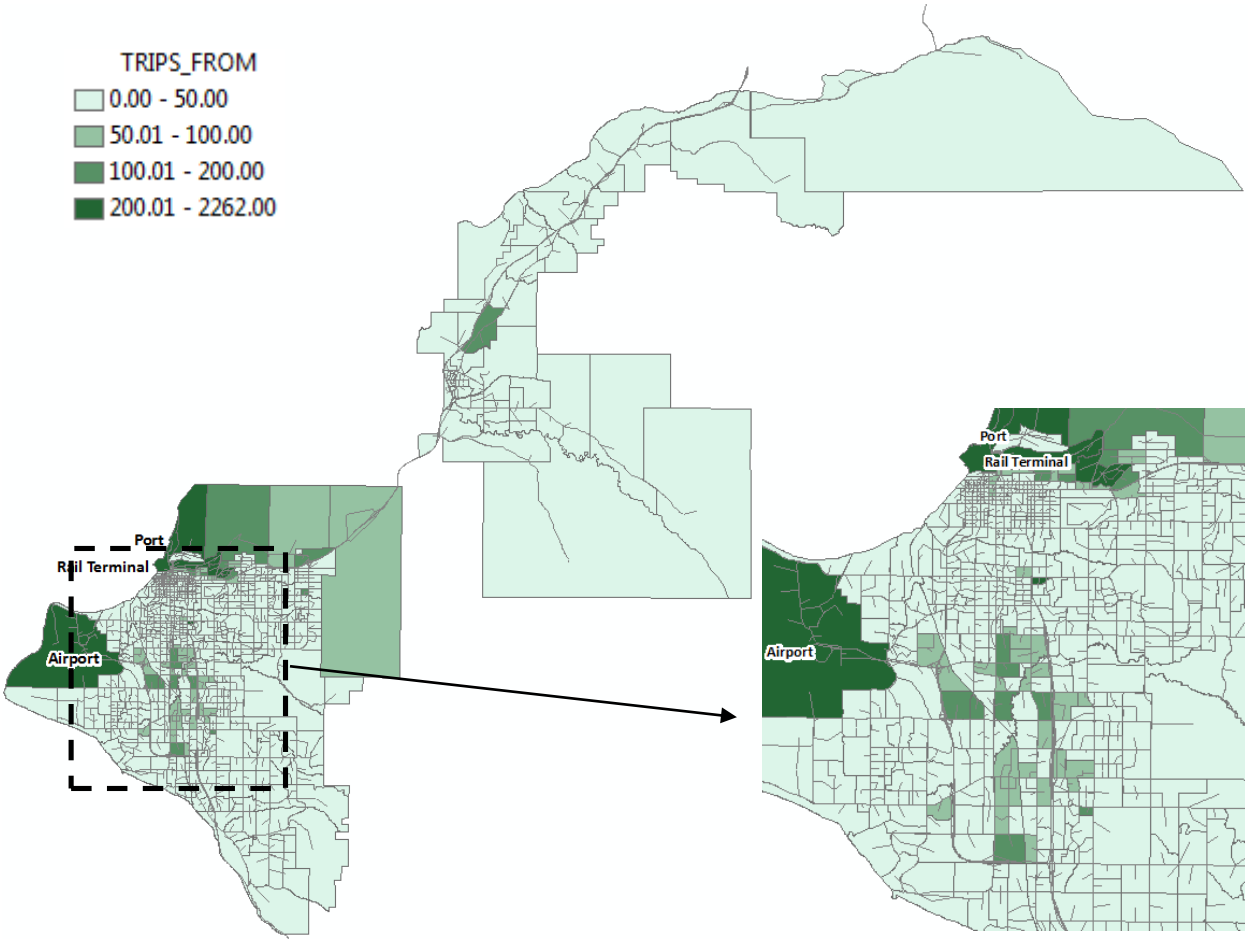


Figure 6: Total Trip Attracted to TAZ (Arriving at TAZ), 2014

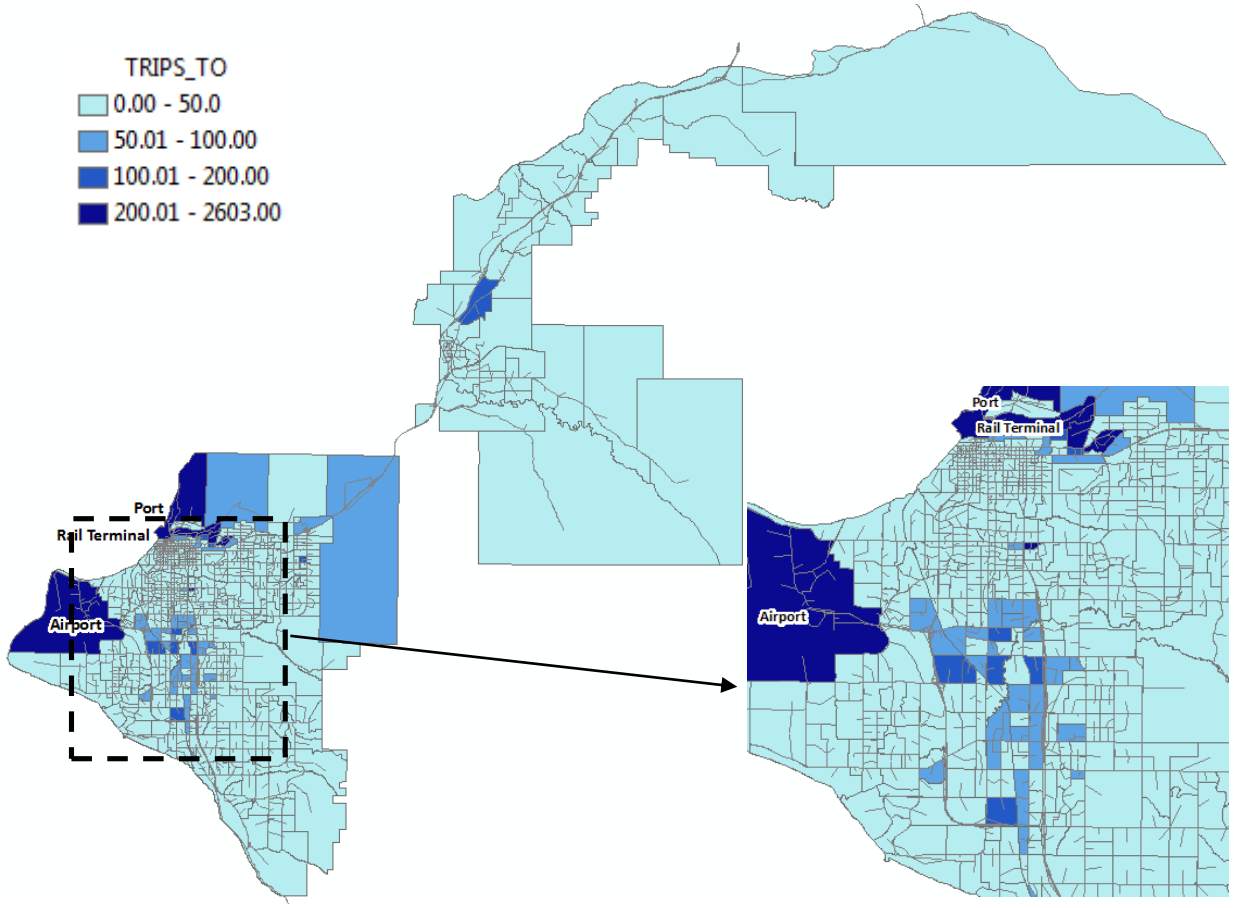
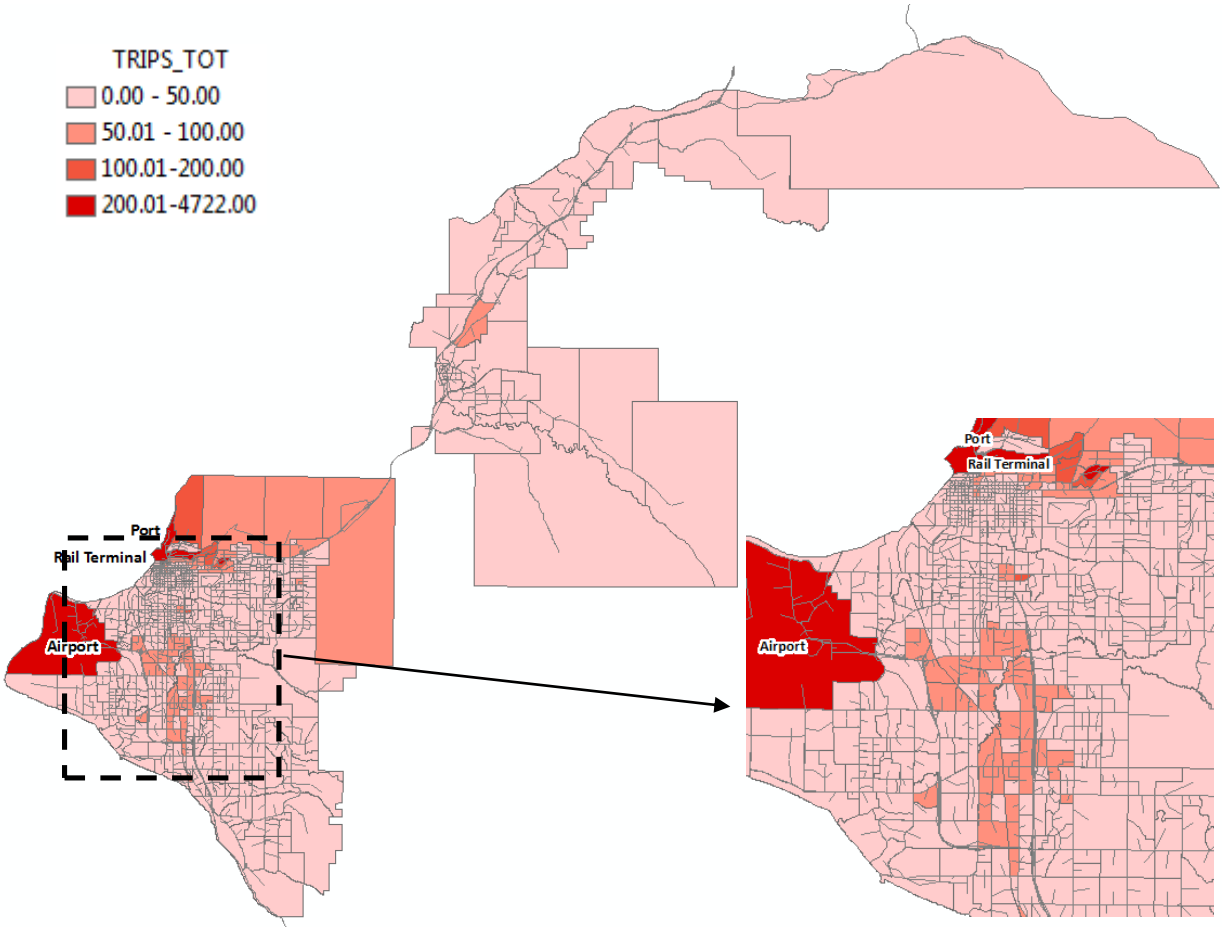


Figure 7: All Trips To/From TAZs, 2014



3.2 Future Year Estimates

3.2.1 Future Year Long Haul Commercial Vehicles

Developed future year commercial long haul vehicle traffic table for the AMATS model is pivoted off of the base year estimates using the "eight-case method" that was take from Daly, Fox and Tuinenga (2005) "Pivot-Point Procedures in Practical Travel Demand Forecasting."[1] In this approach, factor pivoting is applied for what is termed 'normal growth'. However, the eight-case method also uses additive pivoting, where the difference between future and base demand model predictions is applied to the base matrix for 'extreme growth' cases[2]. The base year long haul commercial vehicle traffic is derived primarily from factoring an origin-destination matrix prepared using the ATRI truck GPS data. For the AMATS study region, ATRI provided GPS locations of trucks operated by its member companies in the Anchorage and Mat-Su region for the months of March, June, August and November in 2014. This data matrix is factored, weighted and balanced[3] and then

[1] http://www-sre.wu-wien.ac.at/ersa/ersaconfs/ersa05/papers/784.pdf

[2] Please refer to the paper and/or AMATS Model specifications document

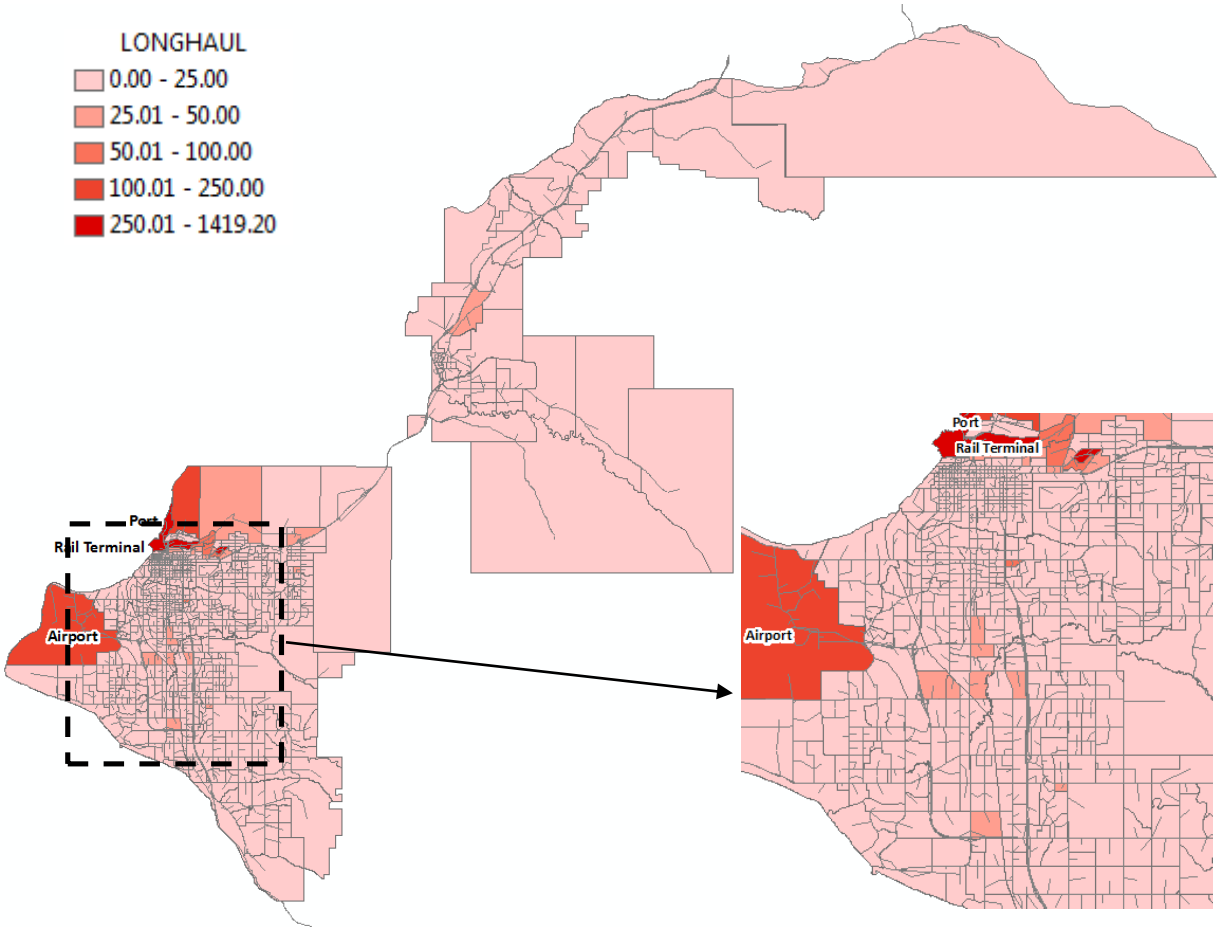
[3] For details, refer to AMATS Model specifications document.

assigned to the AMATS network. Moreover, in order to accurately predict traffic at the Port of Anchorage and the Rail Terminal next to the port TAZs in the base year, different factors were used to develop future year traffic. Table 5 shows future year long haul truck top TAZs by daily truck traffic. Figure 8 illustrates these trips by TAZ.

Table 5: Future Year Long Haul Truck Traffic (Top 5 TAZs by Number of Trucks)

TAZ	Daily Long Haul Trucks To/From
Port of Anchorage (Multiple TAZs)	725
Industrial Area W of Downtown/Various DCs/Lynden Transport (TAZ 63)	706
ARRC Terminal (Multiple TAZs)	439
Portion of Port Connected to JBER – Petroleum Movements (TAZ 369)	213
TSAIA (Multiple TAZs)	136

Figure 8: 2040 Estimated Long Haul Truck Trips



Long haul movements generally involve the Port of Anchorage and industrial districts. Port-related cargo requires heavier vehicles than that of other local movements. TSAIA has long haul trips, but not as frequently at short haul trips.

3.2.2 Future Year Short Haul Commercial Vehicles

Future year short haul commercial traffic for the AMATS model is developed using commercial vehicle trip rates adapted from Quick Response Freight Manual (QRFM) II. Those rates were adjusted in model calibration to produce the final trip rates. Long-haul truck data (such as ATRI) misses many commercial vehicle trips and some short-haul goods movement trips. The short-haul commercial vehicle model is developed to better account for these missing trips. The primary source for definition, model structure and parameters of the short haul commercial vehicle model comes from FHWA report, "Accounting for Commercial Vehicles in Urban Transportation Models"[4]. Commercial vehicles are grouped into three main categories based on what is being carried and the economic, demographic and land use factors influencing the magnitude and distribution of the commercial vehicle trips. These categories are:

- **Commercial Passenger (Moving People) Vehicles**– includes school buses, shuttle services, rental cars, taxis, and paratransit vehicles.
- **Freight (Goods) Vehicles**– includes mail delivery, trash collection, warehouse delivery, parcel pickup and delivery, and construction vehicles.
- **Services Vehicles** – includes household/building services such as plumbers and cleaning services as well as public safety, utility maintenance, and retail support functions.

The short haul commercial vehicle model assumes that the commercial vehicles described above do not include trips from outside the model region based on the understanding that the long-haul freight model captures the inter-regional movements.

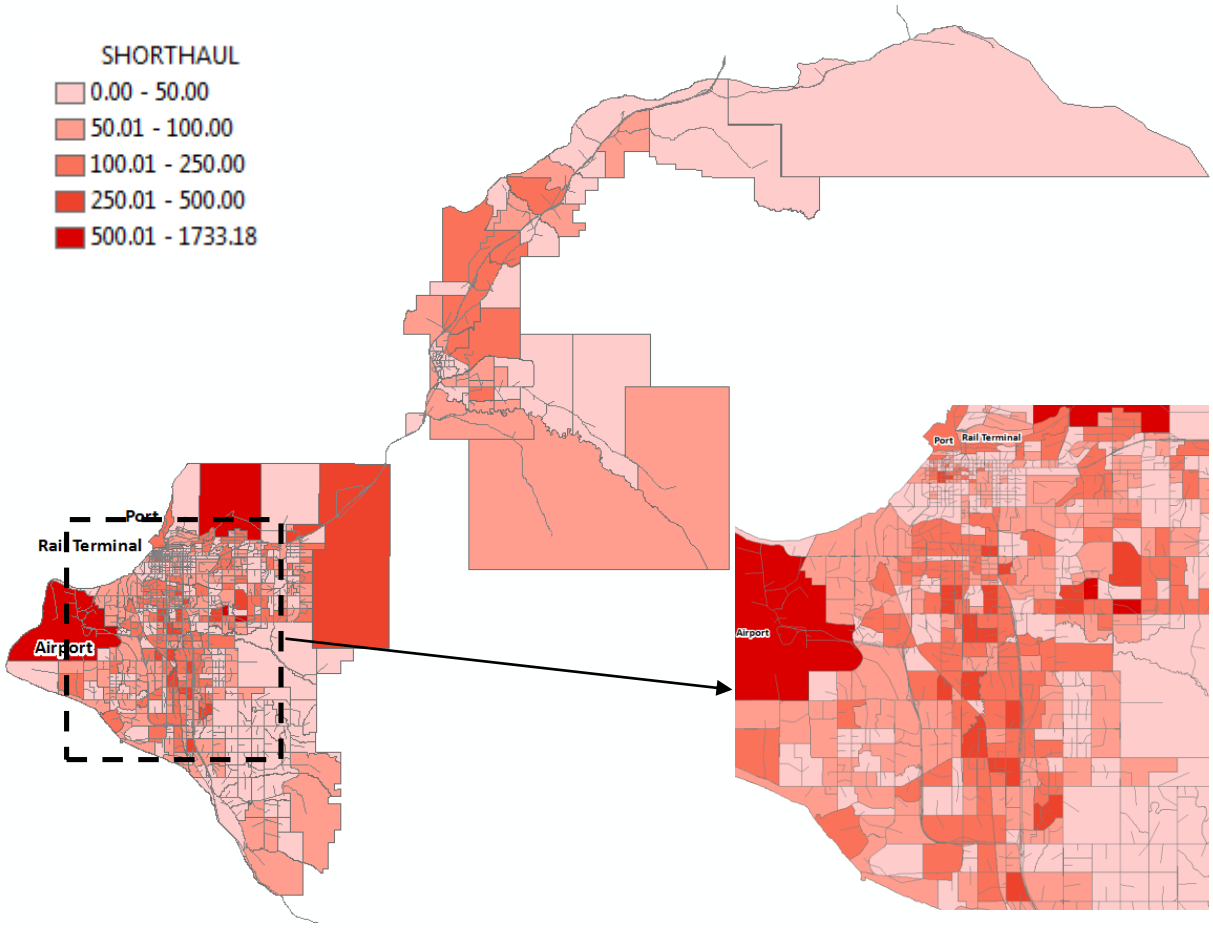
The information in Table 6 summarizes the top five short haul movement areas for 2040. Figure 9 illustrates 2040 short haul truck trips.

[4] https://www.fhwa.dot.gov/planning/tmip/publications/other_reports/commercial_vehicles_transportation/

Table 6: Future Year Short Haul Truck traffic (Top 5 TAZs by Number of Trucks)

Traffic Analysis Zone (TAZ)	Daily Short Haul Trucks To/From
TSAIA (Multiple TAZs)	1,733
JBER & Warehouse (TAZ 57)	824
Alaska Native Medical Center Hospital (TAZ 528)	761
Providence Hospital (TAZ 58)	650
Dimond Center (TAZ 138)	381

Figure 9: 2040 Estimated Short Haul Truck Trips



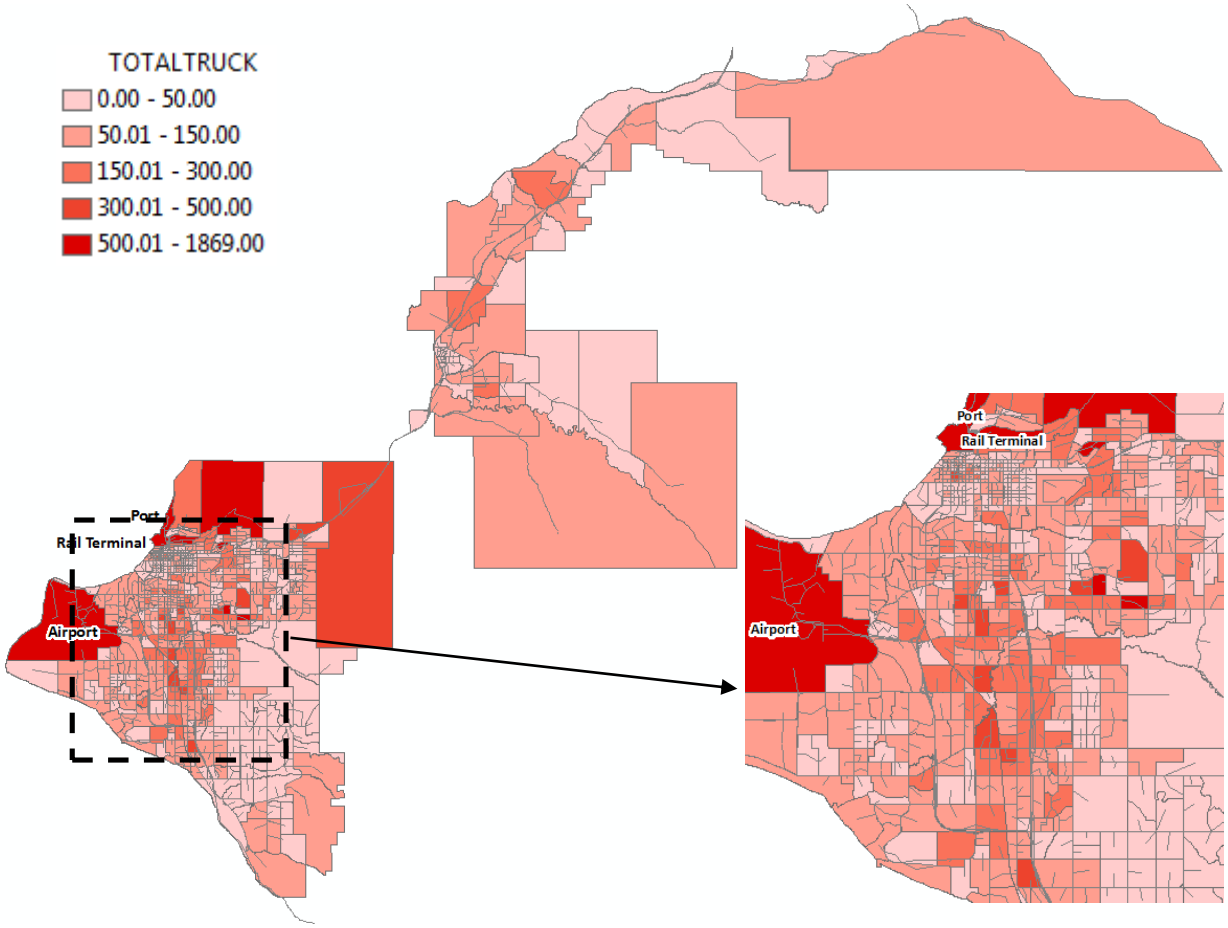
Short haul trips most commonly involve TSAIA movements and freight movement associated with medical facilities. JBER also attracts/generates significant short haul movements.

The data in Table 7 summarize 2040 truck trips for both short and long haul purposes. TSAIA, the Port of Anchorage, and JBER are the top three TAZs for overall trips. Industrial districts and medical facilities comprise the remaining top TAZs for freight movement. Figure 10 illustrates these movements by TAZ.

Table 7: Future Year Truck Traffic (Top TAZs by Number of Trucks)

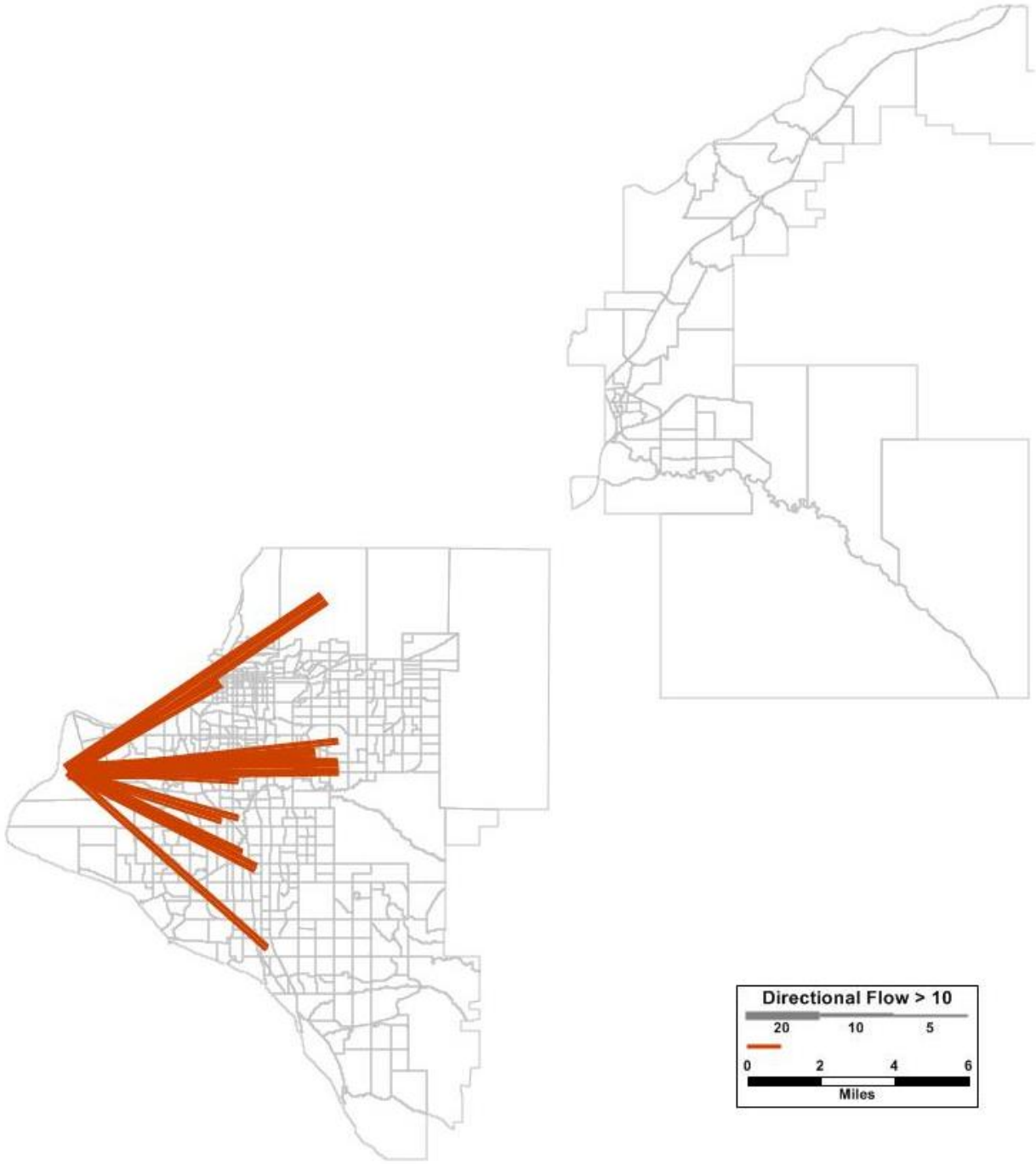
TAZ	Daily Trucks to/from
TSAIA (Multiple TAZs)	1,869
Port of Anchorage (Multiple TAZs)	930
JBER & Warehouse (TAZ 57)	850
Industrial Area W of Downtown/Various DCs/Lynden Transport (TAZ 63)	797
Alaska Native Medical Center Hospital (TAZ 528)	770
Providence Hospital (TAZ 58)	652
ARRC Terminal (Multiple TAZs)	516
Dimond Center (TAZ 138)	394
JBER & US Post Office *(TAZ 40)*	390
Various DCs (TAZ 134)	379

Figure 10: 2040 Estimated All Truck Trips



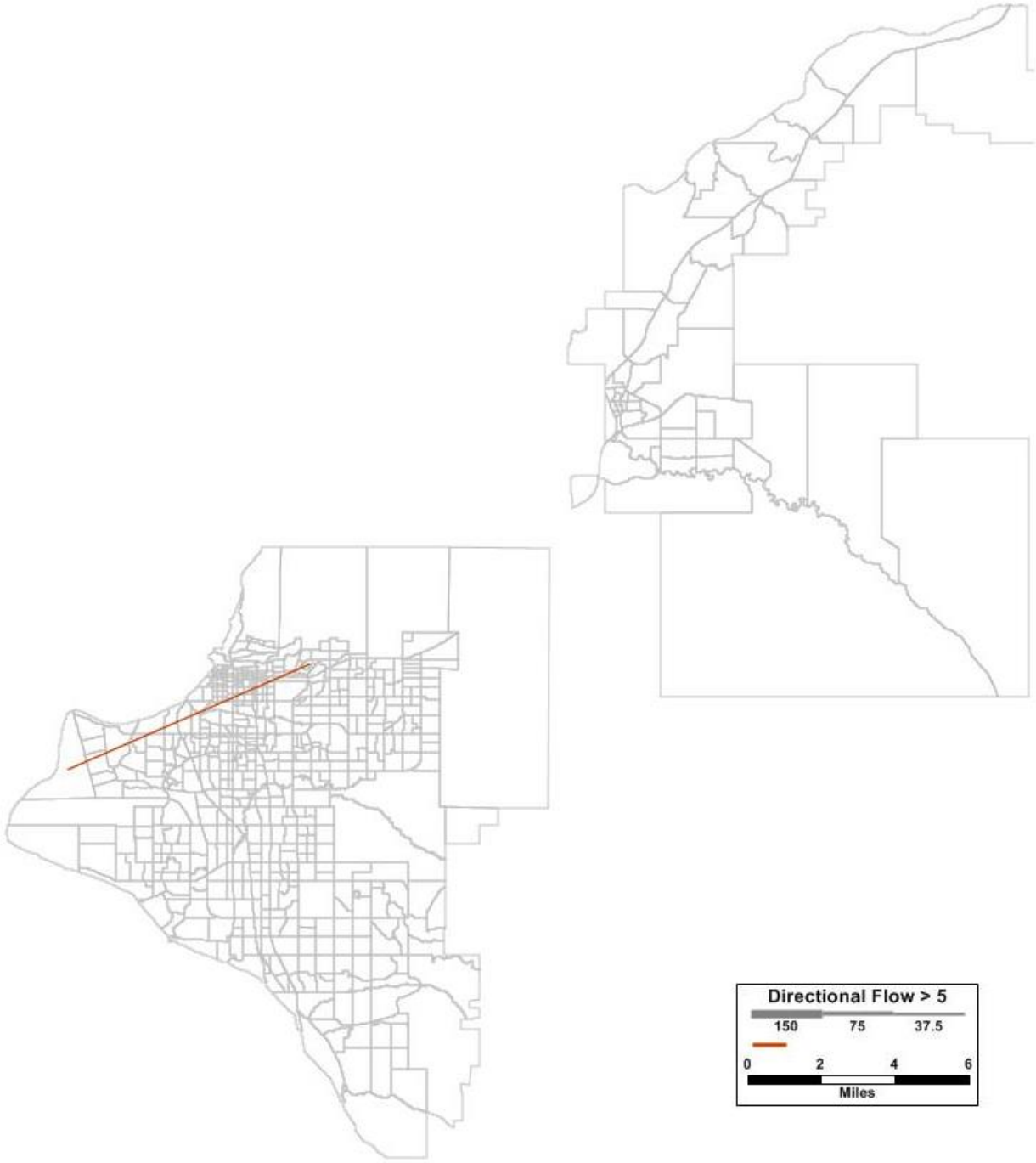
The desireline maps in Figure 11 and Figure 12 show estimated movements to and from TSAIA in further detail for short haul and long haul trips.

Figure 11: 2040 Short Haul Movements To/From TSAIA



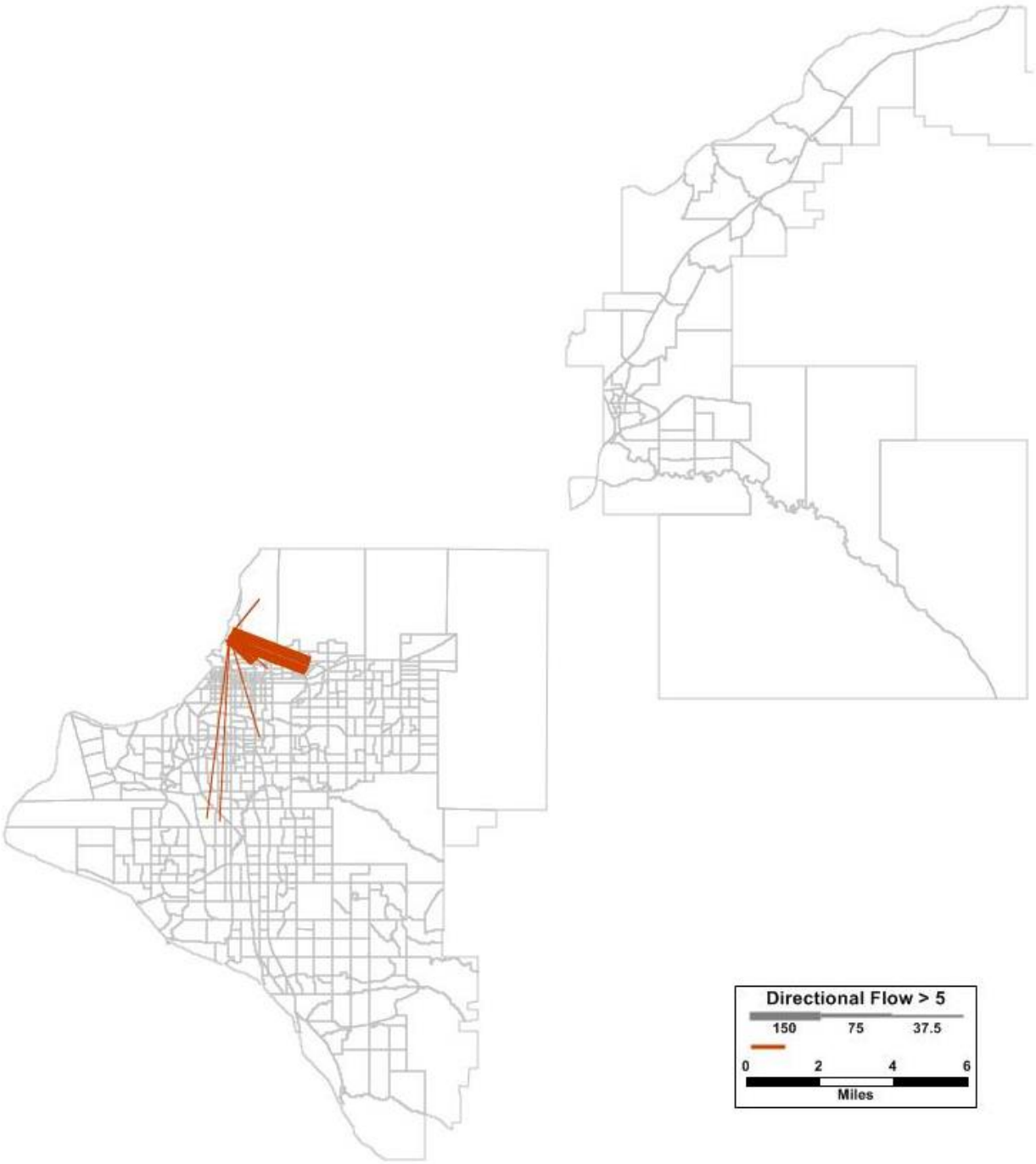
Estimated short haul movements from TSAIA show significant volumes on roadways within the Anchorage Bowl. Common origins/destinations include the Port of Anchorage, JBER, and industrial districts, as the desirelines show movements primarily to these areas.

Figure 12: 2040 Long Haul Movements To/From TSAIA



Long haul movements to and from TSAIA are less common, as aircraft do not generally move the large-scale cargo that require heavy trucks. The only major movement estimated for 2040 is from TSAIA to an industrial area in the northern portion of Anchorage.

Figure 13: 2040 Long Haul Movements To/From Port of Anchorage



2040 estimates did not predict any major short haul movements to or from the Port of Anchorage, as this area often requires medium to heavy vehicles to move larger amounts of tonnage. Figure 13 summarizes the long haul movements associated with the Port of Anchorage. Traffic to and from the Port generally targets industrial districts, including the same major industrial district area that supported long-haul movements from TSAIA.

Figure 14: 2040 Short Haul Movements To/From All TAZs

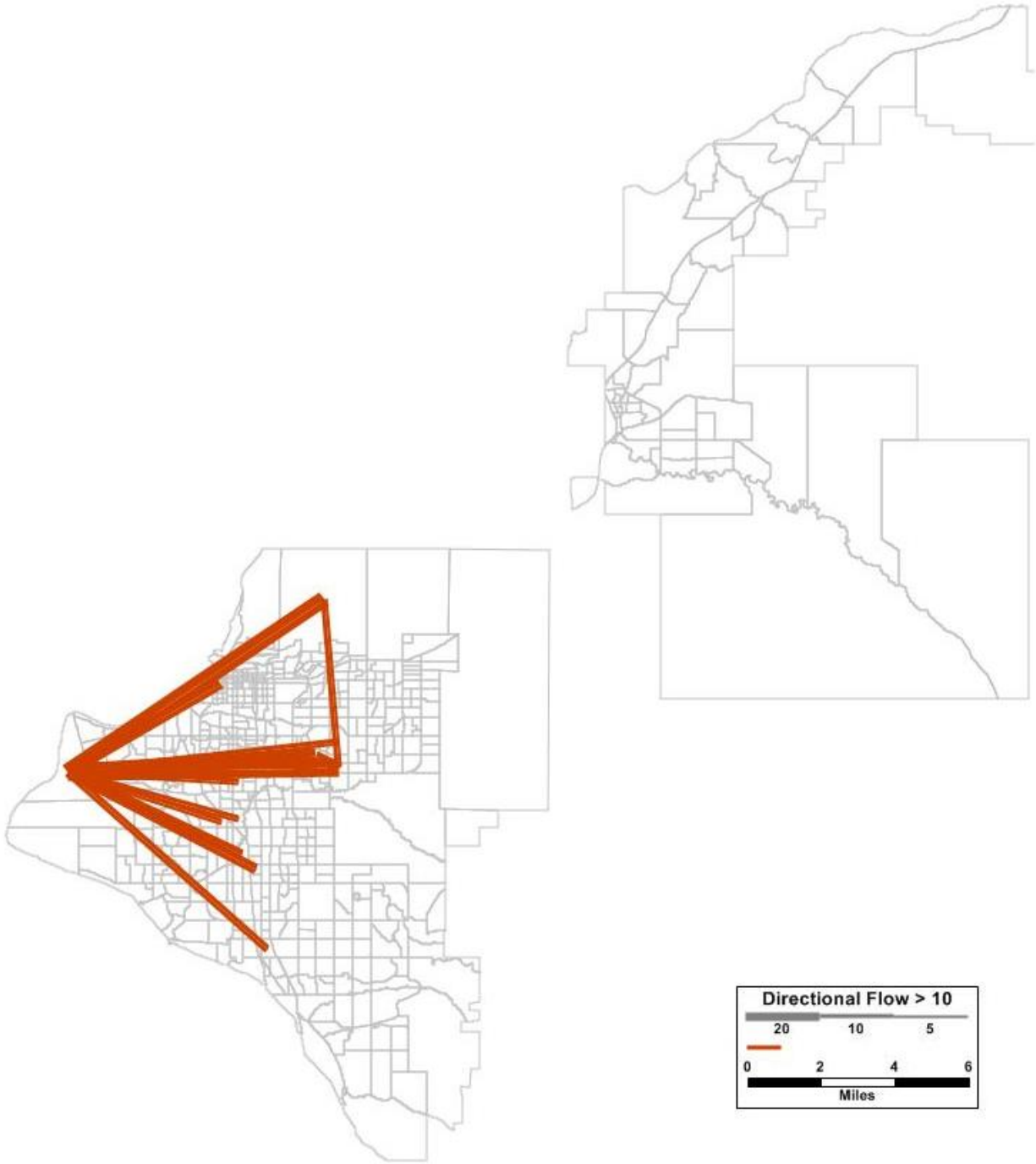


Figure 14 shows short haul movements estimated between all TAZs, predicting extensive movement to and from TSAIA, JBER, industrial districts, and medical facilities.

Figure 15: 2040 Long Haul Movements To/From All TAZs

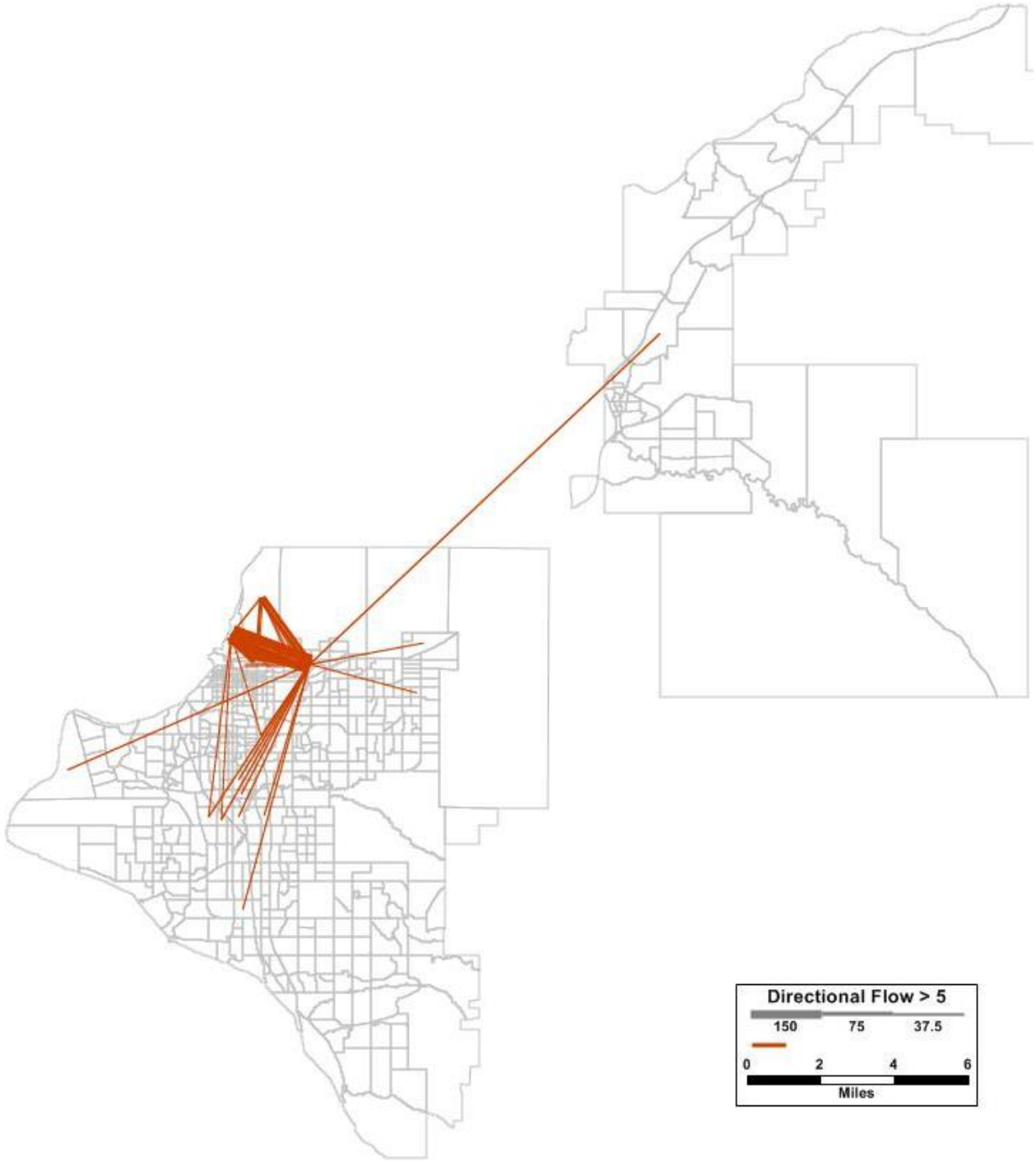


Figure 15 shows long haul movement estimates between all TAZs, suggesting major movements at the Port, as well as major movements to and from the major industrial district in the north portion of Anchorage.

Figure 16: 2040 Short & Long Haul Movements To/From All TAZs

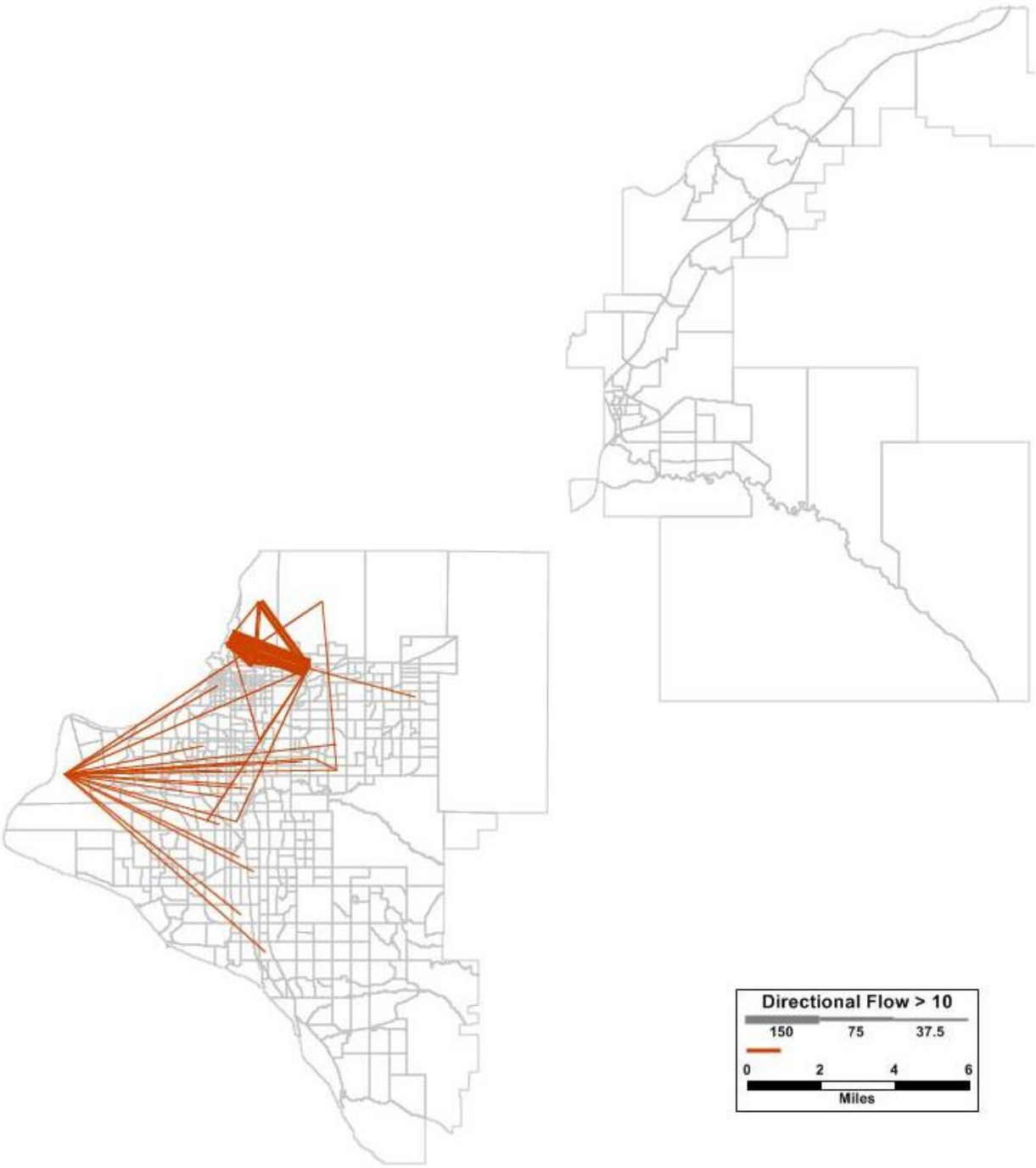


Figure 16 shows the combined short and long haul movement estimates to and from all TAZs in the region, suggesting that predicted major truck traffic patterns depend heavily on short haul trips to and from TSAIA and long haul trips to and from the Port of Anchorage.

4 Summary

The 2040 forecasts provided by FHWA's FAF reports and the ATRI/AMATS travel forecast model combined methodology provide the basis for freight forecasts in the Anchorage region. Because FAF data is provided on a statewide, rather than regional, basis the forecasts provided for modes other than truck will be supplemented by publications, estimates, and reports provided by both public and private regional entities.

This forecast information will be collectively provided in the Task 5.1 Freight Issues and Trends White Paper. Combined with supplemented by publications, estimates, and reports provided by both public and private regional entities, as well as on the ground knowledge from stakeholders, this information will guide the understanding of freight conditions and needs through the Anchorage FMS.

Task 6: AMATS FMS Development – Freight Analysis

AMATS Freight Mobility Study

Prepared for

AMATS

Prepared by

HDR with RSG

Anchorage, AK
May 25, 2016

Contents

Tables

Figures

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1 Introduction

In support of the Anchorage Metropolitan Area Transportation Solutions (AMATS) Freight Mobility Study (FMS), this report presents the Task 6: Freight Analysis. This report discusses implications of key local and regional freight issues and trends in Anchorage from the context of a **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats (SWOT) analysis. The contents of this report stem from the findings of the Task 4 Freight Profile and the Task 5 Freight Issues and Trends White Paper, prepared previously for the AMATS FMS study.

This report documents the following:

- **Strengths** include existing characteristics of the Anchorage freight system and conditions that support and strengthen the vision, goals, and objectives for the AMATS FMS.
- **Weaknesses** are presented as existing characteristics of the Anchorage freight transportation system that are deficient and may constrain the region's progress towards achieving the vision, goals, and objectives of the FMS.
- **Opportunities** include existing, future, and unrealized considerations that may positively influence progress towards achieving the vision, goals, and objectives of the FMS.
- **Threats** consider potential future issues that may impact the Anchorage freight transportation system and potentially inhibit progress towards meeting the vision, goals, and objectives of the FMS.

The last section of this report presents a summary of the different SWOT components and how they relate to the goals of the FMS.

2 Strengths

Strengths include existing characteristics of the Anchorage freight transportation system and conditions that will support the vision, goals, and objectives of the FMS. The strengths of the regional freight transportation system include:

- Balance of commodity flows;
- Port of Anchorage;
- Ted Stevens Anchorage International Airport;
- Truck mobility and movement;
- Safety on the highway system;
- Versatile mode share mix;
- Meet DOT Environmental Justice Strategy; and
- FAC Involvement.

2.1 Balance of Commodity Flows

The overall freight system in Anchorage is not reliant on the movement of one particular commodity, such as coal or oil. While most coal exports are processed through Seward and oil exports are concentrated in Valdez, the predominant goods flowing through the Anchorage freight transportation system are consumed and used by Alaskan residents and businesses. Such flows, while susceptible to general economic pressures (e.g., unemployment and consumer discretionary spending), have not experienced the boom or bust characteristics that often affect natural resource exports.

2.2 Port of Anchorage

The Port of Anchorage (POA) has a significant impact on both cargo and commerce/trade in the region. Specifically, the POA acts as a key freight node for the state, as well as Anchorage. The POA is currently undergoing a modernization effort that will increase its capacity and propensity for industry use.

2.2.1 Key Freight Node

The POA is a key component of the U.S. Strategic Highway Network (STRAHNET). As a key freight node, the POA supports jobs and the economy at the local, regional, and state levels. For example:

- 30% of all refined bulk fuel products consumed in the state (outside of Southeast Alaska) passes through the POA;
- 90% of the merchandise goods used by Alaskan communities west of Cordova (as reported in Alaska's Lifeline) is transported via the POA;

- More than 80% of the cement used for concrete construction in the state comes into the POA annually; and
- 25% of supplies to rural communities transship through the POA.

More than two-fifths of Alaskans live in the Anchorage area, while the rest of the state averages less than one resident per square mile (as reported in the Alaska Department of Labor and Workforce Development's *Alaska Population Overview, 2013 Estimates*, February 2013). The close proximity of the state's population to the POA is a key strength for concentrating warehouses and distribution facilities in the Anchorage region.

Approximately 74% of waterborne freight and 95% of refined petroleum products for Southcentral Alaska arrive via the POA, making it a critical transportation infrastructure asset to the regional economy. The POA also plays an instrumental role in the distribution of cargo to rural communities throughout the state. Recent tonnage trends at the POA are stable, and are expected to remain stable for the near future. The POA modernization project will develop a safe and efficient commercial port facility that is able to meet current needs and accommodate future growth, if and when it occurs.

2.2.2 Modernization

The 55-year-old POA is currently undergoing a multifaceted modernization effort. The improvements identified in this modernization effort will increase the POA's ability to accommodate larger vessels by enhancing dredging efforts to maintain a consistent 35-foot depth, with the capability of safely going to 45 feet when necessary. This effort will also replace two petroleum terminals and two cargo terminals to maintain and expand storage capacity. Modernization efforts will also seek to advance the POA's seismic resiliency, technology application, and operational efficiency.

These pending improvements to modernize the POA will play a key role in maintaining a stable cargo market in Alaska and the Anchorage region, and may also assist in attracting higher tonnage volumes to the facility in the future.

2.3 Ted Stevens Anchorage International Airport

Ted Stevens Anchorage International Airport's (TSAIA) air cargo infrastructure supports three distinct, but interrelated, cargo operations. These operations include:

- Import and export of international air cargo, including "fuel and go" operations;
- An entry and exit point for domestic air cargo to/from the Lower 48 states; and
- A hub for intrastate air cargo movements.

2.3.1 Import and Export of International Air Cargo

The location of TSAIA on the great circle route between Asian cargo airports and United States destinations allows freighter aircraft to use the facility as a refueling station. Cargo carriers use TSAIA as a transshipment point. Aircraft already fly direct between United States and Asian destinations, though these are typically passenger flights. Air cargo companies operating freighter aircraft utilize this refueling stop to facilitate carrying the maximum freight payload

possible, rather than the decreased loads they would carry if they were to fly non stop between Asia and the Lower 48 states.

Along with maximizing the payload carried, the refueling stop also allows air cargo companies, and especially the integrators such as FedEx and UPS, to transship and sort cargo at TSAIA. They can then fly cargo closer to their final United States destinations rather than having to transfer the cargo via a centrally located main hub such as Memphis or Louisville. For example, FedEx and UPS cargo sortation facilities are used at TSAIA (which also acts as a regional hub for operations to, from, and within the state).

2.3.2 Entry and Exit Point for Domestic Air Cargo

Cargo between the Lower 48 and Anchorage is transported using a variety of air freighters, including bellyhold cargo on passenger airlines, regular and ad hoc freighter transport, and integrator freighter aircraft. Data from the Bureau of Transportation Statistics (BTS) cites that 29% of domestic cargo leaving TSAIA goes to, as well as 22% of incoming cargo arrives from, Louisville International Airport, making it TSAIA's greatest domestic trading partner. Louisville International Airport is the worldwide UPS hub. Approximately 15% of domestic cargo leaving from, as well as 18% of domestic cargo arriving at, TSAIA is from Memphis International Airport, which is a worldwide hub for FedEx. Approximately 15% of domestic cargo leaving from, as well as 12% of domestic cargo arriving at, TSAIA is from Cincinnati/Northern Kentucky International Airport, which is a hub for DHL Aviation and DHL Express. UPS, FedEx, and DHL are major carriers to/from TSAIA, as movements between these airports comprise over half of domestic cargo movements.

2.3.3 Hub for Intrastate Air Cargo Movements

Due to the geographic nature of Alaska, many rural communities rely on air services to supply them with the mail, goods, and services that residents and businesses need. Operations also include sustainment of oil operations by flying supplies and equipment to those locations. According to BTS data, TSAIA's trading partners by airport within Alaska are shown in Table 1.

Table 1: Domestic Intra-State Tonnage

From Airport	To ANC	%	To Airport	From ANC	%
ADQ - Kodiak Benny Benson State Airport	3,391	46%	BET - Bethel Airport	5,492	32%
OTZ - Ralph Wien Memorial Airport	1,578	21%	OME - Nome Airport	4,387	25%
FAI - Fairbanks International Airport	1,406	19%	FAI - Fairbanks International Airport	3,917	23%
TOG - Togiak Airport	1,008	14%	OTZ - Ralph Wien Memorial Airport	3,460	20%
Total	7,383		Total	17,256	

Source: BTS

2.3.4 Connectivity of the Air System

These different operations provide greater flexibility as well as cost effective and timely solutions that facilitate the movement of goods. These goods are typically of high value, urgent, medical, critical, or time sensitive in nature and support Anchorage's, as well as Alaska's, businesses and residents in their daily lives.

2.3.5 Cargo Operation Infrastructure

TSAIA has three runways and a variety of surrounding industrial parcels that benefit from easy airport access. The North Airpark has sufficient storage space to accommodate current levels of freight traffic. Over 265 businesses and agencies currently lease space at TSAIA.

2.4 Truck Mobility and Movement

A number of freight transportation system characteristics support efficient truck movement as well as reduce the impact of trucks in sensitive areas of Anchorage. These characteristics include:

- Truck movements are generally not constrained by low bridges.
- Title 9 of the Anchorage Municipal Code is the Traffic Code for the Municipality of Anchorage (MOA). Section 9.46.400 identifies designated truck routes in the central business district. Provision A of Section 9.46.410 states, "No local or neighborhood collector street, as designated on the official streets and highways plan of the municipality, shall be used by any commercial vehicle with a gross weight of 10,000 pounds or greater, except where required to make deliveries or pickups, or to provide business service at a specific location where the vehicle is required as an essential part of the service, and then only by the most direct route requiring the least amount of travel upon such local or residential collector streets." MOA has also identified routes that must be used by double loads.
- Alaska is one of 25 states that allow a truck tractor and 2 trailing units, following the Intermodal Surface Transportation Efficiency Act "freeze" in 1991. This movement improves efficiency, reduces transportation cost, and lowers emissions from truck activity.

The Seward Highway—one of the major trucking routes to, from, and throughout the region—is undergoing a variety of improvements. These include widening; capacity, safety, and pavement improvements; and bridge and interchange rehabilitation. These improvements may aid overall mobility through the region, especially for long-haul truck trips. The Glenn Highway is also undergoing improvements. A third outbound lane between Hiland and Artillery Roads was largely complete as of February 2016. Construction associated with replacement of the Glenn-Muldoon interchange will also begin in 2016.

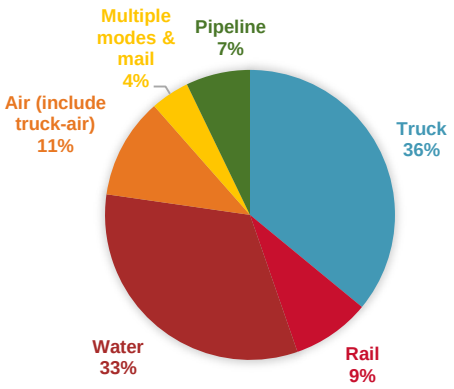
2.5 Safety on the Highway System

The Anchorage highway system currently includes a low number of fatal accidents (e.g., low fatality rates). Similar accident rates at the statewide level are also low. This helps keep motorists safe and reduces incident-related delays.

2.6 Versatile Mode Share Mix

The Anchorage freight transportation system relies on a widely range of modes/systems to deliver goods and cargo (Figure 1). Sixty percent of tonnage entering the POA moves forward via the Alaska Railroad (ARRC) rail line. This connectivity of port-to-rail modes is a key factor in reducing truck traffic in the region, contributing to reduced roadway damage and emissions, improving road safety, and reducing intrusion by trucks in residential areas. By 2040, forecasts show even greater distribution by modes/systems, increasing both rail and air freight traffic based on the latest FHWA Freight Analysis Framework (FAF) data.

Figure 1: 2015 Commodity Movements by Mode/System in the Anchorage Region



2.7 Meet DOT Environmental Justice Strategy

DOT and FHWA require that environmental justice (EJ) strategies be identified and addressed while implementing various projects to ensure the fair and equitable participation from the public. When this is accomplished, planning processes should also reflect an equal distribution of benefits and burdens. The guiding EJ principles followed by DOT are briefly summarized below:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations;
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

AMATS is meeting the requirements for the EJ strategy by ensuring that the public is well aware of the FMS and allowing opportunity for public participation through various AMATS committee meetings.

2.8 FAC Involvement

The AMATS Freight Advisory Committee (FAC) is the citizen's forum for freight issues affecting the AMATS area. The FAC provides comments on freight studies and plans, and promotes public participation in the freight planning process. The FAC assists in identifying freight needs to better improve MOA's freight network.

3 Weaknesses

Weaknesses are existing characteristics of the Anchorage freight transportation system that are deficient and may constrain progress towards achieving the vision, goals, and objectives of the FMS. The weaknesses are presented below:

- Restrictions at the POA;
- Lack of Dedicated POA funding;
- Truck freight problem areas;
- Lack of truck route design and designation standards;
- Lack of truck parking facilities;
- Seasonal weight restrictions;
- Access issues at TSAIA; and
- Authority variation.

3.1 Restrictions at the POA

3.1.1 Ship Draft

Ship draft limitations restrict the import of bulk cement per ship to 24,000 tons, just over half the average cement shipping capacity typically available. This adds a premium to the unit cost of cement delivered to the state.

3.1.2 Storage

In addition to draft constraints, onsite storage capacity can also influence the amount of cement offloaded. Suggested improvements for the POA to address this deficiency include cement silos on the backland of the POA.

The POA delivers jet fuel to TSAIA via pipeline. The POA suggests that additional tank storage for petroleum products onsite is necessary to accommodate peak period demand. Future plans

for the POA may include two dedicated pool berths with offload headers at new petroleum docks to provide increased storage opportunities. This improvement would also allow the POA to handle a more diverse array of refined petroleum products.

3.1.3 Access

Truck movements to and from the POA are focused on one entry point. The road network leading to that entry point passes through urban areas and conflict with other traffic and pedestrians in these areas. Freight mobility and journey time can also be impacted by the number of intersections trucks travel through to/from the facility. Alternative access routes to/from the POA are limited and not readily available. The Ocean Dock Road rail crossing is a specific challenge to accessing the POA. Trains, particularly during rush hour, can have serious bottlenecking effects on the local roadway network for passenger cars and trucks alike.

3.2 Lack of Dedicated POA Funding

Ports do not contribute to the highway trust fund (or similar funds). In return, ports do not receive money from this source. As a result, the POA lacks a revenue stream or bonding to meet both waterside and landside transportation access needs. Regional ports typically rely on government funding assistance, as does the POA.

3.3 Truck Freight Problem Areas

In 2009, the MOA identified 27 “problem area locations” for freight movement in the Anchorage Bowl area. As of 2009, eight problem locations had projects identified to aid in reducing congestion that was specifically impacting truck traffic. The other problem areas were regionally based and along major truck and double-load routes. Projected truck patterns for 2040 suggest significantly increased movements on corridors where freight “problem area locations” exist, making these corridors susceptible to likely future increases in congestion.

Due to increased growth in travel demand projected by 2040, truck bottlenecks may result in additional transportation system bottlenecks. When trucks are delayed, this causes delays at other facilities due to missed loading/unloading times, which could cause issues at both the POA and ARRC.

In addition to the bottlenecks, the at-grade crossing near 68th Avenue and C Street was identified by multiple stakeholders as a problem area for truck movements. Use of the C Street railroad crossing is an example of how the region’s neighborhood noise ordinances conflict with congestion management policy. To comply with the MOA’s noise ordinance, ARRC must complete gravel operations by 10:00 p.m. To reduce impacts on traffic congestion during commuter rush hours, ARRC’s gravel operations must not block C Street.

3.4 Lack of Truck Route Design and Designation Standards

While Title 9 codifies the roadways that trucks are allowed to operate on, the MOA currently lacks specific guidelines for the design and/or designation of truck facilities that are developed to encourage freight movement. Various major truck routes are narrow facilities, and other

physical impediments can stop or slow down truck movement through critical regional pathways. Many truck routes lack the necessary signal timing for freight vehicles to safely traverse an intersection. Other things like medians, roundabouts, landscaping, and curb design can cause issues, and these features will require specific guidelines so trucks know which routes to use and can be secure in knowing that their large vehicle can successfully navigate the route.

3.5 Lack of Truck Parking Facilities

According to the Jason's Law Truck Parking Survey published in August 2015, Alaska has approximately 85 truck parking spaces per daily 100,000 miles of combination truck-vehicle miles of travel, which is low compared to all states in terms of truck parking. Alaska reported a total of 179 truck spaces statewide that were all private facilities. The report also identified that shoulder parking is a significant safety issue in the state. Based on stakeholder interviews, this is not a significant issue in Anchorage. It may become an issue if there are dramatic increases in the number of trucks coming to Anchorage from outside Alaska.

3.6 Seasonal Weight Restrictions

Seasonal weight/load restrictions are applied to vehicles over 10,000-pound Gross Vehicle Weight during spring conditions (typically March/April through May) to protect and reduce damage to roadway (e.g., pavement) infrastructure. The duration of the restrictions depend upon weather and temperature. This restriction reduces the effective payload of trucks and increases transportation costs. Compliance with this restriction may be difficult, especially with trailers transported by sea into Anchorage.

3.7 Access Issues at TSAIA

Truck access to TSAIA's North and South Airparks is a concern. Primary access to the north cargo terminal is via International Airport Road, which is more congested and takes longer for trucks to travel than Northern Lights Boulevard. For example, International Airport Road adds almost 2 miles to the trip length and takes 5 minutes longer for trucks to get to this TSAIA facility from Midtown or Downtown than it does on Northern Lights Boulevard. These delay impacts reduce the flexibility for truckers to access the facility.

The primary access for the South Airpark is from Raspberry Road. Both Raspberry and International Airport Roads do not have direct access to the highway system, causing trucks to have to use alternative connections. In addition, there are residential neighborhoods along Raspberry Road and Northern Lights Boulevard that are concerned about increased truck traffic through their community.

3.8 Authority Variation

Signal management and weight restrictions vary by roadway and roadway jurisdictional ownership. Therefore, regulation of both signalization and weight restrictions are not consistent across the Anchorage region, and are potentially confusing or inefficient for truck drivers.

4 Opportunities

Opportunities include existing, future, and unrealized considerations that can positively influence progress towards achieving the vision, goals, and objectives of the AMATS FMS. The opportunities are presented below:

- Steady growth;
- Transportation-dependent economy;
- Freight-considered land use;
- Reducing impacts from trucks;
- Investment in highways;
- Data collection/technology improvements;
- On port rail facilities;
- On port warehousing and distribution facilities; and
- Collaboration and partnerships.

4.1 Steady Growth

Anchorage's population growth is modest, with a 12% increase over the most recently recorded decade and a 13% increase in households. According to annual U.S. Census estimates, Anchorage's population grew by approximately 2.6% in the 5-year period between 2010 and 2014. The Anchorage Economic Development Corporation's *2015 Three-Year Economic Outlook* also predicted stable population growth in the region. The AMATS travel forecast model population estimates show approximately 20% growth to year 2040, indicating that this stable growth is expected to maintain over the long term. The AMATS travel forecast model data also estimates a 21% increase in employment throughout the region, indicating that employment growth may parallel population growth. Maintaining steady growth for both population and employment is critical to maintaining commerce throughout the region.

4.2 Transportation-Dependent Economy

As identified in the Location Quotient (LQ) analysis conducted in Task 4 and 5 of the AMATS FMS and in AMATS's 2035 Metropolitan Transportation Plan (MTP) published in 2012, 'manufacturing' is not a significant industry sector in the region. Rather, the region is dependent on imported goods. Consequently, 'transportation/warehousing' is a stable industry and within the top five employment sectors in the region. UPS and FedEx have facilities onsite at TSAIA. Additionally, West Anchorage hosts various distributions centers (DCs) and warehouses that receive/distribute goods from TSAIA. The region includes 17 major distribution centers and third-party logistics companies. Other steadily growing industries include 'mining/extraction' and 'retail trade.' These sectors affect the freight system. For example, 'mining/extraction' facilities require bulk materials moving in and out to support the extraction process. 'Retail trade' facilities and stores receive large shipments of commodities for distribution.

4.3 Freight-Considered Land Use

Clustering industrial land uses help municipalities to both avoid conflicts of land use and increase efficiency for freight transportation. By removing industrial land uses from other types of commercial and residential uses, limited personal vehicle traffic is ensured and truck routes are consolidated. *Anchorage 2020*, the Comprehensive Plan for the Anchorage Bowl, supports cluster-type land use planning practices by adding “Industrial Reserve” land use areas.

Both local agencies and private sector companies have emphasized the importance of coordinated land use planning integrated with major transportation infrastructure in the region. These types of context-sensitive land use policies serve to maintain a harmonized land use system and ensure the safe, efficient, and non-disruptive freight transportation services in the region. Both the POA and TSAIA would benefit from industrial clustered areas near their respective sites. For example, the Anchorage Economic Development Corporation (AEDC) cites areas adjacent to the POA as candidate parcels for development of a “multimodal industrial center” connecting the POA to rail and highway modes. Given assistance from the AEDC and the potential for partnerships across industries, the POA and local agencies, through increased development and industrial clustering, can help to cost-effectively grow commerce at the POA and reduce traffic impacts on non-industrial land by consolidating truck traffic.

Further, the *West Anchorage District Plan* cites the need for industrial reserves in the eastern portions of the District to preserve space for industrial cluster development near TSAIA rather than a mixed-land use environment. ARRC also owns land in the Ship Creek and Birchwood Industrial Park areas. ARRC is open to discussion regarding industrial opportunities in these areas that would support freight movement without having a major impact on haul times. For example, the Ship Creek Industrial Park area is close to the rail line and easy to access/navigate. The Birchwood Industrial Park is close to the rail lines and reduces short haul time. ARRC is continuing to develop relationships and educate the public and non-transportation stakeholders about the importance of these nearby industrial areas.

4.4 Reducing Impacts from Trucks

A number of opportunities exist to reduce the impact of trucking operations upon local communities and reduce damage to roadways. The Approved Routes for Reasonable Access within MOA for Double Load Trucks was authorized in 2000. Given the region’s growth and land use changes, the approved routes should be reassessed every 10 years to ensure they are still fit for their purpose—mitigating impact on the community and providing access to large freight generators.

Developing a truck route network that identifies where trucks should and should not go, as well as balancing the needs of residential communities and industry, is necessary and can be accomplished with policy, including:

- The concept can be based on restricting trucks to major routes and highways but allows truck use of non-designated highways for the purposes of making deliveries and collections;
- Truck route designations can also ensure resources (e.g., maintenance) are focused on these key truck corridors;

- Trucks could be weighed prior to leaving the POA, especially during the Spring weight restricted season, to reduce roadway damage from overweight trucks on the Anchorage roadway system; and
- MOA's current clean truck programs, including incentivizing newer trucks and use of alternative fuels (e.g., CNG trucks), could be further enhanced to reduce truck emissions.

4.5 Investment in Highways

Future infrastructure plans that could further enhance mobility throughout the Anchorage region include the Knik Arm Crossing, which would connect Anchorage with Port MacKenzie via road. According to the Alaska Statewide Transportation Improvement Program (2016-2019), the Knik Arm Crossing would involve the design and construction of a bridge across the Knik Arm between Anchorage and Matanuska-Susitna Borough. This would also involve the construction of a roadway between the northern terminus of the POA and the bridge to expedite access from the POA to the new facility.

The completion of the Seward Highway to Glenn Highway Connection and Ingra-Gambell Couplet Extension would be beneficial as they would provide direct access from the POA to the highway network. The Seward Highway to Glenn Highway Connections would also help to reduce congestion in downtown Anchorage, as the two highways are currently connected by arterial facilities that are subject to delays during high volume times of day, thus increasing mobility and access for freight across the region.

4.6 Data Collection/Technology Improvements

The Alaska Statewide Transportation Improvement Program (2016-2019) identifies the maintenance, operation, and enhancement of the existing network of weigh-in-motion (WIM) equipment throughout the state as a priority. The Anchorage area currently has five WIM stations. The addition of WIM stations and technology will assist the Alaska Department of Transportation and Public Facilities (DOT&PF) and AMATS in understanding the counts and weights of vehicles on the region's system to assist in future planning efforts.

The *2035 AMATS Interim Metropolitan Plan* identified continuing efforts to implement the Commercial Vehicle Information Systems and Networks (CVISN) throughout Anchorage, which will serve to improve safety for commercial vehicles throughout the region. CVISN assists with verifying credentials, enforcing safety on high-risk operations, and rendering the process more efficient through electronic vehicle screening. Also, the addition of a Transportation Operations Center (TOC) to better collect and manage the information obtained through improved Information Technology System (ITS) efforts also presents an opportunity moving forward to actively monitor real time traffic conditions while creating a more robust base of information for freight planning. While not an immediate need, a TOC would be valid for consideration in the mid-to-long term to enhance truck movements in the region.

ITS technology will also be important for traffic improvements along major corridors in Anchorage. The Glenn and Seward Highway ITS plans will enhance data collection/implementation capabilities, signal controlling, highway warning systems, real time

traveler information, weather/conditions reporting, and transit operations—all of which can aid the efficiency of commercial vehicle traffic.

4.7 On Port Rail Facilities

Developing on port-rail loading facilities would reduce the number of trucks entering and leaving the POA and potentially reduce double trailer and container handling, thereby reducing cost from the transportation system.

4.8 On Port Warehousing and Distribution Facilities

If land availability permits, then warehousing and distribution facilities could be constructed within the POA to potentially reduce truck movements.

4.9 Collaboration and Partnerships

While it is often difficult to identify public funding sources for freight projects, creating partnerships between public and private entities can help to secure funding for small and large scale projects or programs. For example, the Alaska Trucking Association (ATA) is a non-profit professional trade organization developed to foster and promote the trucking industry in Alaska. The ATA recently collaborated with the MOA's Street Maintenance group to identify snow removal strategies at the Spenard Recreation Center. While a small scale project, this collaboration provides an example of how organizations outside of MOA or AMATS have the opportunity to contribute time and resources to improve freight operations.

Another example is how the DOT&PF and ARRC coordinated for winter rail plowing. The freeze-thaw cycles and snow and ice build-up at grade crossings are complex. Relationships and communication such as this can be helpful for maintaining and informing freight operations.

A third example is how Joint Base Elmendorf-Richardson (JBER) has a substantial amount of land available for use, while Anchorage is relatively built-out. JBER currently has a contract with the MOA to lease a site for the Anchorage Regional Landfill. The Army is able to use the facility for free through the agreement as well, so it will create benefits for both parties involved.[1] Coordination via the AMATS FAC is educational for members of the private sector, as the meetings and communications encourage these types of mutually beneficial relationships.

On the private side, coordination across private industries could also render the supply chain more effective. The use of data collection and tracking can assist in improving freight operations, safety, and overall efficiency, specifically at intermodal locations.

[1] The agreement was established prior to Fort Richardson and Elmendorf Air Force Base consolidated into one facility.

5 Threats

Threats include existing and future issues that would potentially inhibit progress towards meeting the vision, goals, and objectives of the AMATS FMS. The threats area presented below:

- Reduced air cargo operations at TSAIA;
- Access issues from the POA;
- Funding uncertainty;
- Lack of capacity for mega projects; and
- Need for traffic calming efforts.

5.1 Reduced Air Cargo Operations at TSAIA

Anchorage's international air freight market is reliant on the relationship between North American consumption and Asian produced goods. Additionally, these changes have resulted in mode shifts of commodities once moved by air that are now moved by sea. Conversely, shippers desiring to reduce inventories may benefit in utilizing more air cargo services, rather than continuing to use ships that consider longer travel times. Lighter and more fuel efficient freighter aircraft may allow the payload carried on these aircraft to be maximized; therefore avoiding the need for a refueling stop at Anchorage. Investment in other west coast air cargo hubs (such as sortation facilities) could pull cargo and freighter aircraft activity away from Anchorage.

5.2 Access Issues from the POA

Access to and from the POA is limited, and while it does consider "redundancy" with the JBER, it is not an option that can readily used for day-to-day movements.

5.3 Funding Uncertainty

In December 2015, the U.S. Legislature passed the Fixing America's Surface Transportation (FAST) Act, the first federal law in more than 10 years to provide long-term funding for surface transportation. The FAST Act authorizes $305 billion over fiscal years 2016 through 2020. Alaska expects to receive over $2.6 billion in funding over the duration of the FAST Act. In federal fiscal year 2015, Alaska received $483.9 million from the federal government for surface transportation programs. In 2016, Alaska anticipates that this amount will increase to $508.6 million. By the end of the FAST Act in 2020, Alaska expects to receive $555.3 million. While these figures provide a picture of potential funding available to the state, the amount of funding that AMATS will receive for transportation improvements by any mode is uncertain.

It is also critical to acknowledge that in years past, oil revenue comprised approximately 90% of Alaska's budget. Since 2014, Alaska's oil revenue has dropped by approximately 88%. Given these reductions in revenue, Alaska faces a budget deficit that may result in reduced state spending on transportation.

Uncertainty in funding renders maintenance prioritization decisions both challenging and critical. Allocations of funding for road network maintenance are at the discretion of the state legislature. AMATS must take this uncertainty into consideration when planning maintenance programs, understanding that deferring roadway maintenance may end up costing more as roadway conditions deteriorate and costs for repair increase. Additionally, major facilities/operators including the POA, TSAIA, and ARRC also rely in part on public funding and will also see the effects of reduced funding for regional transportation.

5.4 Lack of Capacity for Mega Projects

Anchorage and its surroundings areas and facilities are not equipped with the proper industry resources and infrastructure to respond to a mega project. If a mega project such as a large pipeline were commissioned, most of the resources are likely to be transported through Southcentral Alaska to the final project site. The AMATS region lacks adequate trucks, drivers, and infrastructure to support such a massive effort.

5.5 Traffic Calming Efforts

The implementation of traffic calming techniques, intended to promote safety along Anchorage's transportation system, could consequently stress the freight transportation system. For example, roundabouts with small turning radii; speed reducing infrastructure; and lane removal for landscaping, bike facilities, etc. can all have negative consequences on freight movement despite the positive intent of the projects.

5.6 Land Use Changes

As Anchorage develops, land uses evolve to meet changing needs. Anchorage anticipates some residential areas increasing in density which may increase traffic on roads used by freight. This could have a negative impact on freight mobility. In addition, land may be allocated differently resulting in less industrial and commercial land being available for development or areas that can be developed are further away from existing transportation hubs such as the Port of Anchorage or TSAIA.

6 Summary

This section presents a summary describing how the various strengths, weaknesses, opportunities, and threats relate to the goals of the AMATS FMS. Table 2 shows how each strength, weakness, opportunity, or threat addresses the goals of the AMATS FMS.

Table 2: Comparison of FMS Goals to Identified Strengths, Weaknesses, Opportunities, and Threats

Freight Plan Goal	Strengths	Weaknesses	Opportunities	Threats
Goal 1: Provide a freight transportation system that moves goods safely and securely throughout the community; improves access; provides mobility; and supports a thriving, sustainable, broad-based economy.	• Balance of commodity flows • POA • TSAIA • Truck & mobility movement • Safety on the highway system	• Restrictions at POA • Truck freight problem areas • Lack of truck parking facilities • Access issues to TSAIA	• Transportation dependent economy • On port rail facilities	• Reduced air cargo operations at TSAIA • Access issues from the POA • Lack of capacity for mega projects • Land use changes
Goal 2: Develop an efficient freight transportation network that considers the cost of building, operating, and maintaining the system; the equity of all users; public health impacts; community values; and social justice.	• Meets DOT Environmental Justice Strategy and Requirements	None	• Steady growth • Freight considered land use • Reducing impacts from trucks	• Traffic calming efforts that do not consider freight movement • Land use changes
Goal 3: Incorporate technology and best management practices that allow for improved freight movement in the Anchorage region.	None	• Lack of area-wide truck route design and designation standards • Seasonal weight restrictions • Authority variation	• Data collection/technology improvements	None
Goal 4: Integrate freight needs and financing into transportation project prioritization processes for the region.	• FAC active involvement in the freight planning process	• Lack of dedicated POA funding	• Investments on highways	• Funding uncertainty
Goal 5: Develop a multimodal freight system that includes effective public and stakeholder partnerships to leverage opportunities and resources.	• Versatile mode share mix	None	• On port warehousing and distribution facilities • Collaboration and partnerships	None

Many of Anchorage's **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats relate in Goal #1, which targets a safe/secure, accessible, mobile, sustainable, and economically thriving freight environment. While the economy in Anchorage is strong and facilities that include the POA and TSAIA move a significant amount of freight, there is continued room for improvements at these sites and for the roadways that connect the region.

Goal #2 is viewed from an efficiency, maintenance, public health, and community-driven standpoint. These topics relate back to land use type issues and ensuring that the transportation system considers Anchorage residents and their needs to coexist with freight facilities.

Technology and best management practices are the focus of Goal #3. The need for better management of truck facilities, data collection, and integration of state of the art technology into the system is apparent in the Anchorage area to help improve roadside freight movements.

Goal #4 aims for integrated financing and strategic project prioritization. Funding issues are increasingly common as revenue and reserves for transportation dwindle. The need for effective prioritization of projects will become increasingly important.

Goal #5 envisions a multimodal freight system that integrates public and private partnerships to leverage resources to improve the local freight system. The Anchorage area has a very versatile mode share, allowing cargo to move in and out of the area in a variety of ways. The FMS helped to identify areas and players that may be critical to expanding opportunities for investment by mode.

Task 7 – Draft Report Performance Management Framework and Performance Measures

AMATS Freight Mobility Study

Prepared for

AMATS

Prepared by

HDR with CPCS

Anchorage, AK
May 24, 2016

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Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AHD	Annual Hours of Delay
AMATS	Anchorage Metropolitan Area Transportation Solutions
ATRI	American Transportation Research Institute
CMAQ	Congestion Mitigation and Air Quality
CMP	AMATS Congestion Management Process
CMV	Commercial Motor Vehicle
CVISN	Commercial Vehicle Intelligent Systems Network
DOT&PF	Alaska Department of Transportation and Public Facilities
FARS	Fatalities Analysis Reporting Systems
FHWA	Federal Highway Administration
FMS	Freight Mobility Study
FMS	Freight Mobility Study
GPS	Global Positioning System
HPMS	Highway Performance Monitoring System
IRI	International Roughness Index
LRTP	Long-Range Transportation Plan
MOA	Municipality of Anchorage
MS/CVE	Measurement Standards/Commercial Vehicle Enforcement
MTP	Metropolitan Transportation Plan
NCFRP	National Cooperative Freight Research Program
NHS	National Highway System
NOX	Nitrogen Oxide
NPMRDS	National Performance Management Research Data Set
PM	Performance Measure
STIP	Statewide Transportation Improvement Program
TAZ	Traffic Analysis Zone
TIP	Transportation Improvement Program
TPTI	Truck Planning Time Index
TRB	Transportation Research Board
TSAIA	Ted Stevens Anchorage International Airport
TTTI	Truck Travel Time Index
USACE	U.S. Army Corps of Engineers
VHT	Vehicle Hours of Travel
VMT	Vehicle Miles Traveled
WIM	Weight-in-Motion

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1 Introduction

The Anchorage Metropolitan Area Transportation Solutions (AMATS) Freight Mobility Study (FMS) will serve as one of several system elements to support regional transportation planning over the next 25 years. Components of the FMS will be used to support the anticipated update (2016-2018) of the Anchorage Metropolitan Transportation Plan (MTP). The MTP update will provide strategic guidance to achieve the vision, goals and objectives established in the FMS (FMS Task 6).

Transportation policy and programming decision-making processes involve a number of steps, one of which is defining a performance analysis framework and associated measures used to assess planned changes or activities in the transportation system. In support of Task 7 of the FMS, the objective of this Report is to answer the following questions:

- What is the performance management framework that defines how AMATS can monitor progress towards freight-related goals of the FMS and MTP?
- What specific performance measures (and data sources) can be used over time to monitor the freight-related goals and objectives of the MTP that also meet federal mandates, and state and MPO targets?

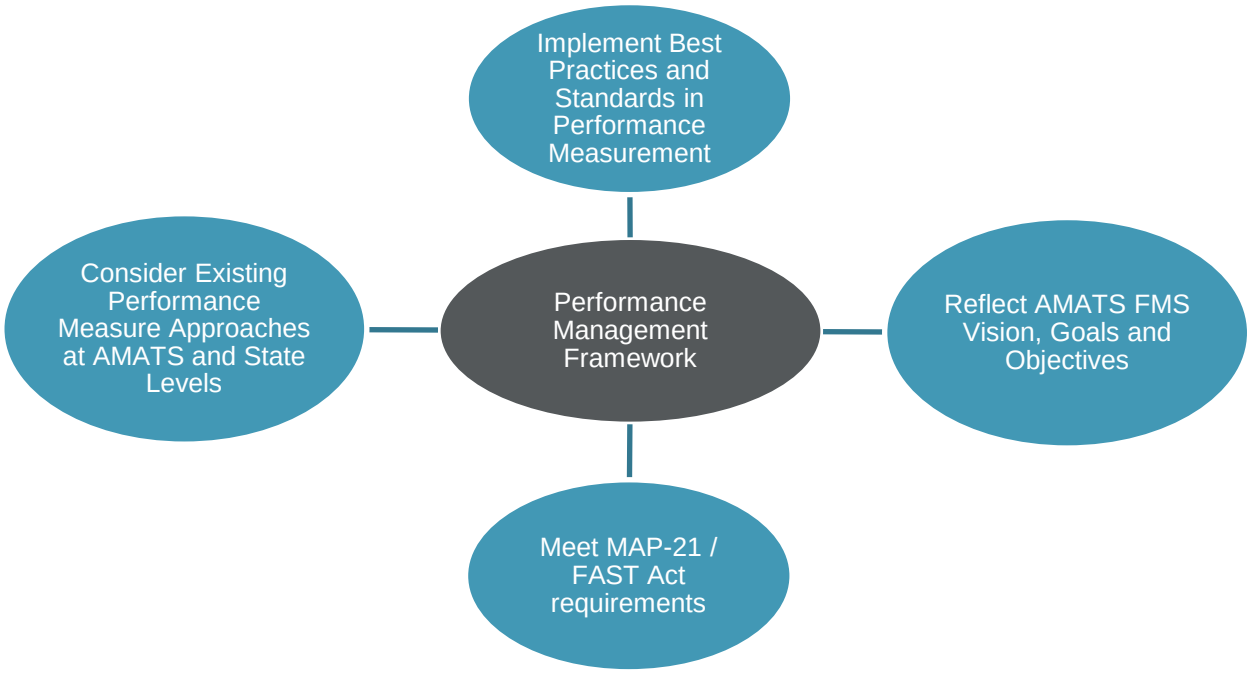
Section 2 presents the proposed performance management framework while Section 3 presents the proposed performance measures and data recommended for use in monitoring freight system performance. The recommended framework and measures were included as part of the Task 4. Best Practices Review and refined based on the Freight Profile, Stakeholder Interviews, Visioning, and **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats (SWOT) analysis conducted in Tasks 4, 5, and 6 respectively.

2 Performance Management Framework

2.1 Components of a Performance Management Framework

The recommended framework to assess performance and implementation of the recommendations of the FMS will be designed to reflect and take into consideration the factors shown in Figure 2-1. Each component is presented below.

Figure 2-1. Components of FMS Performance Management Framework



2.1.1 Best Practice in Freight Performance Measurement

As presented in the Task 4 Best Practices White Paper for the FMS, a number of "best practices" exist with respect to measuring performance and freight-related performance measurements. The key best practices themes are summarized below and were taken into consideration in developing the recommended performance measures presented in Section 3 below.[1]

[1] Sources for best practice concepts include: 1) FHWA "Integrating Demand Management into the Transportation Planning Process: A Desk Reference" (2012); 2) FHWA "Advancing Metropolitan Planning for Operations: An Objectives-Driven, Performance-based Approach – A Guidebook", February 2010; 3) and NCFRP Report 10 – Performance Measures for Freight Transportation (2011). http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_010.pdf NOTE: these are not specific to metropolitan freight

- **Don't re-invent the wheel.** Agencies should begin with what is already available in terms of performance measurement frameworks and associated data sets and adapt or build on them as required. For AMATS, performance measures and approaches prepared previously were used as the foundation of this analysis. Sources included the updated AMATS Congestion Management Process. AMATS Status of the System Report and the 2035 Metropolitan Transportation Plan. Information from the Alaska Department of Transportation and Public Facilities (DOT&PF) Statewide Long-Range Transportation Plan and Alaska State Freight Plan (currently underway) was also considered.
- **SMART and KISS Principles.** Agencies should choose performance measures that are Specific, Measurable, Attainable, Realistic, and Timely (SMART) that provide meaningful assessments and that can be collected regularly over time. Performance measures should also be in the spirit of Keeping It Short and Simple (KISS). Practitioners should focus on the vital measurements of relevance to their targeted objectives, and avoid getting buried in measuring metrics. A performance-based, objectives-driven approach to planning for operations will be based on the concept that "what gets measured gets managed." However, this needs to be balanced against the complexity and cost of measuring too much.
- **Focus Performance Measures on Relevant Topics.** Agencies should focus on identifying performance measures that match the areas that the agency has some influence over and/or interest in. In the case of the AMATS FMS, performance measures should be illustrative of performance specific to the freight industry, not all sectors of the economy. They should be related to areas that AMATS and its partners can influence, for example, through support to projects that facilitate or regulate freight activities.
- **Understand the role and distinguish between Freight Indicators and Freight Performance Measures.** Freight indicators should provide an indication of economic activity in the freight sector (e.g., trucking freight rates, mode share, or tonnage) and can be used to assist stakeholders in understanding the economic context of the freight transportation system. However, they should not necessarily be used to measure the system's performance. For example, demand for trucking services (freight indicator) is much more affected by the economy than by improvements in highway infrastructure. In contrast, the percentage of total crashes that involve trucks is a performance measure that can be used directly by agencies to inform decision-making and adjust investments.
- **Harness and Use Big Data, Carefully**. Data on traffic flows can be accurately tracked with cost-effective electronic tagging and Global Positioning System (GPS). With Big Data there will potentially be a step-change in the availability and application of freight data, allowing many existing gaps to be plugged and permitting macro-level analysis of freight flows and operations at a higher degree of detail. A wealth of data is currently being collected in most regions by transportation system operators who track real-time travel information. Intelligent Transportation Systems (ITS) components, in particular, such as toll tag readers and transponders, video detector systems, and traffic management systems used to provide travelers with real-time travel information, are used to measure performance in some regions on an ongoing basis. Care should be taken when assessing this data for potential use and on-going assessments of this data should be conducted to better understand its quality and usefulness for freight planning.

- **Consider Reporting Requirements and Benefits of Publishing Performance Measurement Results to Stakeholders.** Agencies should consider the future reporting of performance measures and how information can be provided to stakeholders interested in performance of the transportation system. An example is the use of dashboards or "report cards" that summarize performance with succinct assessments of performance. The data and analysis supporting succinct measures should also be accessible for users to drill down into details and answer more nuanced questions, or to explore trends in further detail.

2.1.2 Reflective of AMATS FMS Vision, Goals and Objectives

The Vision, Goals, and Objectives for the AMATS FMS should be the starting point for the development of freight-specific performance measures for the FMS and freight elements of the updated MTP. The draft goals and objectives of the FMS (defined in Task 6) are presented in the Table 2-1. The objectives which relate directly to freight transportation are highlighted in **bold**, and are accompanied by an indication of whether the objective lends itself to quantitative or qualitative measurement (or whether it is N/A, reflecting a process which requires internal management rather than measurement). In Section 3, a series of quantitative performance measures are recommended specific to freight transportation, as well as recommendations on how to assess performance against some of the FMS' freight-related objectives on a qualitative basis (using value judgment indicators).

2.1.3 Build on Current AMATS Approaches to Performance Measurement

The AMATS FMS performance framework should be developed taking into consideration key AMATS processes already in-place or underway. These include those established in the 2035 MTP and recent Congestion Management Plan.

AMATS 2035 Metropolitan Transportation Plan

The AMATS 2035 MTP was published in May 2012 with an interim update developed in 2016. The MTP will be updated again in 2016-2018, and will take into consideration the results of the FMS. Chapter 7 (e.g., Recommendations) of the 2035 MTP established nineteen recommended performance measures, and the associated goals and objectives that they will support. Table 7-14 of the MTP outlines the recommended MTP performance measures. The performance measures which could be relevant to freight (and transportation system optimization) are summarized in the Table 2-2.[2] However these performance measures apply to the transportation system as a whole, and they are not specific to freight transportation. Therefore, they are not recommended as performance measures for use in the FMS.[3]

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[2] AMATs 2035 Metropolitan Transportation Plan, Chapter 7: http://www.muni.org/Departments/OCPD/Planning/AMATS/2035%20MTP/AMATS%20Chapter-7_20120511_s.pdf

[3] A review of the Draft Interim MTP 2035 (provided for public comments in June 2015) was also carried out, though no specific performance measures were included in that report. http://www.muni.org/Departments/OCPD/Planning/AMATS/Documents/2015%20Docs/Interim_2035_MTP/Interim2035MTP_Public-Review-DRAFT_15y06m26d.pdf

Table 2-1: FMS Goals, Objectives, and Performance Measurement Approach

Goals	Objectives (bold indicates a freight-specific objective)	Quantitative Measurement	Qualitative Measurement
Goal 1: Provide a freight transportation system that moves goods safely and securely throughout the community; improves access; provides mobility; and supports a thriving, sustainable, broad-based economy.	**Minimize conflicts between freight and passenger vehicles and non-motorized travelers to reduce vehicle, pedestrian, and bicyclist crashes and reduce and/or eliminate road versus rail conflicts**	X	
	Identify short-term and low cost freight infrastructure improvement strategies		N/A – internal process
	Monitor system performance and make progress toward meeting performance targets		
	Optimize the transportation system to meet the needs of the Port of Anchorage, Ted Stevens International Airport, Alaska Railroad, military bases, employment centers, and industrial and commercial areas	X	
	Develop alternative multimodal access strategies to support major freight hubs and improve first/last mile connectivity between freight modes and major generators		X
	Define transportation links with freight investment(s) and economic activity		X
	Promote better integration of transportation and land use and target redevelopment/development in locations that are well-located and well-served by freight infrastructure		X
	Promote development of an effective roadway network that meets capacity needs and is designed to enhance freight mobility while reducing infrastructure impediments and bottlenecks	X	
	Provide transportation choices and improve system connectivity for all freight modes while improving intermodal system linkages and interactions between modes		X
Goal 2: Develop an efficient freight transportation network that considers the cost of building, operating, and maintaining the system; the equity of all users; public health impacts; community values; and social justice.	Consider the life-cycle costs and return on investment of projects when evaluating and selecting them		
	Minimize adverse impacts on the community, such as neighborhood through-traffic movements; noise, air, and light pollution; and impacts to the natural environment, such as water resources, fish habitat, watersheds and wetlands, and parklands	X	
	Design and landscape roads to maintain and enhance the attractiveness of neighborhoods, open space, and commercial corridors and centers.		

Goals	Objectives (bold indicates a freight-specific objective)	Quantitative Measurement	Qualitative Measurement
	Use context-sensitive design strategies, especially to support the development of mixed-use centers (such as town centers, employment centers, and redevelopment areas) and transit-supportive corridors with more pedestrian-, bicycle-, and transit-oriented street environments while recognizing the need to move freight into and throughout the community.		
Goal 3: Incorporate technology and best management practices that allow for improved freight movement in the Anchorage region.	**Develop a multimodal freight system that incorporates advanced technology**		**X**
	Incorporate freight technology trends into the region's transportation planning process		**N/A – internal process**
	Use technology, when appropriate, to develop an efficient multimodal system		
	Integrate Intelligent Transportation Systems for implementation while partnering with federal, state, municipal, and local agencies to optimize technologies		
Goal 4: Integrate freight needs and financing into transportation project prioritization processes for the region.	**Develop a reliable funding source for multimodal freight projects**		**N/A – internal process**
	Develop a freight project prioritization process		**N/A – internal process**
	Increase consideration of freight transportation needs in the MTP project prioritization process		**N/A – internal process**
	Improve forecasting techniques and long-term needs assessments		
	Consider all potential funding mechanisms and increase the use of innovative funding strategies		
	Educate key stakeholders and the public about the cost and benefit to constructing and maintaining freight infrastructure		**N/A – internal process**
	Collaborate and coordinate with key stakeholders regarding project planning and delivery		
	Invest in freight projects that enhance global competitiveness, freight mobility and reliability, and economic vitality		**N/A – internal process**
	Improve project delivery and implementation processes and scheduling		
Goal 5: Develop a multimodal freight system that includes	**Continue working with the Freight Advisory Committee to help define freight oriented policy**		**N/A – internal process**

Goals	Objectives (bold indicates a freight-specific objective)	Quantitative Measurement	Qualitative Measurement
effective partnerships to leverages opportunities and resources.	**Provide additional opportunities for collaboration and information sharing with the private sector/businesses (freight community)**		**N/A – internal process**
	Establish and support public private partnerships		**N/A – internal process**
	Develop interagency relationships to better coordinate freight system regulation		**N/A – internal process**
	Encourage freight expertise and knowledge within and across all agencies and among elected officials		**N/A – internal process**

Table 2-2. 2035 MTP Goals and Performance Measures Relevant to the FMS

MTP Goal	Objective relevant to freight	Performance measure relevant to freight
2. Provide a transportation system that moves people and goods safely and securely throughout the community.	"Minimize conflicts between freight and passenger vehicles and non-motorized travelers"	PM 7: Hours of vehicle delay per average daily traffic at crossing
4. Develop a transportation system that supports a thriving, sustainable, broad-based economy by locating and using transportation infrastructure and facilities to enhance community development.	"Optimize the transportation system to meet the needs of the Port of Anchorage, Ted Stevens Anchorage International Airport, the Alaska Railroad, the military bases, employment centers, and industrial and commercial areas"	PM 9: Volume to Capacity (V/C) Ratios along high-priority freight routes (commercial and military) and/or along connections from key destinations to major highways

Source: AMATS 2035 Metropolitan Transportation Plan, Chapter 7

AMATS Congestion Management Process (CMP) and Performance Measures

Development of a Congestion Management Process (CMP) is federally required for metropolitan areas with populations exceeding 200,000 (Transportation Management Areas). The CMP is a structured process designed to incorporate and address congestion issues into the regional transportation planning process. The CMP both informs and receives information from other elements of the planning process, including the MTP and Transportation Improvement Program (TIP).[4] It is particularly relevant to freight given congestion affects all freight modes and stakeholders.

In February 2016, the Congestion Management Process Update was approved by the Municipality of Anchorage (MOA)[5]. Recommended measures were developed to understand congestion problems, assess potential solutions, and evaluate implemented strategies in Anchorage. The performance measures were identified to consider:

- Measures already used or identified in previous AMATS efforts, including past CMPs/Status of the System Reports and the 2035 Metropolitan Transportation Plan;
- MAP-21 performance measures (as documented in the rulemaking available at that time and American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Performance Management (SCOPM) Task Force Findings on MAP-21 Performance Measure Target-Setting); and
- The need for measures to be easily understood, supported with available data and models, consistent with other AMATS planning processes, as well as providing adequate comparisons of congestion, and the ability to track trends over time

[4] http://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/chap01.cfm#sec1.1

[5] http://www.muni.org/Departments/OCPD/Planning/AMATS/Documents/CMP/2016/CMPFINAL_3316.pdf

Table 2-3 presents the recommended measures from the CMP Update report that are directly relevant to freight.[6] These have been taken into consideration in the development of the specific performance measures for the FMS presented later in Section 3 below.

2.1.4 MAP-21 and FAST Act

The FMS and upcoming MTP Update must consider the performance measurement requirements of MAP-21 and the Fixing America's Surface Transportation (FAST) Act. A key feature of MAP-21 was the establishment of a performance- and outcome-based program, with the objective for regions to invest in projects that collectively make progress towards national goals. Our review of the FAST Act suggests that key sections pertaining to performance measurement have not materially changed. As such, the information presented below from MAP-21 is still pertinent under the FAST Act and will continue to be used as the basis for developing the performance measures framework for the Anchorage FMS.

MAP-21 required the Secretary of Transportation—in consultation with States, MPOs, and other stakeholders—to establish performance measures under the four programs shown in the Table 2-4 below.[7] Additionally, within the four programs, MAP-21 requires the creation of the specific performance measures also shown in Table 2-4.[8]

MAP-21 called for the Secretary of the DOT to promulgate rulemaking establishing performance measures shown in Table 2-4 listed above not later than 18 months after the enactment of MAP-21 (April 1, 2014). The rulemaking process is still underway and to date FHWA has finished or has a rulemaking underway to establish all national performance measures.

The first Notice of Proposed Rulemaking (NPRM) proposed measures to carry out the Highway Safety Improvement program (HSIP) assessing serious injuries and fatalities on all public roads. The final rule covering the HSIP was published on March 15, 2016 (FR Vol.81 No.50).

The second performance measure NPRM (RIN: 2125-AF35) proposes measures to assess pavement and bridge conditions on the Interstate and non-Interstate NHS for the purpose of carrying out the NHPP. These rules are not yet final.

The final performance measure NPRM (published April 22, 2016) suggests measures for the performance portions of the (National Highway Performance Program (NHPP), freight movement on the Interstate system and the measures under the CMAQ program. These rules are not yet final.

A summary of the final/proposed performance measures is provided in the following sections, organized by program and presented in the order rulemakings were released.

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[6] The table excludes recommended measures related to "Public Transportation", "Rideshare Participation" and "Pedestrian and "Bicycle Elements" which are not directly relevant to freight transportation.

[7] National performance measures will be fixed by the federal government, though States and metropolitan organizations have flexibility in setting the specific targets under each measure.

[8] https://www.fhwa.dot.gov/tpm/rule/pm3_nprm.pdf

Table 2-3. MOA CMP Performance Measures of Relevance to FMS[9]

Performance Measure	Definition	Data Needs	Comments
Daily Truck Volumes by Location	Average daily volume of single-unit and truck/ tractor units at selected roadway locations around the Anchorage metropolitan area	Daily traffic volumes for single-unit trucks and truck/tractor units	Daily truck volumes reported for selected locations only. Does not meet CMP criteria of Adequate Measure of Congestion. Difficult to track regional trend.
Annual hours of truck delay	Travel time above the congestion threshold in units of vehicle-hours for Trucks on the Interstate Highway System	Corridor segments (O-D pairs), freight VMT (corridor length, truck volume), Truck speed or TT, determination of congestion threshold (e.g., speed < 35 mph, 85% of FFS, etc.). NPMRDS is potential data source.	Provides an indicator of the amount of extra time spent by each truck on an Interstate corridor based upon a state-determined threshold of what constitutes congestion and/or other factors such as severe weather, safety inspections, or roadway geometrics. MAP-21 proposes annual hours of delay on the Interstate Highway System, which would include Glenn Highway and Seward Highway. Meets MAP-21 national goals.
Truck reliability index (RI_{80})	Ratio of the total truck travel time needed to ensure on-time arrival to the agency-determined threshold travel time (e.g., observed travel time or preferred travel time)	Corridor segments (O-D pairs), truck speed or TT, agency-determined threshold truck travel time (Note – recommended to use same speed threshold as for annual hours of truck delay). NPMRDS is a potential data source.	Provides an indicator of the reliability of truck travel times on an Interstate corridor, or the extra time needed to ensure on-time arrival. Meets MAP-21 national goals.

Source: Cambridge Systematics, Congestion Management Process Update & Status of the System Report, Anchorage Bowl & Chugiak-Eagle River: February 2016.

[9] The table excludes recommended measures related to “Public Transportation”, “Rideshare Participation” and “Pedestrian and Bicycle Elements”

Table 2-4. National Performance Measure Programs and Performance Measures

National Performance Measure Programs and the Associated Performance Measures
National Highway Performance Program (NHPP) • Pavement condition on the Interstate System • Pavement condition on the non-Interstate National Highway System (NHS) • Bridge Condition on the NHS • Performance of the Interstate System • Performance of the National Highway System (excluding the Interstate System)
Highway Safety Improvement Program (HSIP) • Serious injuries per vehicle miles traveled • Fatalities per vehicle miles traveled • Number of serious injuries • Number of fatalities
Congestion Mitigation and Air Quality Program (CMAQ) • Traffic congestion • On-road mobile source emissions
National Freight Movement • Freight movement on the Interstate System.

Source: 23 U.S.C 150(c)

2.1.5 Highway Safety Improvement Program

Table 2-5 displays the final performance measures for the HSIP. The safety performance measures were the first rulemaking to be released and are the only ones that are final to date.

Table 2-5. Safety Performance Measures

Rulemaking Area	Proposed / Final Measures	Measure Applicability	Definition
Highway Safety Improvement Program (FINAL)	Number of Fatalities	All public roads	5-year rolling average of the total number of fatalities
	Rate of Fatalities	All public roads	5-year rolling average of the State's fatality rate per VMT Calculate the number of fatalities per 100 million VMT for each of the most recent 5 consecutive years, add the results, and divide by 5
	Number of Serious Injuries	All public roads	5-year rolling average of the total number of serious injuries
	Rate of Serious Injuries	All public roads	5-year rolling average of the State's serious injuries rate per VMT Calculate the number of serious injuries per 100 million VMT for each of the most recent 5 consecutive years, add the results, and divide by 5
	Number of non-motorized fatalities and non-motorized serious injuries	All public roads	5-year rolling average of the total number of non-motorized fatalities and non-motorized serious injuries

Source: 23 CFR 490.207

2.1.6 National Highway Performance Program

The following section presents the NHPP performance measures. The NHPP performance measures were split between two rulemakings, the first in January 2015 and the second in April 2016. Neither rulemakings have been finalized to date

Pavement and Bridge

The performance measures for the NHPP are calculated based-on International Roughness Index (IRI), cracking, rutting, and faulting. The performance measures applicable to a segment of pavement vary based on the type of pavement. The following displays the various pavement types and the associated performance measures.

- Asphalt – Rutting, Cracking, and IRI;
- Jointed Concrete – Faulting, Cracking and IRI; and
- Continuously Reinforced Concrete – Cracking and IRI.

The condition of pavement is classified as good, fair, and poor. Each performance measure includes unique thresholds that classify a segment of pavement as good, fair, and poor. IRI also varies based on whether the segment is in urbanized areas (e.g., defined as having a population greater than one million). Table 2-6 presents the thresholds for condition for each measure.

Table 2-6. Pavement Classification Thresholds

Measure	Good	Fair	Poor
IRI (inches/mile)	<95	95-170 (non-urban) 95-220 (urban)	>170 (non-urban) >220 (urban)
Cracking (percent)	<5	5-10	>10
Rutting (inches)	<0.2	0.20-0.40	>0.40
Faulting (inches)	<0.05	0.05-0.15	>0.15

Source: 80 FR 325

Table 2-7 displays the pavement performance measures and the IRI, cracking, rutting and faulting classification required to report the pavement as good and poor. The performance measures for NHS bridges are based on three parts of a bridge; the deck, superstructure, and substructure. Each portion has an individual rating, the lowest of which defines the condition of the bridge. Table 2-8displays the classification of ratings as good, fair, and poor. Note that the rating of culverts relies on one part compared to three for bridges. As shown in Table 2-9, the bridge performance measures are based on the overall area of bridge decks classified as good or poor on the NHS within the state.

Table 2-7. Pavement Performance Measures

Rulemaking Area	Proposed / Final Measures	Measure Applicability	Definition
National Highway Performance Program (Proposed)	Percentage of pavements of the Interstate System in "Good" condition	The Interstate System	Asphalt and jointed concrete Rated good on all three applicable measures Continuous reinforced concrete Rated good on both applicable measures
	Percentage of pavements of the Interstate System in in "Poor" condition	The Interstate System	Asphalt and jointed concrete Rated poor if two or more applicable measures are rated poor Continuous reinforced concrete Rated poor if both applicable measures are rated poor
	Percentage of pavements of the non-Interstate NHS in "Good" condition	Non-Interstate NHS	Asphalt and jointed concrete Rated good on all three applicable measures Continuous reinforced concrete Rated good on both applicable measures
	Percentage of pavements of the non-Interstate NHS in "Poor" condition	Non-Interstate NHS	Asphalt and jointed concrete Rated poor if two or more applicable measures are rated poor Continuous reinforced concrete Rated poor if both applicable measures are rated poor

Source: 80 FR 325

Table 2-8. Bridge Classification Thresholds

Asset Type	Measure	Good	Fair	Poor
Bridge	Deck	≥7	5 or 6	≤4
	Superstructure	≥7	5 or 6	≤4
	Substructure	≥7	5 or 6	≤4
Culvert	Culvert	≥7	5 or 6	≤4

Source: 80 FR 325

Table 2-9. Bridge Performance Measures

Rulemaking Area	Proposed / Final Measures	Measure Applicability	Definition
National Highway Performance Program (Proposed)	Percentage of NHS bridge deck classified as in "Good" condition	NHS	The overall area of a state's bridge deck rated as good over the state's total deck area.
	Percentage of NHS bridge deck classified as in "Poor" condition	NHS	The overall area of a state's bridge deck rated as poor over the state's total deck area.

Source: 80 FR 325

2.1.7 System Performance

System performance is defined by the Level of Travel Time Reliability (LOTTR) and the Interstate Peak Hour Travel Time Ratio (PHTTR). LOTTR is the ratio of the 80th percentile of

travel time to the 50th percentile of travel time. Essentially this measure is applied to assess the reliability of a roadway.

PHTTR is the ratio of the longest average hourly travel time to the desired travel time. The desired travel time is defined by the State DOT or MPO. PHTTR essentially compares the hour with the worst travel times on an average annual basis during peak traffic hours (6am-9am and 4pm-7pm) compared to an aspirational performance consistent with the plan and design of the roadway specified by the DOT and MPO. LOTTRs and PHTTRs with 1.5 are defined as reliable (Table 2-10).

Table 2-10. System Performance Measures

Rulemaking Area	Proposed / Final Measures	Measure Applicability	Definition
National Highway Performance Program (Proposed)	Percent of the Interstate System providing for reliable travel times	The Interstate System	Percent of the Interstate System with LOTTR < 1.5
	Percent of the non-Interstate NHS providing for reliable travel times	The non-Interstate NHS	As above for non-Interstate NHS
	Percent of the Interstate System where peak hour travel times meet expectations	The Interstate System in urbanized areas with a population over 1 million	Percent of the Interstate System with PHTTR < 1.5
	Percent of the non-Interstate NHS where peak hour travel times meet expectations	The non-Interstate NHS in urbanized areas with a population over 1 million	As above (PHTTR), for non-Interstate NHS

Source: 81 FR 23805

2.1.8 National Freight Movement

The freight specific performance measures include Truck Travel Time Reliability (TTTR) and Average Truck Speed (Table 2-11). TTTR is similar to LOTTR, but is the ratio of the 95th percentile of travel time to the 50th percentile and only uses truck travel times as opposed to all vehicles. TTTR essentially defines how much extra time compared to the average trip time a truck would have to use to ensure it arrived at its destination on time 95 percent of the time. For the purposes of reporting system performance, a TTTR of less than 1.5 is considered reliable. A TTTR of 1.5 means that a truck driver would have to build in 50 percent more time than average to the trip to ensure an on-time arrival 95 percent of the time. Average truck speed is a straight average of truck speeds reported in five minute bins for a segment throughout the year. An average speed of greater than 50 miles per hour (MPH) is defined as uncongested

Table 2-11. Freight Performance Measures

Rulemaking Area	Proposed / Final Measures	Measure Applicability	Definition
National Freight Movement (Proposed)	Percent of the Interstate System Mileage providing for Reliable Truck Travel Time	The Interstate System	Truck Travel Time Reliability (TTTR) <1.5
	Percent of the Interstate System Mileage Uncongested	The Interstate System	Average Truck Speed ≥50 MPH

Source: 81 FR 23805

2.1.9 Congestion Mitigation and Air Quality Program

The CMAQ performance measures are annual hours of excessive delay per capita and total tons of emissions reduced from CMAQ projects (Table 2-12). Annual hours of delay per capita is used to assess the transportation performance of large urbanized areas (population over one million) that contain nonattainment or maintenance areas for any of the criteria pollutants (e.g., O3, CO, PM10 and PM2.5). Excessive delay is defined when highway users are traveling at speeds less than 35 MPH on freeways and expressways or 15 MPH on all other NHS roadways. Excessive travel times are weighted based on hourly traffic volumes that experience delay throughout the year.

Air quality is measured by emissions reductions of a CMAQ project of the criteria pollutants and precursors CO, PM10, PM2.5, volatile organic compounds and NOX. FHWA does not specify an approach to measuring pollutants in their rulemaking.

Table 2-12. Congestion and Air Quality Performance Measures

Rulemaking Area	Proposed / Final Measures	Measure Applicability	Definition
Congestion Mitigation and Air Quality Program (PROPOSED)	Annual Hours of Excessive Delay Per Capita	The NHS in urbanized areas with a population over 1 million in nonattainment or maintenance for any of the criteria pollutants under the CMAQ program (e.g., not currently applicable to the Anchorage region).	Total excessive delay (vehicle-hours) for each reporting segment on the NHS
	Total tons of emissions reduced from CMAQ projects for applicable criteria pollutants and precursors	Projects financed with CMAQ funds in all nonattainment and maintenance areas for one or more of the criteria pollutants under the CMAQ program	Reporting on emissions levels (short tons) per year for a range of pollution categories (CO, PM10, PM2.5, volatile organic compounds and NOX) resulting from CMAQ projects.

2.1.10 Implementation Timeframe for MAP-21 Performance Measures

Rather than waiting for all three rules to be finalized before implementing the MAP-21 performance measure requirements, FHWA will phase in the effective dates for the three final rules with individual effective dates.

In terms of adhering to the federal rules, Sections 1201 and 1202 of MAP-21 require that States set performance targets that reflect the federal measures no later than 1 year following promulgation of the rules[10], and that metropolitan planning organizations establish matching performance targets not later than 180 days after the State has established their performance targets[11] (these requirements are unchanged by the FAST Act to any significant extent). States and MPOs must also coordinate with each other, and with public transportation organizations in their regions, in the

[10] Title 23, Section 150 (c)

[11] MAP-21, Section 1201.

development of performance targets and measures, and integrate each other's performance plans into the performance-based process. A rulemaking to update the Metropolitan and Statewide Planning Regulations (RIN 2125-AF52) at 23 CFR 450 discusses this coordination requirement.[12]

Fixing America's Surface Transportation (FAST) Act and Map-21. On December 4, 2015, President Obama signed into law a five-year ***Fixing America's Surface Transportation (FAST) Act***, transportation legislation that authorizes a number of Titles, including Title 23 that outlines the role of highways. A review of the *FAST Act* suggests that key sections pertaining to performance measurement (Section 1201 and 1202) have no impact on the performance measurement requirements and targets for Metropolitan, State and Non-Metropolitan Transportation planning organizations. In particular, there is still a requirement (established through MAP-21) in Title 23, Section 150(c), which requires the Secretary of Transportation to promulgate rulemaking to establish performance metrics. As such, we believe the information presented below from MAP-21 is still pertinent under the FAST Act.

Source: FAST Act. https://www.gpo.gov/fdsys/pkg/CRPT-114hrpt357/pdf/CRPT-114hrpt357.pdf

2.1.11 Alaska State-Level Performance Measures

The performance measures included in the AMATS FMS and 2035 MTP may reflect performance measures that have been adopted at the State level (to be determined upon release of the DOT&PF's updated Let's Keep Alaska Moving Plan 2036 anticipated for release later in 2016).. The Alaska Department of Transportation and Public Facilities (DOT&PF) collects and analyzes data to meet the needs of a range of state and federal programs. The key data of relevance to freight performance includes:

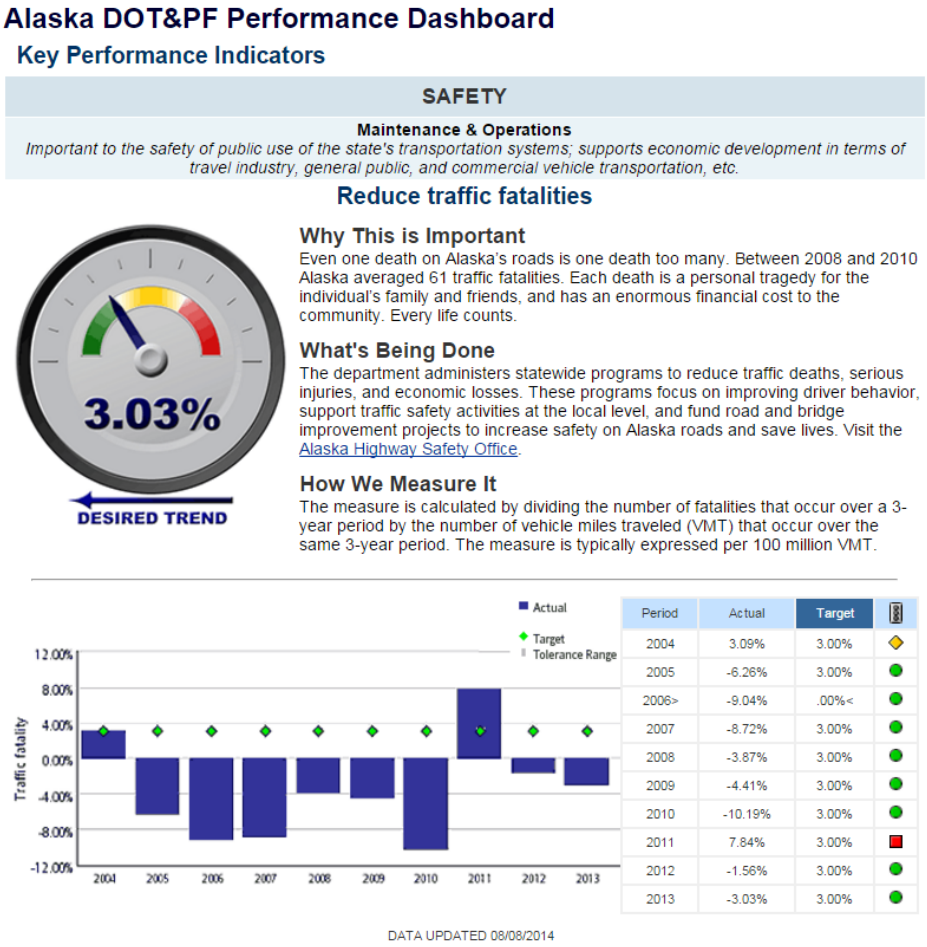
- **Motor Vehicle Crash data**, including number of crashes, accident rates / fatalities per VMT, vehicle types involved in crashes, etc. This information is gathered for the Highway Safety Improvement Project (HSIP), Strategic Highways Safety Plan (SHSP), and Fatality Analysis Reporting System (FARS).
- **Traffic Data**, which includes average annual daily traffic (AADT), vehicle classification, vehicle miles travelled (VMT), Weigh-in-Motion (WIM). The data is used – among other things – to meet FHWA reporting requirement for the Highway Performance Monitoring System (HPMS)[13].

The DOT & PF website also hosts a public "Performance Dashboard" related to safety and infrastructure key performance indicators. An illustration of the dashboard for the KPIs related to reducing traffic fatalities (as measures by the number of fatalities divided by number of VMT) is presented in Figure 2-2.

[12] https://www.fhwa.dot.gov/tpm/rule/pm3_nprm.pdf

[13] The Highway Performance Monitoring System (HPMS) is a federally maintained software product used for submitting Alaska's highway data to the FHWA. HPMS is the primary source of transportation data that FHWA uses to determine Alaska's share of annual federal transportation funds.

Figure 2-2. Alaska DOT & PF Performance Dashboard Snapshot



Source: http://dot.alaska.gov/performance-dash/safety-mno2.shtml

The most recent Alaska "**Let's Get Moving 2030: Long-Range Transportation Plan**" was published in 2008, prior to MAP-21 enactment. Action 2.2 in the Long-Range Transportation Plan (LRTP) is to "Establish a core set of performance measures to monitor performance against plan goals". The next LRTP is due to be complete in 2016.[14]

[14] http://dot.alaska.gov/stwdplng/areaplans/lrtpp2014/plan-status.shtml

3 FMS Freight Performance Measures

This section presents a recommended set of performance measures, data and approaches for measuring, monitoring and reporting performance of freight-focused activities to support the AMATS FMS. It also describes an approach to qualitatively assess the progress of a number of FMS objectives, when the use of quantitative measures is not possible or desirable.

3.1 Linking Performance Measures to Objectives

Table 3-1 presents the FMS objectives and the performance measures recommended using information already available to AMATS, and:

- Reflect the goals and objectives defined for the FMS;
- Reflect the MAP-21, Anchorage CMP, and Alaska DOT & PF performance measurement approaches;
- Can practically be measured, updated, and tracked on an on-going basis; and
- Provide insight about the performance of the freight system specifically, as opposed to the transportation system generally.

The objectives and quantifiable performance measures which meet the criteria above are presented in Table 3-1.

Table 3-1: Proposed FMS Performance Measures

FMS Objective(s)	Performance Area	Relevant MAP-21 Goal Area(s)	Proposed Performance Measure(s)
Minimize conflicts between freight and passenger vehicles and non-motorized travelers	Safety	Safety	• Truck Crash Injury/Fatality Index: Fatality and Serious Injury Crash Rate of incidents involving Commercial Vehicles per 100 million truck VMT
Optimize the transportation system to meet the needs of the Port of Anchorage, Ted Stevens Anchorage International Airport, the Alaska Railroad, the military bases, employment centers, and industrial and commercial areas	Freight System Optimization	Infrastructure Condition, Congestion Reduction, System Reliability, Freight Movement and Economic Vitality	• Truck Travel Time Index • Truck Travel Reliability Index (RI_{95}) • Annual hours of truck Delay • Increase in centerline miles of NHS roads • Percent of the Interstate System Mileage providing for Reliable Truck Travel Time • Percent of the Interstate System mileage uncongested

FMS Objective(s)	Performance Area	Relevant MAP-21 Goal Area(s)	Proposed Performance Measure(s)
Reduce energy consumption and air pollution	Environment	Environmental Sustainability	• Annual Hours of Truck Delay

3.2 Recognizing Quantitative Limitations

Inventing new, complex measures that are either not yet (or never will be) supported using available data or that are difficult to link to the freight sector causally is neither practical nor particularly useful. As such, the following freight-related FMS objectives are not assigned quantifiable performance measures, but rather assigned qualitative assessments (as described in above in Section 2.1.2):

- Improve intermodal system linkages;
- Reduce multimodal freight infrastructure impediments;
- Minimize adverse impacts on the community, such as neighborhood through-traffic movements; and
- Minimize noise and light pollution impacts, to the extent practical.

The FMS objective to "reduce and/or eliminate road versus rail conflicts" could, in theory, be measured on a quantitative basis. However, data is not available to systematically quantify this objective.

Note on Truck-focused Performance Measures

Freight transportation in the AMATS region spans multiple transportation modes, but the focus of the proposed performance measures is largely on truck freight for a number of reasons. First, transport of any type of freight almost always involves use of trucks at some stage in the supply chain, even if it is just the first and last mile. As such, truck transit and reliability indexes provide a strong indication (or have an impact) on the performance of the entire freight supply chain. Second, AMATS is an organization focused on urban issues, where truck traffic has a significant impact on the performance of other aspects of the metropolitan area. Third, AMATS does not have direct control or significant influence on the performance of a number of non-truck related transportation services or infrastructure (port, rail, airport, military bases). As such, bearing in mind the best practice rule of measuring what AMATS can influence, a focus on truck traffic and road conditions appears reasonable.

3.3 Performance Category: Safety

Safety measures are designed to link to the FMS Objective: minimize conflicts between freight and passenger vehicles and non-motorized travelers. These measures are presented below.

3.3.1 Truck Safety Performance Measure: Fatality and Serious Injury Crash Rate per 100 million VMT

Truck safety is a concern because of the size, weight, and reduced handling characteristics of trucks compared to automobiles and other vehicles on the road. To measure the truck safety performance, the primary measure proposed is the number of vehicle crashes (fatalities, injuries) involving trucks per 100 million vehicle VMT.[15] MAP-21 includes a 5-year rolling averages for fatality and serious injury rates per 100 million VMT, but this rate is not specific to freight vehicles.

Data

The DOT&PF Measurement Standards and Commercial Vehicle Enforcement Data presents a summary of motor vehicle crashes throughout the state. These data pertain directly to Commercial Motor Vehicle (CMV) crashes, and provide details on the characteristics of the crash, including reports of fatalities, injuries, total crashes, reportable crashes, and area types (rural / urban). These data do not provide location information, but do summarize crash data at the state level.

VMT is the average number of vehicle-miles traveled per day, calculated as the AADT of a roadway segment multiplied by the length of the roadway segment. Potential data sources include the AMATS regional travel demand model estimates of traffic volume by roadway segment (for Anchorage region) or the VMT reported in the DOT&PF's Highway Performance Monitoring System (HPMS - which is available representing volumes and other characteristics of urban and rural roadway classifications in the AMATS region). If available, VMT to calculate this performance measure should reflect truck travel only.

Approach

Truck safety performance will be calculated with the following formula (which could be replicated with truck fatality data):

$$\text{Truck Crash Injury Index} = \frac{\text{Total Number of Crashes with Injuries Involving Trucks}}{\text{100 million truck VMT (if available)}}$$

Limitation

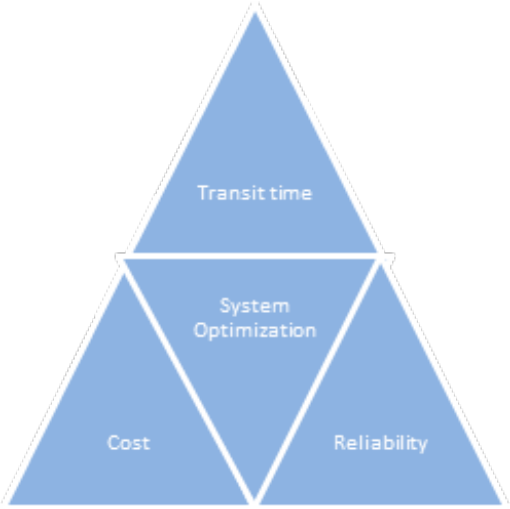
Analyzing crash information for the AMATS region exclusively will be more directly relevant to the FMS than measuring crashes at the state level. One option would be to compare the urban commercial vehicle crashes with the urban VMT, assuming that the geographical boundaries of the regions reported are the same.

Regional crash information is also available from MOA crash reports. However, to create an index (which considers overall traffic levels), this information will need to be reconciled with DOT&PF VMT data with Anchorage specific data.

[15] This performance measure uses VMT for *all* vehicles types in its calculation. We are not aware of a VMT measurement available exclusively for commercial VMT, which would be a preferable choice.

Note regarding Resiliency and Security Measures. We are not aware of any data to quantitatively track resiliency and security issues which would specifically reflect resiliency or security in the freight sector. This type of information lends itself more to qualitative analysis. One option would be to include a qualitative question to freight sector stakeholders in the value judgment context to ask about their experiences regarding resiliency and security. For example, a question might include: "Has the security situation in the trucking sector improved, stayed the same, or gotten worse over the past year? Please provide additional explanation as warranted."

3.4 Performance Category: Freight System Optimization



Freight system optimization measures link to the FMS Objective: Optimize the transportation system to meet the needs of the Port of Anchorage, Ted Stevens Anchorage International Airport, the Alaska Railroad, the military bases, employment centers, and industrial and commercial areas. Land use also plays an important role in creating an optimal freight system. Existing land uses affect cost, travel time, and variability of goods movement in the freight network and are captured in this measure. In addition, meeting the needs of these important freight generators trickles down and contributes in serving the city's needs of goods, food, and other consumer freight. Freight system optimization considers the performance of the freight system supply chain as a whole, attempting to measure freight fluidity through measurement of transit time and reliability for freight related vehicles.

Achieving the objective noted above will mean different things to different stakeholders. For example, port, airport, and railroad operators will want quick turnaround of vessels, airplanes, trucks and railcars that drop off and pick-up freight. In contrast, employment centers will be more interested in decreasing freight traffic in urban centers so as to reduce delays for public and transit vehicles.

Dozens of performance indicators could be developed and reported to reflect all of the system performance and optimization aspects for each stakeholder. A better approach is to consider the performance factors that affect all freight transportation system users: cost, travel time (speed), and reliability (variability of travel time).

Measuring the cost of transportation is not particularly valuable for two reasons. First, transportation costs are heavily influenced by economic and market conditions and not just infrastructure considerations (e.g., price of gas, commodity prices, and labor costs). Second, public agencies have very little direct influence on such costs. While measuring transportation costs can provide an indication of the overall economic activity related to transportation services (freight indicator), it would be more valuable to focus on measures where public investment has an influence on performance.

Measuring travel time and reliability provide better assessments of overall system performance affecting the Anchorage region. These items can be affected by and measured by looking at both transportation system efficiency and the condition of transportation system infrastructure.

We recommend four performance measures to track progress against this objective. The first three performance measures have been proposed to address freight system optimization in terms of freight fluidity. A fourth measure reflects the importance of infrastructure conditions for freight (and other) vehicles, including:

- Truck Mobility (free flow vs. actual truck travel speeds);
- Truck Reliability (variability in truck travel times);
- Truck Efficiency (annual hours of truck delay); and
- Infrastructure condition (pavement conditions).

3.4.1 Truck Mobility Performance Measure (Truck Travel Time Index)

Truck mobility and accessibility improvements will be evaluated using *Truck Travel Time Index (*TTTI) which measures truck related delays primarily due to peak period congestion. TTTI evaluated the different in travel time between 'free flow' (traffic-free) and congested flow conditions.

Data

The FHWA National Performance Management Research Data Set (NPMRDS) is available to MPOs and State DOTs to support performance measurement activities. The NPMRDS includes data on truck travel time along National Highway System roads. Truck travel time is collected in five minute intervals, and calculated as the ratio between the segment length and the average speed on the segment. Average segment speed is determined from freight trucks' individual GPS equipment.

AMATS would need to identify the key segments (or combination of segments) of the road network of interest with respect to freight traffic, where the TTTI would be measured on a regular basis. These could include segments which are linked to critical multimodal facilities (e.g., connections to airport, port, and key military facilities). AMATS' recent CMP noted that at least nine Anchorage corridors of interest (as listed in the 2010 Status of the System Report) could be tracked in the morning, midday, and afternoon peak periods.

Approach

The speed-based TTTI is calculated using the following formula:

$$\text{Truck Travel Time Index} = \frac{\text{Free Flow Truck Speed (miles/hour)}}{\text{Observed Average Truck Speed during Peak Period (miles/hour)}}$$

The free flow truck speed could be calculated based on the speed limit, or another "ideal" speed for trucks to pass through a given segment (or combination of segments), at a given period in time (peak period(s)). AMATS would set a benchmark index of what would constitute good, fair, or poor performance, in terms of a target.

Presentation

The results could be presented as an index (value) for a series of segments (corridors) which could be measured on a regular basis. The results could also be presented in the format of a map of the Anchorage area, identifying road segments with good, fair, or poor performance.

Limitation

The NPMRDS is a very large dataset which can be cumbersome to work with in initial stages, for example, to identify and join specific segments that are interesting for freight transportation. The NPMRDS also only collects data on the National Highway System routes, not local roads.

3.4.2 Truck Travel Time Reliability Performance Measure (Truck Travel Time Reliability Index – RI_{95})

Truck travel time reliability is a measure of the consistency or dependability in travel times between two points. Unreliable freight transportation requires added supply chain redundancy and cost for businesses, making reliability a key performance metric. Reliability of the freight transportation system influences logistics decisions, such as the number and location of manufacturing plants and distribution centers that affect local, regional and state economics.

Reliability is measured through non-recurring delay, which refers to unexpected delays caused by closures or restrictions resulting from inclement weather, crashes and construction activities. Non-recurring delay is measured by Truck Travel Time Reliability Index (RI_{95}). The RI_{95} illustrates the extra "buffer" time needed for on-time delivery while accounting for non-recurring delay. It measures the ratio of total truck travel time needed to ensure on-time delivery 95 percent of the time (95th percentile of truck travel time for a segment to the normal truck travel time (50th percentile of truck travel time for a segment).

Data

The Truck Reliability Index RI_{95} could be developed for selection road segments (corridors) that are particularly important to the freight sector – likely the same corridors being assessed for truck mobility.

The 95th and 50th percentile travel time could be obtained from NPMRDS data (based on actual speeds). .

Approach

The following formula could be applied for each segment of road, for a given snapshot of time each year.

$$\text{Truck Reliability Index } (RI_{95}) = \frac{95^{th} \text{ Percentile Travel Time}}{50^{th} \text{ Percentile Travel Time}}$$

Presentation

As with the TTTI, the results could be presented as an index (value) for a series of segments (corridors) which could be measured on a regular basis. The results could also be presented in the format of a map of the Anchorage area, identifying road segments with good, fair or poor reliability in terms of travel time consistency.

In terms of outputs, a Reliability Index of 1.50, for example, would indicate that truckers and shippers should allow 30 minutes for a trip that would take only 20 minutes at the agency-determined congestion threshold conditions (20 minutes times 1.50 = 30 minutes).

The proposed rulemaking for MAP-21 defines the percent of the interstate system mileage providing reliable truck travel times as the reporting metric for this performance measure. Reliable truck travel times are defined as those direction miles having a truck travel time reliability of less than 1.5.

Limitation

Similar to the TTTI measure, the NPMRDS can be cumbersome to work with initially and only covers major freight corridors.

3.4.3 Average Truck Speed

Average truck speed is the MAP-21 performance measure used to define the proportion of uncongested Interstate mileage in a state. Congestion is defined in the proposed rulemaking as average interstate speeds of less than 50 MPH. FHWA is using 50 MPH as an indicator of congestion on the Interstate system because the speed limits on Interstates are typically 55 MPH or greater.

Data

Average truck speed could be developed for a selection of road segments (corridors) that are particularly important to the freight sector – likely the same corridors being assessed for truck mobility. At a minimum these corridors must include Interstates to be in compliance with the proposed performance measures in MAP-21. NPMRDS data is the recommended data set to define average truck speeds.

Approach

The following formula could be applied for each segment of road, for a given snapshot of time each year.

$$\text{Average Truck Speed } (s) = \frac{\sum_{b=1}^{T} \frac{Segment\ Length}{Truck\ Travel\ Time}}{T}$$

Where:

b = a 5-minute interval for segments

s = the reporting segment

T = total number of time intervals in the full calendar year

Presentation

The results could be presented as a system measure on a regular basis. The results could also be presented in the format of a map of the Anchorage area, identifying road segments with various average truck speeds.

The proposed rulemaking for MAP-21 defines the percent of Interstate Systems direction-miles providing average truck speeds of at least 50 MPH times as the reporting metric for this performance measure.

Limitation

Similar to the TTTI measure, the NPMRDS can be cumbersome to work with initially and only covers major freight corridors.

3.4.4 Annual Hours of Truck Delay Performance Measure

Annual hours of truck delay measures the economic cost of congestion on the freight industry. Traffic congestion and delay are characterized by slower speeds, longer trip times, and increased queuing, and impact truck mobility significantly. Annual hours of truck delay captures all of these characteristics and is a primary measure of freight performance.

Truck delay is also a good proxy for environmental impact in terms of energy consumption and air pollution, as increased truck delay is associated with additional idling and fuel consumption. As such, this performance measure can also be used to measure progress against the FMS objective to “reduce energy consumption and air pollution”.

Data

The following data will be used to calculate annual hours of truck delay.

- Speed limits using the HPMS (or other sources), as an indicator of free flow travel time;
- Real-time truck operating travel times at peak periods (from NPMRDS data); and
- Vehicle classification traffic counts.

Vehicle classification information could be obtained from the Commercial Vehicle Intelligent Systems Network (CVISN), a Federal Motor Carrier Safety Administration (FMCSA)-supported initiative using Intelligent Transportation Systems (ITS) technology to monitor commercial vehicle traffic. Alaska DOT&PF also collects vehicle classification counts, measuring traffic volume by type of vehicle, axle arrangements, number of

trailers and other vehicle characteristics. At key permanent locations, data is collected throughout the year using permanently installed detectors and counters.[16]

Approach

Delay is defined as the time between free flow speed and actual operating speed along a defined roadway segment. Delay is higher during congested peak periods compared to off-peak periods. Delay per truck is multiplied by peak period truck traffic volumes, and summed to identify total daily hours of truck delay. Peak hour factors will be used to estimate peak period truck traffic using vehicle commercial vehicle counts (daily truck volume). AMATS could use the following formula:

> Annual hours of truck delay = (Congested travel time – free flow travel time) * daily truck volumes * 306[17]

Limitations

Assessing truck delay using this formula requires data inputs from three different measurement systems: HPMS, NPMRDS and CVISN. It is not clear at this stage if information is available for the same segments in a compatible format, though this measure could be developed over time if appropriate.

This measure would be limited to considering delays on major corridors (not local roads), given the reliance on NPMRDS data.

Presentation

The annual truck hours of delay could also be summarized by peak period (morning and afternoon) on a map of the Anchorage region.

3.4.5 Infrastructure Condition Performance Measure

Poor pavement conditions can cause damage to trucks and cargo, and also impede traffic flow, contributing to congestion and unreliability. The recommended approach to measure infrastructure conditions considers using a metric that is already tracked and reported on publicly by the Alaska DOT &PF: Increase in centerline mines of NHS roads meeting department standards.

Data

Data for this measure will be obtained from DOT&PF. Through the HPMS, the DOT&PF monitors and tracks NHS road conditions. Each year, the Department identifies the construction projects on the NHS System that have been completed. That list of projects is then reviewed to determine which projects brought the roads up to department standards and the total centerline mileage is calculated.

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[16] http://www.dot.alaska.gov/stwdplng/transdata/traffic.shtml

[17] The Highway Capacity Manual (Special Report 209, Transportation Research Board, 2000) suggests an average truck working week of five (5) weekdays at full capacity and two weekend days at 44% capacity. This equates to 306 truck operating working days per years. Daily truck delays will be multiplied by 306 to estimate annual total hours of truck delay.

Approach

The target (desired trend) set by the DOT&PF is to increase centerline miles of NHS roads meeting department standards by 12 miles per year. More details are available on the DOT & PF website: http://dot.alaska.gov/performance-dash/safety-mno1.shtml

Limitations

This measure reflects the state of infrastructure conditions across the State as a whole, and is not specific to the Anchorage metropolitan area. AMATS will also need to understand and be comfortable with the definition of "department standards", as identified by DOT&PF as the basis for progress for the Anchorage region.

3.5 Performance Category: Environment

This measures links to the FMS objective: Reduce energy consumption and air pollution. We are not aware of any data sources which provide fuel consumption and/or air pollution levels for truck travel in the Anchorage metropolitan region (e.g., CO_2 emissions by vehicle type for AMATS region). It is recommended that the performance measure of Annual Hours of Truck Delay be used as a proxy for energy consumption and air pollution (see Section 3.4.4). As noted above, truck delays result in higher fuel consumption and associated pollution as a result of idling and unnecessary time on the road, all else being equal.

3.6 Beyond Quantitative Performance Measurement: Value Judgment Indicators

FHWA defines a performance measure as a qualitative or quantitative measure of outcomes, outputs, efficiency, or cost-effectiveness. When the development of quantitative performance measures is not practical, feasible, or meaningful (e.g., when underlying data is not readily available, when a causal link to freight is not easy to define, or where there is insufficient capacity or resources to develop them), qualitative indicators can provide a useful proxy. We recommend that qualitative assessments of performance, using value judgment indicators, be used in such instances.

Value judgments provide an assessment of system performance from the perspective of its users and can be a useful complement to quantitative measures.

Value judgment indicators are measures of perception, informed by a combination of qualitative information, observation, local knowledge and stakeholder consultations, as available, relevant and appropriate. By their nature, these sources of information must be interpreted. Value judgment indicators are particularly useful as a basis for defining if transportation performance – on one dimension or another – is getting better, getting worse, or relatively constant versus past performance. Value judgments are less useful for comparing performance across different geographies and freight transportation systems, given differing contexts.

To develop and use value judgment indicators, the indicators themselves must be clearly defined – often in the form of a simple question – and they must be assessed against

benchmark criteria that are relatively objective and that can be ranked on a scale – say, one to three (the consultant team prefers smaller scales to minimize risks associated with different interpretations of the criteria). Benchmark criteria do not need to be detailed or complex, but they should provide a reasonably clear basis establishing value judgments. Put simply, value judgment indicators should be reasonably easy to use and replicate.

Of note, value judgment indicators are not meant to be perfect measures of reality, instead they are a reasonable reflection of performance over time.

The key benefit of value judgment indicators is in getting user input to determine if performance is improving or getting worse over time, and the related reasons.

One of the advantages of using value judgment criteria is that they also provide an opportunity for qualitative comments or details to support the value judgment assessment, which in turn can provide great insight into issues or improvements that can move the dial on future value judgment assessments. Additional qualitative information may be obtained from stakeholders through simple surveys (as suggested above for resiliency and security to help collect value judgment measures.

System users are surveyed on value judgment indicators, providing a routine opportunity for AMATS to gain insight into specific transportation issues.

The following are proposed value judgment criteria and associated benchmark criteria for the AMATS FMS objectives which are difficult or impractical to measure quantitatively. These are broken into two groups: improved multimodal/intermodal accessibility and minimizing negative social impacts from freight.

3.6.2 Improved Multimodal / Intermodal Accessibility

The proposed approach to qualitative measurement for improved multi-modal / intermodal accessibility is summarized in Table 3-2.

Table 3-2. Qualitative Measures to Assess Multimodal/Intermodal Accessibility

FMS Objectives	Basis for value judgment	Benchmark Criteria
• Improve intermodal system linkages • Reduce multimodal freight infrastructure impediments	• Consultation with shippers (perception) to ask: Do shippers experience improved intermodal linkages? Have impediments to multimodal freight been reduced? • Review of multimodal connections in Anchorage region (e.g. new rail spurs)	1. Viable multimodal options / intermodal connections improved from previous period 2. Viable multimodal options / intermodal connections unchanged from previous period 3. Viable multimodal options / intermodal connections worse than previous period

3.6.3 Minimize negative social impacts from freight

The proposed approach to qualitative measurement of the negative social impacts of freight activity are summarized in Table 3-3. Please note that assessing affected Environmental Justice (EJ) populations may prove to be helpful in assessing the social impacts associated with freight. As Tables 3-3 indicates below, it is anticipated that consultations with community groups and local associations, especially in areas with potential negative externalities, can be conducted and used to assess EJ impacts.

Table 3-3. Qualitative Measures to Assess Social Impacts from Freight

FMS Objectives	Basis for value judgement	Benchmark Criteria
• Minimize adverse impacts on the community, such as neighborhood through-traffic movements. • Minimize noise and light pollution impacts, to the extent practical.	Consultations with MPOs, community associations (near major freight clusters (perception, reports of complaints and anecdotes to ask: Have negative social externalities (noise, dust, night-lights, etc.) relating to freight activity and transportation decreased relative to the previous period? Assessment of number of freight-related municipal by-law complaints, news stories about society concerns about freight activity, etc.	1. Freight-related negative social externalities have increased 2. Freight-related negative social externalities are unchanged 3. Freight-related negative social externalities have decreased

3.6.4 Other Uses for Value Judgment Indicators

Beyond the use of value judgments to gauge progress toward the AMATS objectives that are difficult to measure quantitatively, value judgment indicators can also serve as a useful basis for qualitatively validating or adding color to quantified performance metrics. For example, value judgment indicators can complement the quantifiable performance measures by focusing on elements of performance which may be implicit in those performance measures. Value judgment indicators can be developed on a regular basis (e.g. annually), through the use of simple surveys or, better, informal consultations with freight transportation system stakeholders (e.g. Freight Advisory Committee members).

Such value judgment assessments should also be complemented with open questions to obtain further insight about the value judgment assessment. Simple questions such as “what informed your assessment” and “can you cite specific examples of improvements that would lead to an improved assessment next year” can also lead to significant insights (where those consulted are open to providing responses).

One example of a qualitative area where stakeholders could provide comments through a periodic stakeholder survey is related to general resiliency and security in the freight sector. For example, a question might be: “Has the security situation in the trucking sector improved, stayed the same, or gotten worse over the past year? Please provide additional explanation as warranted.”

Another benefit of this survey approach is that it institutionalizes regular interaction between AMATS and freight transportation system stakeholders, which in turn addresses objectives under the FMS ***Goal 5: Develop a multimodal freight system that includes effective partnerships to leverage opportunities and resources.***

3.7 Freight Indicators

Overall freight activity can also be tracked and used as a broad performance indicator across the various modes of freight transport in the Anchorage region. The following measures provide a good indication of overall freight activity and outputs (though do not illustrate congestion or freight system optimization directly):

- Air: Metric tons of air cargo loaded, in-transit and unloaded at Ted Stevens Anchorage International Airport (TSAIA);
- Marine: Port of Anchorage tonnage;
- Rail: Alaska Railroad Freight Tonnage; and
- Road: Daily truck volumes in Anchorage region.

Basic truck volumes could be obtained from the CVISN, for example, average daily volume of single-unit and truck/trailer units at selected roadway locations in the Anchorage metropolitan area. Another option would be to use American Transportation Research Institute (ATRI) data which assesses commercial vehicle movements by traffic analysis zone (TAZ) in regions throughout the U.S., including detailed info on O/D including at the very local level in Anchorage. This ATRI data is not free. Another option would be to use DOT&PF WIM trucking information (counts at various anchorage weigh stations).