Land Use & Transportation Plan 2014

Port of Tacoma

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Executive Summary

"Deliver prosperity by connecting customers, cargo and community with the world."

The Port of Tacoma's Land Use and Transportation Plan is intended to guide future development and infrastructure priorities to achieve the goals set forth in the 2012 Strategic Plan. The Plan focuses on strategic actions and flexibility and responds to the dynamic context in which the Port operates.

The Plan was developed under the oversight of a Steering Committee composed of Port staff and the Port Commission. In addition, property owners, customers and agencies have provided thoughtful input through a series of interviews and public meetings. The information gathered through this process is the basis for the Plan.

The Plan is divided into four chapters:

- Chapter 1 is an introduction to the Plan, including background information on the Port of Tacoma and its facilities, a discussion of the Port's economic impact, and the local and regional planning context in which the Port operates.

- Chapter 2 illustrates the development vision for all port-owned property in the Port of Tacoma Tideflats area, including a map and legend of typical development expected under each development designation. Seven development designations are identified, each of which has a discrete role in helping to achieve the Port's overall development vision: Marine Terminal 1, Marine Terminal 2, Marine Services, Industrial/Maritime Support, Commercial and Mixed Commercial/Maritime Industrial, Public Utilities, and Habitat/Public Access.

- Chapter 3 describes the seven development designations that comprise the development vision in more detail. A brief description of existing character – including total developed and vacant acreage, zoning designations, and relevant shoreline overlays – an overall intent statement, and specific action strategies are provided for each development designation.

- Chapter 4 recommends infrastructure priorities for the road, rail, and waterways to help the Port achieve its Strategic Plan targets and goals, enhance the economic benefit of the Port area, improve traffic circulation, and reduce congestion.

The Land Use and Transportation Plan is a flexible living document that supports future decision-making and adapts to changing conditions. While it is an expression of the Port's intent, it is not regulatory in nature, nor does it mandate specific actions.

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Introduction

Welcome to the Port of Tacoma Land Use and Transportation Plan. The Plan identifies the overall development vision for the Port of Tacoma Tideflats area, describes the development designations that comprise the vision, and identifies and prioritizes the key road and rail infrastructure to support the development vision.

Why Was the Plan Developed?

The Port of Tacoma Strategic Plan, adopted in 2012 and updated annually, guides Port decision-making when investing in assets and builds on existing strengths to ensure long-term future success. A key goal identified in the Strategic Plan is to improve the Port's infrastructure by developing a long-range Port land use and transportation plan that supports the implementation of future business growth. This Land Use and Transportation Plan has been developed in fulfillment of this goal.

What is the Role of the Plan?

This Plan is intended to guide future development and infrastructure priorities to achieve the Port's Strategic Plan goals. Specifically, the objectives of the Plan are to:

- Communicate the Port's long term development initiatives for the future;
- Establish road and rail priorities to achieve the future development vision;
- Provide a vehicle for future collaboration with neighboring agencies on shared goals and initiatives;
- Identify the significance of the regional and national transportation networks to the ongoing and future success of the Port; and
- Illustrate the Port's ability to accommodate future growth in an economic, environmental and socially sustainable manner.

The Plan was developed under the oversight of a Steering Committee composed of Port staff and the Board of Commissioners. In addition, property owners, customers, and agencies have provided thoughtful input through a series of interviews and public meetings. The information gathered through this process is the basis for the Plan.

The Land Use and Transportation Plan is a flexible living document that supports future decision-making and adapts to changing conditions. While it is an expression of the Port's intent for Port-owned property, it is not regulatory in nature, nor does it mandate specific actions.

The Plan is organized as follows:

Chapter 1 provides background information about the Port of Tacoma, the role of the Land Use and Transportation Plan and the planning context within which the Port of Tacoma operates. It also includes a process to allow the Plan to be updated and revised on a regular basis.

Chapter 2 illustrates the Port's vision for development for the Tideflats of Port-owned property.

Chapter 3 describes the specific development designations that comprise the development vision, together with recommended action strategies to achieve the vision.

Chapter 4 describes the recommended infrastructure priorities for the road, rail, and waterways. It also includes the criteria and evaluation process for the recommendations.

A glossary and listing of acronyms is located at the end of the document.

Chapter 1 Background

1.1 About the Port of Tacoma

Port of Tacoma maritime shipping and industrial activities are concentrated in the Commencement Bay tideflats area (Tideflats), located in Tacoma's central waterfront. The area includes the natural deepwater port and industrial lands adjoining the Hylebos Waterway, Blair Waterway, Sitcum Waterway, Puyallup River, Saint Paul Waterway, and Middle Waterway. The Tideflats area is also located at the intersection of three jurisdictions – the cities of Tacoma and Fife and Pierce County – together with territory within Puyallup tribal boundaries (see Figure 1.1 on page 3).

The Tideflats has an established history of maritime industrial activity, dating back to the 1800s. Early uses included lumber and shingle mills, as well as shipyards, flour mills, electrometallurgy, and electrochemical companies. Currently, the Port is home to a wide mix of industrial uses, including cargo terminals, manufacturers, warehouses, repair facilities, rail yards, and others. Some of the largest cargo terminals, especially the container terminals, are owned and leased by the Port of Tacoma, but there are also numerous private facilities that transfer cargo to and from ships and barges. The Port also owns terminals serving grain exports, auto imports, breakbulk cargoes, and heavy-lift cargoes.

Breakbulk cargo – cargo packed in packing units, such as boxes, bales, drums, and others, but not containerized.
Heavy lift cargo – oversized cargo typically transported and lifted or installed into place. Transport is not standardized.

Port of Tacoma Facilities

With ownership of over 2,500 acres, the Port of Tacoma is a major landowner in the Tideflats area operating and leasing significant piers, docks, wharves, cargo handling equipment, and related upland facilities. The waterways play a key role in serving both Port and private interests.

Major container and intermodal rail facilities in the Tideflats area include deep water terminals for containerized, breakbulk and bulk cargo and intermodal rail facilities. The terminals in Tacoma handle a variety of waterborne and intermodal cargo, and this diversity helps to reduce the volatility of individual cargo types. For example, when the economic downturn caused container traffic to drop to a low point in 2010, exports of grain saw a much smaller impact, and exports of logs reached the highest volume in years. In contrast, grain exports declined somewhat between 2010 and 2012, while container volumes saw a strong recovery.

Economic Impact of the Port of Tacoma

What is the level of cargo activity at the Port?

In 2012, Tacoma's total cargo tonnage equaled 17.4 million tons, making it the 23rd largest among all U.S. ports. Tacoma's role in foreign exports is especially important; in 2012 Tacoma's export tonnage ranked 13th in the U.S. According to Port of Tacoma statistics, containerized trade accounts for nearly half of the total tonnage moving through the Port. Manufacturers and farmers from throughout Washington import and export a wide variety of products through the Port of Tacoma, generating jobs in Tacoma and throughout the state. The major export commodities include agricultural products, food products, machinery, petroleum products, waste/scrap, paper, chemicals, transportation equipment, other forestry products, fish and seafood products, among others. Imports include electronic components, components for equipment manufacturing, retail goods, and goods and equipment for Joint Base Lewis-McChord, as well as other installations in the region.

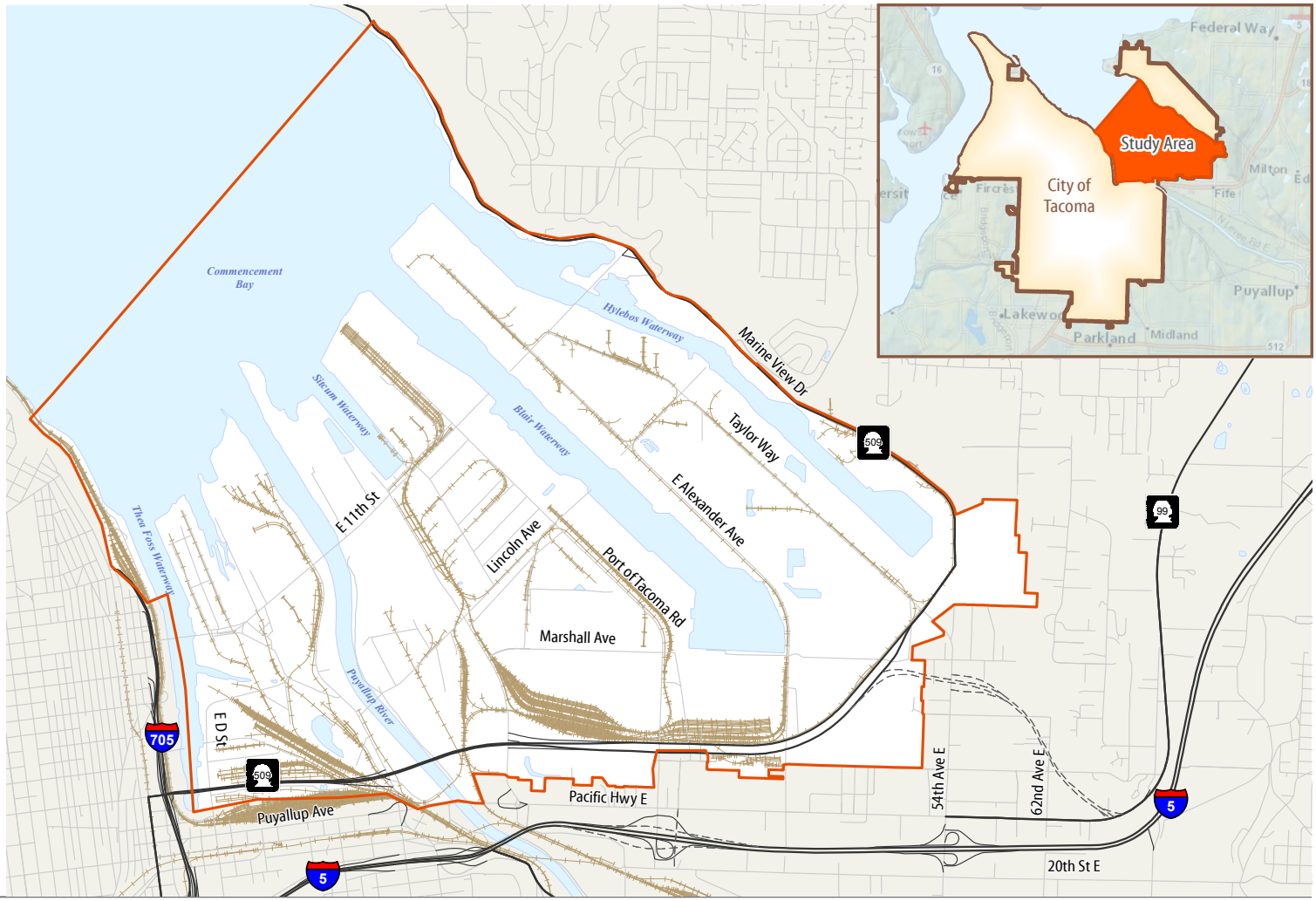
How does the Port contribute to the economy?

The marine cargo terminal trade plays a vital role in the Tacoma and Pacific Northwest economy, contributing thousands of jobs and millions of dollars in revenues and state and local taxes to the region.

The Port serves as a major economic engine for Pierce County, creating thousands of family-wage jobs and serving as a catalyst for economic development. It is estimated that Port activities are related to over 40,000 jobs in Pierce County, paying about 40 percent more than the county average wage. Statewide, over 110,000 jobs are related to Port activities. The Port's cargo handling, construction and leasing activities generate an estimated $13.9 million annually in local taxes in Pierce County.[1]

[1] Estimates based on 2005 data.

Figure 1.1 - Vicinity Map



1.2 Planning Context

This Plan describes the Port of Tacoma's development vision within the context of adopted applicable policy and regulatory guidance, providing a deeper level of information as to how the Port will continue to grow and flourish within the regional and local planning framework. Within this context, it should be noted that, while the Puget Sound Regional Council and City of Tacoma are subject to the Washington Growth Management Act, the Port of Tacoma is not required or empowered to plan under the GMA. The Port, however, is subject to state, regional, and local government goals and policies developed and implemented in a manner consistent with GMA requirements.

The Land Use and Transportation Plan was developed based on guidance and input from existing plans and regulation, including the following:

1. The Port of Tacoma **Strategic Plan** and the **Comprehensive Scheme for Harbor Improvements** provide guidance on the broad goals for future development within the Tideflats.

2. The Puget Sound Regional Council **Vision 2040** establishes a long-term land use and transportation vision for the Puget Sound region, including Tacoma.

3. The City of Tacoma **Comprehensive Plan**, **Shoreline Master Program**, and **Land Use Code** provides specific guidance and requirements for development in the Tideflats.

Each of these documents is summarized on the following pages. The plans and policies summarized in this section are not inclusive of all applicable policy and regulatory guidance and are intended only to provide a short description of the basic planning framework within which the Port of Tacoma operates.

Port of Tacoma Strategic Plan

In 2012 (and subsequently updated), the Port of Tacoma adopted a strategic plan intended to guide actions over the next ten years. The Strategic Plan defines the Port's mission, four areas of focus and goals, all of which are listed below.

Mission: Deliver prosperity by connecting customers, cargo and community with the world.

"Four areas of focus

1 Strategic investments. We will make strategic investments that enhance the Port's waterway, terminal, road, rail, and industrial property infrastructure to create the most efficient, productive, and cost-effective system possible to move our customers' freight to the marketplace.

2 New business opportunities. To create opportunity for future investments, we will focus attention on attracting new business opportunities with healthy income streams and increase the diversity of the Port's business portfolio.

3 Customer care. We're serious about our tagline "People. Partnership. Performance." We will continue to demonstrate great care for our business relationships with customers and key stakeholders.

4 Community pride. Business development, environmental stewardship, and livable communities go hand in hand. We continually hear that our community's support of the Port and trade-related jobs is a key competitive advantage. We intend to grow the Port responsibly to ensure continued trust in our collective future."

Goals

1. Enhance the Port's Competitive Position
2. Provide Reliable and Efficient Regional & Local Infrastructure Connections
3. Improve the Port's Financial Performance
4. Increase Organizational Capabilities
5. Advance Environmental Stewardship
6. Strengthen the Port's Community Connections

Port of Tacoma Comprehensive Scheme of Harbor Improvements

Port districts in Washington are required to prepare and update a Comprehensive Scheme of Harbor Improvements (CSHI) which describes the development goals for the Port (RCW 53.20). CSHI documents are conceptual or programmatic in nature and do not provide specific design details about individual projects. The CSHI also defines the geographic boundaries within the Port District where facilities development and industrial improvements will occur.

The CSHI can also be periodically amended to expand the geographic limits of the Port District to support specific improvement projects.

The current Port of Tacoma CSHI was amended in 2012. The 2012 update states the following:

- Port of Tacoma's planning boundaries include the geographic bounds of Pierce County for which it serves.
- The Port's intent is to engage in the implementation of its Strategic Plan for 2012-2022 to guide the organization in achieving its next chapter of economic growth and business success. This growth will occur within its geographic planning area and under its guiding policies in order to satisfy the Port's Mission and Goals.
- The Port's Strategic Plan, together with the Capital Budget and this Comprehensive Scheme of Harbor Improvements, will in concert describe the Port's plans and intended future improvements, and provide the public notice for purposes of satisfying the Port's comprehensive scheme requirements of the RCW 53.20.101.

Puyallup Tribe of Indians

The Puyallup, or S'Puyalupubsh ("generous and welcoming behavior to all people (friends and strangers) who enter our lands."), are a federally recognized Coast Salish Native American tribe forcibly relocated onto reservation lands more than 100 years ago. Today they have an enrolled population of 4,000, of whom 2,500 live on the reservation.

Land Claims Settlement & Cooperation Agreement

In the 1980s, the Tribe claimed that it owned the land under much of downtown Tacoma, the Port of Tacoma, Fife and Puyallup. The Tribe contended that much of its tribal land had been taken from it through sales, swindles, and murders.

A federal appeals court ruled in 1983 in the tribe's favor, awarding 12.5 acres of the Port of Tacoma to the Tribe. Further claims to more land by the Puyallup put a cloud on the title of any firms wanting to expand, and was seen as a threat to the growth of the Port of Tacoma.

In 1988, the Tribe, the Port and numerous other governments and private entities entered into a Land Settlement Agreement, a historic event that resolved a number of land, jurisdictional, and other issues between the parties. President George Bush signed the Puyallup Indian Settlement in 1989, making way for future growth and Port-Tribe cooperation.

One of the most significant elements of that agreement was the return of close to 900 acres of land to the Puyallup, including land on the Blair Waterway which the parties envisioned would be developed by the Tribe as an international marine terminal.

In April 2008 the Tribe and Port signed agreements to aid in the development of facilities on the Blair-Hylebos Peninsula. As part of the agreement, the parties exchanged additional parcels of land and agreed to cooperate on the ongoing development of the Blair Waterway.

Puget Sound Regional Council

Vision 2040

The Puget Sound Regional Council (PSRC) is a Metropolitan Planning Organization (MPO) that develops policies and makes decisions about transportation planning, economic development and growth management in the four-county (King, Kitsap, Pierce, and Snohomish) Seattle metropolitan area surrounding Puget Sound. It is a forum for local governments, special districts, Native American tribes, and state agencies to address common regional issues. PSRC duties include prioritizing and distributing federal transportation funds.

The PSRC's Vision 2040 plan, which establishes a long-term land use and transportation framework for the region, designates the Tideflats as one of eight Manufacturing/Industrial Centers (MIC) in the region. Vision 2040 recognizes MICs as important employment locations that serve both current and long-term regional economic objectives and calls for the provision of infrastructure and services in MICs necessary to serve intensive manufacturing and industrial activity. MICs are given funding priority both for transportation infrastructure and for economic development.

City of Tacoma

Comprehensive Plan

The Comprehensive Plan includes goals and policies for future growth, development and improvement of the City over a twenty year timeframe. Consistent with Vision 2040, the Comprehensive Plan designates the Tideflats as the Port Manufacturing Industrial Center, an area of high intensity development, high activity patterns and high traffic generation. Centers are intended to be well served by transportation including road, rail and transit systems. With respect to the Tideflats, the Comprehensive Plan states:

> "The "Port Manufacturing / Industrial Area" is the largest and most intensively developed area in the City. This area is designated as a regional hub and is

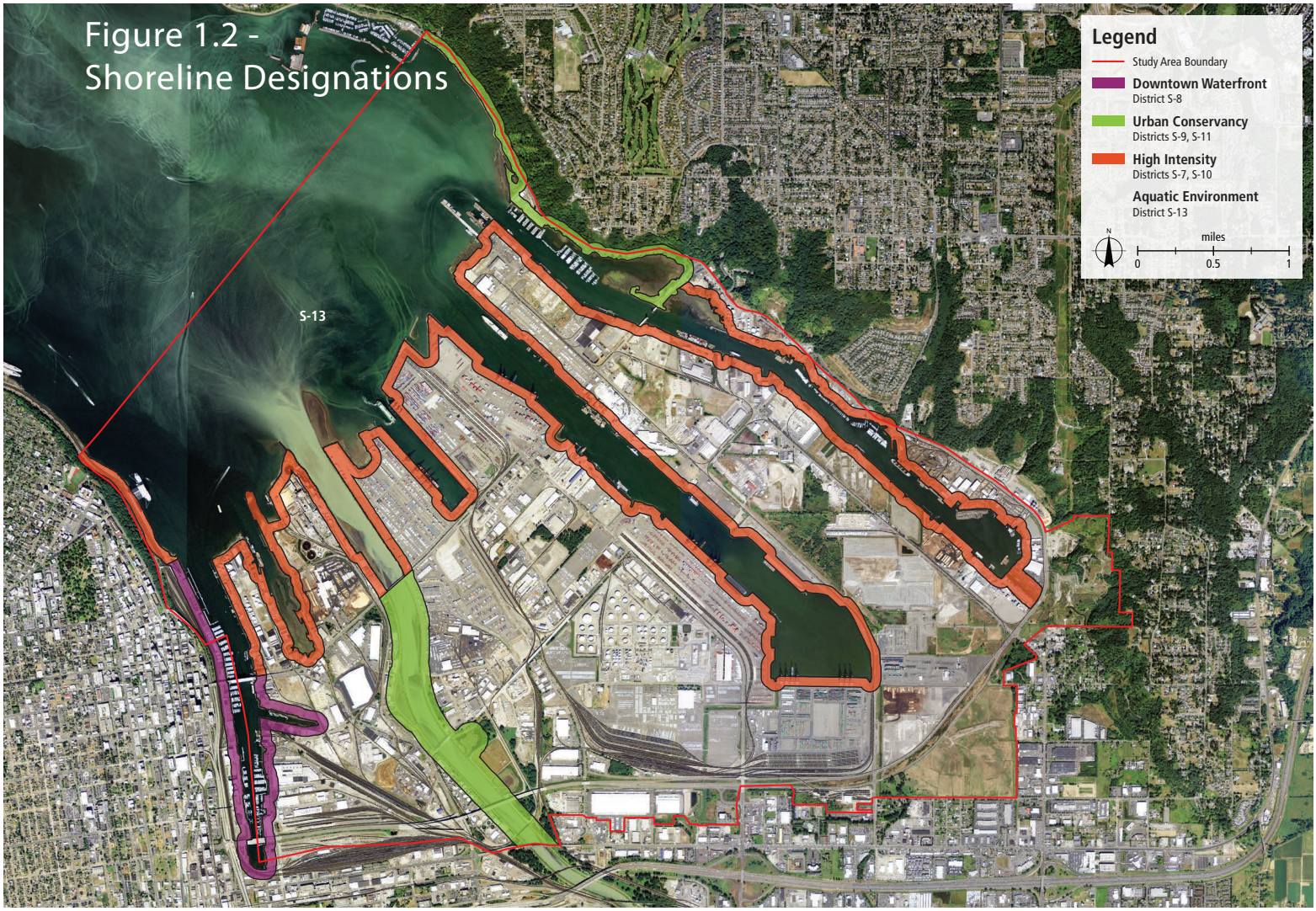
expected to accommodate a greater share of regional employment than other locations within the City. The Port Manufacturing / Industrial Area is anticipated to generate large amounts of automobile, truck, rail, and/or waterborne traffic. Structures are generally large in size with large areas devoted to parking, loading and storage. The amount of odors, noise, smoke, light, glare, traffic congestion, and other undesirable nuisance characteristics in these areas can be fairly high. ”

Shoreline Master Program

Portions of the Port's waterfront property on Commencement Bay are included within the S-7, S-8, S-9, S-10, and S-11 Shoreline Districts. Each district is briefly described below and shown in Figure 1.2 – Shoreline Designations.

- **S-7 – Schuster Parkway** – The intent of the S-7 district is to allow development of a deep water terminal and light industrial facilities, support and retain water dependent commodity export businesses, and to preserve the character and quality of life in adjoining residential areas, school, and park properties.

- **S-8 – Thea Foss Waterway** – The intent of this district "is to improve the environmental quality of Thea Foss Waterway; provide continuous public access to the Waterway; encourage the reuse and redevelopment of the area for mixed-use pedestrian-oriented development, cultural facilities, marinas and related facilities, water-oriented commercial uses, maritime activities, water-oriented public



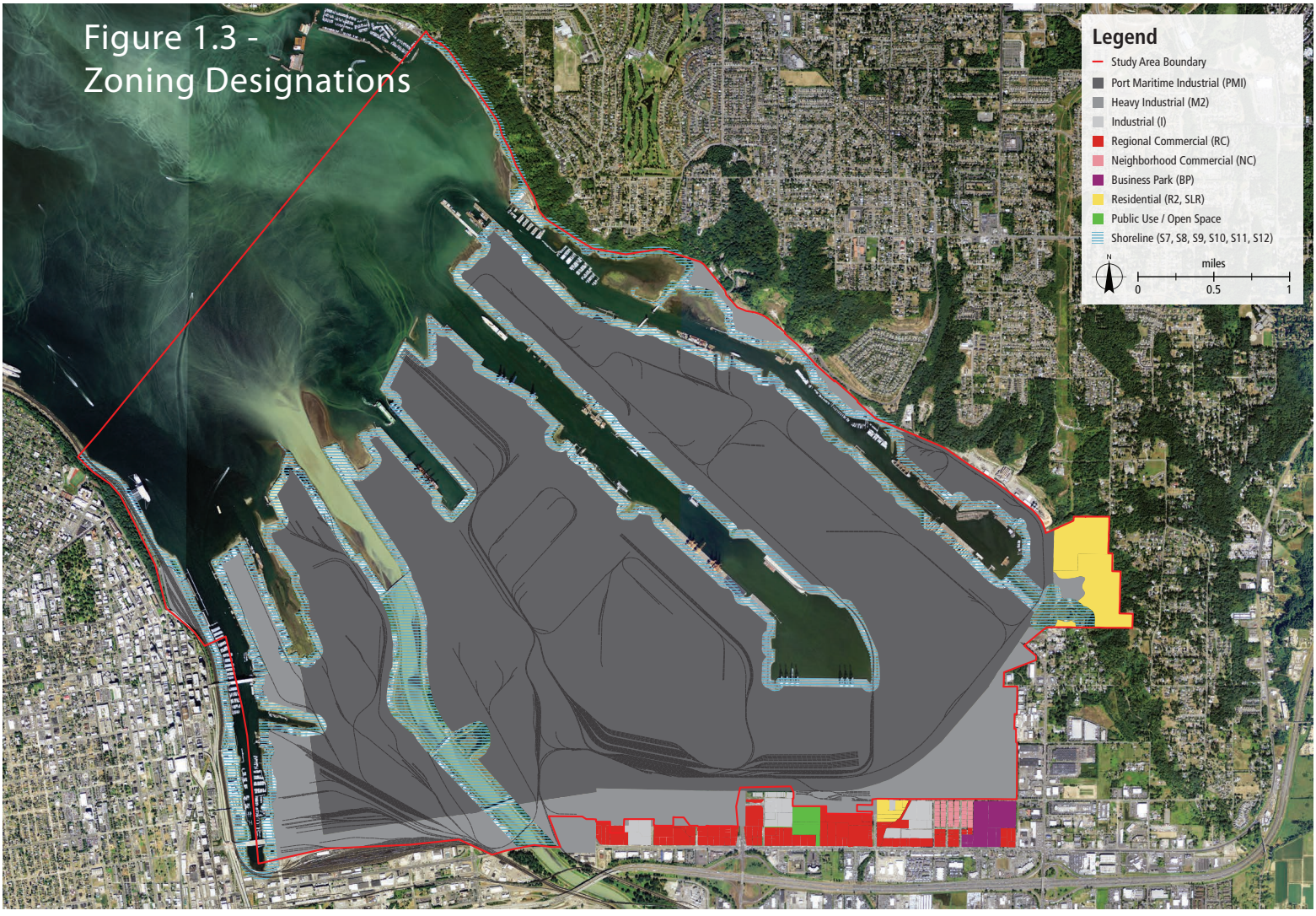
parks and public facilities, residential development, and waterborne transportation; and to encourage existing industrial and terminal uses to continue their current operations and leases to industrial tenants."

- **S-9 – Puyallup River** – The intent of this district "is to permit recreational development of the riverfront while allowing industrial development of adjacent upland areas, and to encourage continued preservation of Clear Creek, its associated wetlands, and related ecosystems. The Puyallup River is a shoreline of statewide significance. Primary consideration shall be given to the effects of proposed development on the statutory preferred uses of such shorelines."

- **S-10 - Port Industrial** – The intent of this district "is to allow the continued development of the Port Industrial Area, with an increase in the intensity of development and a greater emphasis on terminal facilities within the City."

- **S-11 – Marine View Drive South** – The intent of the S-11 district "is to permit the development of water-related parks, open space, and recreation facilities, and to allow development of marinas and related facilities, water-oriented commercial uses, and residential uses."

- **S-13 – Marine Waters of the State** – The purpose of this district is to "maintain these water bodies for the use by the public for navigation, commerce and recreation purposes and to manage in-water structures in a consistent manner throughout the City's shorelines."



Land Use Regulatory Code

The Tacoma Municipal Code (Title 13, Land Use Regulatory Code) includes the zoning designations within the City. The Tideflats area is zoned Port Maritime and Industrial (PMI), Heavy Industrial (M-2), and Light Industrial (M-1). These designations are briefly described below.

Port Maritime and Industrial District (PMI)

The PMI designation is intended to allow all industrial uses. According to the Code, the area "is characterized by proximity to deepwater berthing; sufficient backup land between the berths and public rights-of-way; 24-hour operations to accommodate regional and international shipping and distribution schedules; raw materials processing and manufacturing; uses which rely on the deepwater berthing to transport raw materials for processing or manufacture, or transport of finished products; and freight mobility infrastructure, with the entire area served by road and rail corridors designed for large, heavy truck and rail loads (TMC 13.06.400.B)."

Heavy Industrial District (M-2)

This district is intended to allow most industrial uses. The impacts of these industrial uses include extended operating hours, heavy truck traffic, and higher levels of noise and odors. (TMC 13.06.400.B)

Light Industrial District (M-1)

This district is intended as a buffer between heavy industrial uses and less intensive commercial and/or residential uses. (TMC 13.06.400.B)

City of Fife

Most of the area just south of the study area is currently zoned Regional Commercial by the City of Fife, with small portions of Industrial, Neighborhood Commercial, and Business Park zoning. The City's Comprehensive Plan designates this area as a downtown district center and the City is currently preparing a City Center Subarea Plan. The City intends that the City Center Subarea Plan will emphasize transit-oriented development principles, including mixed-use development, pedestrian-oriented design, multi-modal transportation, and connectivity. The Subarea Plan will be implemented by zoning districts that accommodate a range of well-designed retail, service, civic, and high density residential uses.

1.3 Plan Amendments

The Land Use and Transportation Plan is a flexible living document that supports future decision-making and adapts to changing conditions. Accordingly, the Plan will be reviewed and updated regularly and as needed to adapt to changing conditions. Whether on a regular or as-needed basis, the updates are intended to be simple and straightforward processes, as described below.

Regular updates: On a regular two-year basis, Port staff will conduct a review of the Land Use and Transportation Plan to:

- Review the development vision to identify necessary informational updates and changes to the future vision;
- Assess progress on, and continued relevance of, the land use action strategies and transportation priorities; and
- Identify factual corrections and updates needed to keep the plan current.

Staff will summarize this information in a short report to the Port Commission, together with a recommendation for actions needed to keep the Plan current. Amendments will be prepared based on Port Commission guidance.

Interim Updates: Because the Port operates in rapidly changing market and technological conditions, interim Plan amendments should be considered when helpful to address unique circumstances that cannot wait for the annual review process. In these circumstances, staff will prepare a report describing the circumstances and recommendations for review by the Port Commission. Action will be taken based on the Port Commissions' guidance.

Development Vision

2.1 Introduction

Chapter 2 provides an overview of the development designations, including a map showing the geographic distribution of designations and a legend providing examples of typical development expected under each designation.

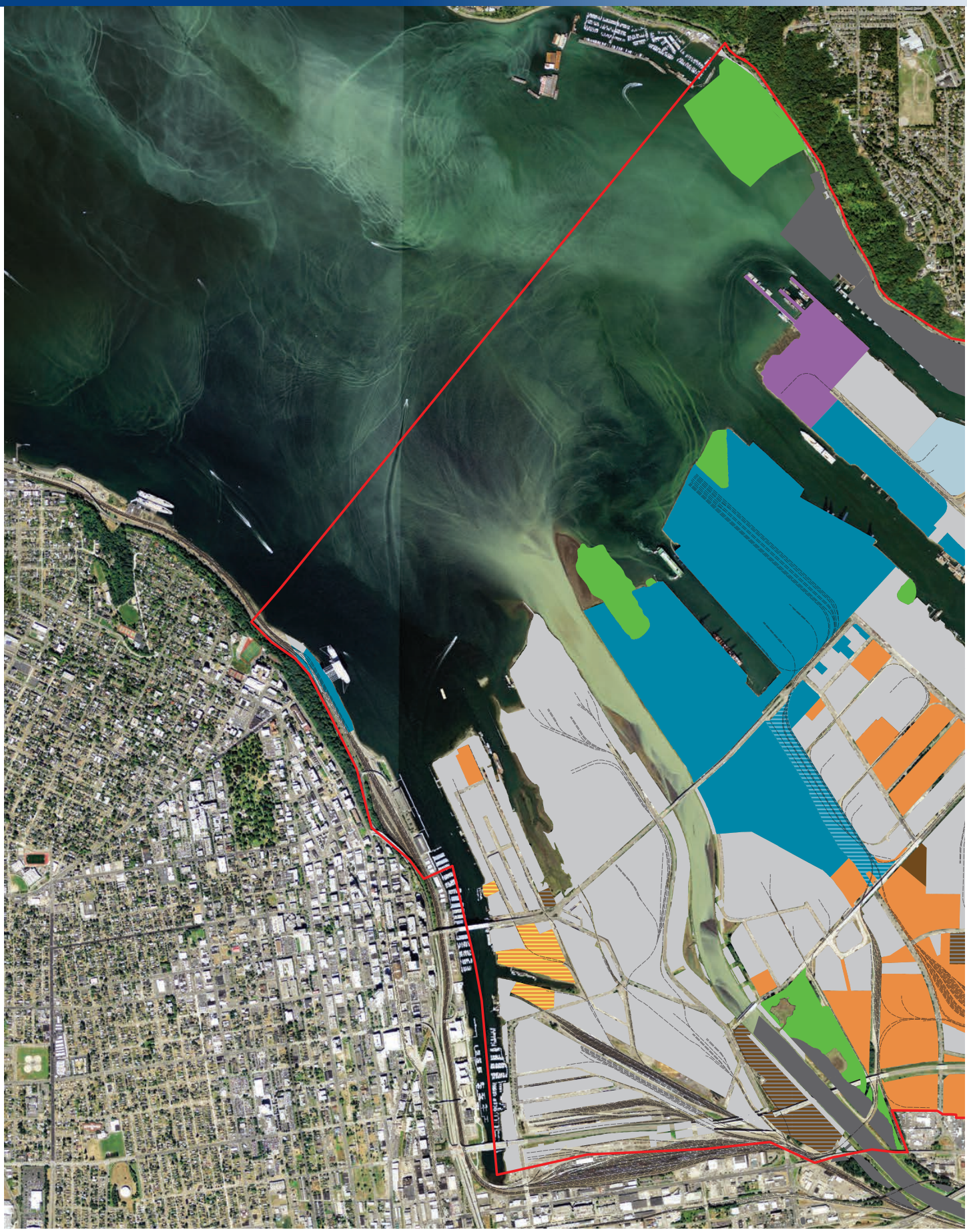
2.2 Development Designations

The Land Use and Transportation Plan establishes a development vision for all port-owned property in the Tideflats. The development vision identifies seven development designations that are consistent with adopted City of Tacoma land use and shoreline regulations, but provide additional detail about the Port's intentions about where development is likely to occur within the Tideflats.

The Port identified development designations based on a wide range of factors, including:

- Port of Tacoma economic development goals
- Consistency with the Port of Tacoma Strategic Plan
- Consistency with adopted development regulations
- Existing land use patterns
- Site and waterway characteristics
- Existing and planned transportation connections
- Potential for new development and redevelopment
- Environmental characteristics
- Land use compatibility

Based on these considerations, all port-owned property has been designated for a particular development category, indicating the Port's intention for future development and use. While each designation is focused on a specific category of uses, the Plan allows for interim uses on sites where current market or trade conditions create needs not originally contemplated by the development designation or the planning area intent. Interim uses are temporary in nature or may be relocated in the near future to a more appropriate location.



Development Vision Map

2.3

Development Vision Map Legend

Port Owned Property

Marine Terminal 1*

Example Uses
» Domestic and international container
» Domestic trailer
» Bulk import/export
» Breakbulk

Marine Terminal Use Requirements
» Greater than Panamax vessel capacity
» On-site working rail and rail lead track
» Heavy industrial pavement
» Service by more than 2 total daily unit trains

Marine Terminal 2

Example Uses
» Barge services
» Bulk import/export
» Marine manufacturing
» Breakbulk

Marine Terminal Use Requirements
» Less than Panamax vessel capacity
» Service by less than 2 total daily unit trains

Commercial

Example Uses
» Fueling station
» Office
» Restaurant
» Retail
» Recreational marina

Mixed Commercial / Maritime Support

Example Uses
» Mix of uses allowed in commercial and maritime support development types

Non-Port Owned Property

Tribal

» Tribal owned property

Future Tribal

» Future tribal owned property

Marine Services

Example Uses
» Ship building and repair
» Production of ship and barge sections
» Related specialized services

Industrial / Maritime Support

Example Uses
» Rail support
» Chassis/container storage
» Distribution center
» Maintenance facilities
» Cargo staging/storage
» Remediation/scrap metal
» Materials processing
» Trucking logistics/support
» Truck queuing
» Warehouse
» Barge services
» Transloading
» Manufacturing
» Log storage
» Shipyard

Public Utilities / Public Safety**

Example Uses
» Electrical substation
» Sewer processing
» Stormwater processing
» Electrical switchgear
» Communications hub

Habitat / Public Access***

Example Uses
» Open space
» Habitat area

Other

» Non-tribal or port-owned property

* Includes Port of Tacoma land in long term lease from the City of Tacoma.
** Includes non-Port owned Public Utilities.
*** Includes non-Port owned Habitat / Public Access.

Development Designations

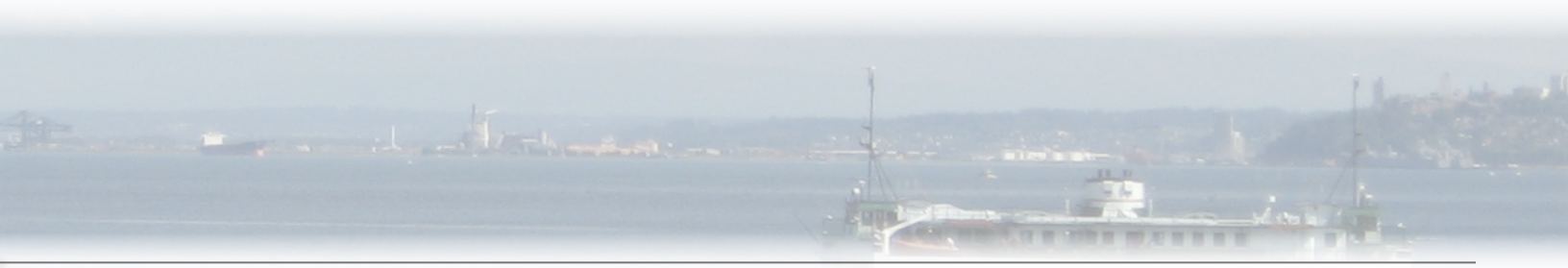
As described in Chapter 2, the Port has divided the port-owned property in the Tideflats area into seven development designations. Each of these designations support the Port's overall development vision and each have a discrete role in helping to achieve this vision.

The seven designations are:

1. Marine Terminal 1
2. Marine Terminal 2
3. Marine Services
4. Industrial/Maritime Support
5. Commercial and Mixed Commercial/Maritime Industrial
6. Public Utilities
7. Habitat/Public Access

Please see Chapter 2 for a map and list of example uses for each designation. As discussed in Chapter 2, the development designations described here are consistent with City of Tacoma zoning designations. In addition, the highest densities of archaeological sites in the Puget Sound region are frequently found along shorelines and adjacent to aquatic features, such as the Tideflats area. Future development proposals should plan for archaeological surveys as part of the development review process.

The following provides additional information for each designation, including a brief description, overall intent statement, and specific action strategies. Estimates of developed and vacant acreage under each designation are based on Pierce County Assessor's data and limited field verification. An existing land use map can be found in Appendix 1.



Marine Terminal 1

At a Glance

Existing Development Character: The majority of the Port properties along the Blair and Sitcum waterways are designated as Marine Terminal 1. Existing terminal development includes the APM, Husky, Olympic Container, Totem Ocean Trailer Express, Pierce County, and Washington United container terminals and portions of Terminal 7, Blair, and the East Blair 1 Terminal for non-containerized cargo. Other existing development includes support rail yards, smaller industrial uses and the Port of Tacoma Administration Building.

Total Area:	934 acres
Developed Area:	824 acres
Vacant Area:	110 acres

Tacoma Zoning Designations

Upland:

Port Maritime Industrial

Shoreline:

District S-7 Schuster Parkway

District S-10 Port Industrial Area, High Intensity

Marine Terminal 1

Development Vision

The Marine Terminal 1 designation is intended to preserve lands with deep water access for marine cargo terminals and facilities. The vision for Marine Terminal 1 properties is to allow terminals to operate efficiently and competitively, to provide increased capacity for larger vessels, and to adapt and expand to market and technological changes. Over time, existing development that does not contribute to this vision, such as the Port of Tacoma Administration Building, will be sited at a different location.

Action Strategies

- Prepare redevelopment plans, including terminal improvements and support facilities, street and rail improvements, and gate improvements, to expand cargo movement capacity and improve overall density of use.
- Identify property acquisitions, divestitures, and street vacations needed to support future terminal development.
- Define the street and rail network that will provide essential capacity to serve expanded terminal facilities.
- Relocate Port administration building to an appropriate location that won't interfere with terminal operations.
- Develop a plan to ensure long-term capacity and viability for the Union Pacific domestic cargo facility.
- Collaborate with the Puyallup Tribe of Indians to develop complementary terminal development plans.
- Maximize land use productivity by promoting shared use of equipment and facilities wherever possible, especially where terminals adjoin each other.

Marine Terminal 2

At a Glance

Existing Development Character: Port property along the west side of the Hylebos Waterway is designated as Marine Terminal 2. About 40 percent of port-owned area is vacant and the remainder is developed with a mix of transload, transportation, and industrial uses.

Total Area:	201 acres
Developed Area:	115 acres
Vacant Area:	86 acres

Tacoma Zoning Designations

Upland:

Port Maritime Industrial

Shoreline:

District S-10 Port Industrial Area, High Intensity

Marine Terminal 2

Development Vision

The development vision for the Marine Terminal 2 is to preserve waterfront land with non-deep-water access for shallow draft water-dependent commercial and maritime uses. These may include barge services, bulk and breakbulk import/export, and marine manufacturing.

Action Strategies

- Prepare sites for development by completing site remediation projects.
- Identify alternative sites for existing development not meeting the vision of the Marine Terminal 2 designation.
- Identify property acquisitions, divestitures, and street vacations needed to support future envisioned development.
- Define the street and rail network to serve future development consistent with the Marine Terminal 2 vision.
- Develop a marketing plan to reach out to targeted end users.

Marine Services

At a Glance

Existing Development Character: The Marine Services designation is developed with uses in the Earley Business Center, a World War II era naval shipbuilding center. Consistent with this history, much of the development in the Marine Services area includes shipbuilding and repair operations. Existing piers are used by current tenants.

Total Area:	51 acres
Developed Area:	51 acres
Vacant Area:	0 acres

Tacoma Zoning Designations

Upland:

Port Maritime Industrial

Shoreline:

District S-10 Port Industrial Area, High Intensity

Marine Services

Development Vision

The Marine Services designation provides area for marine-related industries that benefit from direct water access or close proximity to navigable waters. Future development in the Marine Services designation will focus on marine related manufacturing and construction, including shipbuilding and repair, production of prefabricated ship and barge sections, and specialized services, such as ship scaling.

Action Strategies

- Prepare sites for development by completing site remediation projects.
- Inventory existing development to assess long-term suitability for the Marine Services designation and to identify potential relocation needs.
- Develop a marketing plan to reach out to targeted end users.
- Formulate a business plan that supports the utilization of viable piers, docks, and wharves.

Industrial/ Maritime Support

At a Glance

Existing Development Character: The Industrial/ Maritime Support designation is found primarily in upland areas throughout the Tideflats area. Existing development includes a mix of vacant, industrial, auto processing, transportation, marina, office, and other similar uses.

Total Area:	689 acres
Developed Area:	514 acres
Vacant Area:	175 acres

Tacoma Zoning Designations

Upland:

Port Maritime Industrial, M-2 Heavy Industrial, M-1 Light Industrial

Shoreline:

With the exception of one parcel on the west side of the Foss Peninsula, the remainder of the Industrial/ Maritime Support area is outside of the designated shoreline area. The property on the Foss Peninsula that is within the shoreline area is designated District S-10 Port Industrial Area, High Intensity.

Industrial/Maritime Support

Development Vision

The vision for the Industrial/Maritime Support designation is primarily for industrial development that supports the cargo terminals, such as transload, warehouse, and rail uses, as well as a range of complementary industrial, warehousing, and office uses. These uses do not require direct water access, but do provide important service and support to other port industries and terminals and benefit from being located in the Tideflats.

Action Strategies

- Prepare sites for development and increase development potential by consolidation of small parcels.
- Identify property acquisitions and divestitures needed to support future envisioned development.
- Define the street and rail network necessary to support increased development intensity in the Industrial/Maritime Support designation.
- Develop maritime support facilities.

Commercial/ Mixed Commercial/ Maritime Industrial

At a Glance

Existing Development Character: Three Port properties are designated as Commercial. The first is located off of Port of Tacoma Road between SR 509 and I-5. This area is developed with a multi-use office building known as the Fabulich Center. The second area is a vacant property located on the east side of the Foss Waterway, known as the Wheeler-Osgood property. The Youth Marine Foundation is also located on the Thea Foss Waterway to the north of the Wheeler-Osgood property. The Wheeler-Osgood property and Youth Marine Foundation are designated for either Commercial or Mixed Commercial/Maritime Industrial development.

Total Area: 32 acres
Developed Area: 18 acres
Vacant Area: 14 acres

Tacoma Zoning Designations

Upland:

Port Maritime Industrial, M-2 Heavy Industrial

Shoreline:

The Marine Youth Foundation is located in the District S-10 Port Industrial Shoreline District. A portion of the Wheeler-Osgood property is located in the District S-8 Thea Foss Waterway, Downtown District; the Fabulich Center property is outside of the designated shoreline area.

Commercial/Mixed Commercial/ Maritime Industrial

Development Vision

The vision for this designation is to support industrial development in the Tideflats area through complementary office and commercial uses. Properties designated Commercial or Mixed Commercial/Maritime Industrial are envisioned for development consistent with either or both of these designations.

Action Strategies

- Assess the Port's role as a commercial property developer/ owner and develop a property acquisition and divestiture strategy based on the defined role.
- Establish a long-term re-development and/or divestiture plan for the Fabulich Center.
- Establish long-term development and/or divestiture plan for the Wheeler-Osgood property.

Public Utilities/ Public Safety

At a Glance

Existing Development Character: The Public Utilities/Public Safety designation consists of three substations owned by Tacoma Public Utilities (two of which are on Port-owned property), one substation owned by the Bonneville Power Administration (BPA), one wastewater treatment plant operated by the City of Tacoma and property operated by the Tacoma Fire Department.

Total Area:	59 acres
Developed Area:	59 acres
Vacant Area:	<1 acre

Tacoma Zoning Designations

Upland:

Port Maritime Industrial

Shoreline:

Not applicable, sites are not located in the designated shoreline area.

Public Utilities/Public Safety

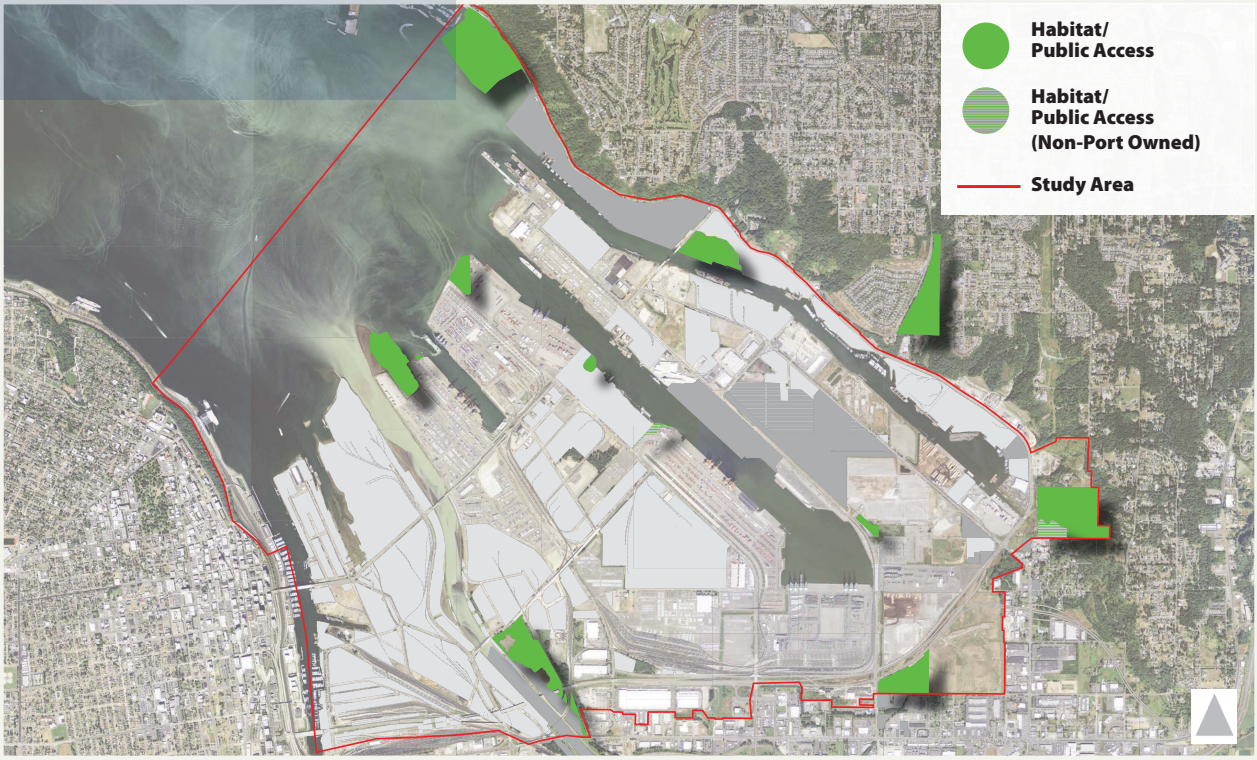
Development Vision

The existing facilities are part of the essential infrastructure serving the Port of Tacoma and are anticipated to continue to function at their current locations. In addition, the Port of Tacoma will work on collaborating with service providers to ensure the efficient delivery of services in a manner that promotes public safety and economic growth.

Action Strategies

- Meet with utility providers early-on during the design of new development or major redevelopment.
- Work with the City of Tacoma and other emergency responders and stakeholders to develop an Emergency Response Plan for the Port of Tacoma Manufacturing and Industrial Center
- In collaboration with Tacoma Public Utilities, determine need for electrical substation locations.
- Review and update interlocal and agency agreements as needed.
- Continue working with BPA to acquire the necessary property to facilitate the construction of rail projects.
- Explore franchise opportunities and revenue potential.

Habitat/ Public Access



At a Glance

Existing Development Character: Habitat and open space areas are located throughout the Tideflats area and are either vacant, in the process of being restored as habitat areas, or fully restored as a habitat or open space area. As described in the Port-Wide Habitat Mitigation Strategy (Strategy, March 12, 2014), the Port has completed the construction of, or obtained conservation easements for, 19 mitigation and preservation sites including several phases within each of these sites. These sites include a broad mix of estuarine, riverine, and wetland habitats associated with marine, intertidal, and freshwater environments.

As described in the Strategy, the Port's current mitigation and preservation holdings total approximately 268 acres.

Existing public access areas include:

- Dick Gilmur Shoreline Restoration and Kayak Launch (also known as Saltchuk), located at 5002 Marine View Drive, along the east side of Commencement Bay provides kayak access and views of Commencement Bay.
- Gog-le-hi-te Wetlands, located at 1402 Lincoln Avenue, along the eastern shore of the Puyallup River. A public overlook and path provide views to the habitat area.
- Julia's Gulch, located at 101 Norpoint Way NE, consists of a natural forested area along the bluff above the east side of Commencement Bay.
- Observation Tower, located at One Sitcum Plaza, provides views of the working waterfront.
- Place of Circling Waters, located at 1621 Marine View Drive, consists of a paved path and viewing platform overlooking this habitat area.
- Rhone Polenc, 2545 Lincoln Avenue, a habitat site that contains a public overlook toward maritime activities and wildlife.

Tacoma Zoning Designations

Upland:

Port Maritime Industrial, M-2 Heavy Industrial, M-1 Light Industrial ,C2 Commercial, R2 One Family Dwelling

Shoreline:

District S-9, Puyallup River, Urban Conservancy, District S-10 Port Industrial Area, High Intensity, District S-11, Marine View Drive, Urban Conservancy.

Habitat/Public Access

Development Vision

Habitat mitigation sites, once developed, are very difficult or impossible to move. Therefore, locating mitigation sites and determining when to build them is a critical strategic decision. Well planned sites provide the Port with multiple benefits including compensatory mitigation, flood control credit, land use buffers, and public access opportunities.

The Port's Habitat and Mitigation Strategy examines future needs and alternative means of fulfilling habitat mitigation. The Strategy provides a comprehensive method for mitigation planning across Port property, a specific road map for probable future Port developments and areas to mitigate for that development, and informs the Port's comprehensive land use and public access planning efforts.

Based on future development scenarios and concurrent mitigation ratios, the Strategy identifies the following needs:

- By 2018, approximately 52 acres, primarily in forested and scrub wetlands
- Between 2019 and 2024, approximately 12 acres of mostly intertidal mitigation
- After 2025, approximately 38 acres, with a mix of inter-tidal and scrub shrub wetlands

Action Strategies

- Act on Port-wide Habitat Mitigation Strategy to create sustainable habitat mitigation sites and public access in desirable locations.
- Implement Port's Shoreline Public Access Plan using the Interlocal Agreement with the City of Tacoma.
- Inside the Study Area:
  - Complete design for Saltchuk Mitigation Site
  - Complete habitat mitigation/restoration of Wapato Creek on Parcel 14
- Outside the Study Area:
  - Complete work on Upper Clear Creek Mitigation Site
- Develop Mitigation Bank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Transportation

4.1 Introduction

The purpose of the Transportation section of the Plan is to create a comprehensive and logical plan that will help the Port achieve its Strategic Plan targets and goals, enhance the economic benefits of the Port area, improve traffic circulation, and reduce congestion.

The Port's Strategic Plan targets call for doubling container volume and dry bulk throughput, increasing breakbulk volume by 30 percent, increasing auto import volume by 20 percent, while adding port-related direct jobs by 4,700 over the next 10 years.

Addressing existing transportation congestion on and off the Tideflats, while at the same time identifying transportation improvement projects that will be necessary to sustain the projected growth at the Port over the next 10 years, will be crucial to the Port's success for enhancing the economic competitiveness of the area.

The main objectives of the Transportation section of the Plan are to prioritize freight system improvement strategies and investments in the following user group areas:

- Regional and Port Access
- Tideflats Circulation and Preservation
- Rail Facilities
- Waterways


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4.2 Existing Transportation Conditions

The Tideflats Area Transportation Study (TATS), June 2011, was a coordinated transportation plan developed primarily for the Port of Tacoma, Downtown Tacoma, the City of Fife, portions of unincorporated Pierce County, and Puyallup Tribal Lands. While this Plan covered a much larger area than is the focus of this Land Use and Transportation Plan, it included a very comprehensive look at multi-modal transportation facilities, with a specific focus on freight movement in and around the Tideflats. This Plan utilizes much of the TATS analysis.

The complex nature of the Tideflats area results in a variety of transportation opportunities and constraints that influence the need for improvements. These issues include bottlenecks with heavy congestion, interaction between rail and roads, bridge conditions, baseline projects that are currently underway or are anticipated to be implemented but may not yet be funded in the immediate term, and plans for roadway extensions, interchange improvements, and transit routes.

Figure 4.1 on the next page, shows daily traffic volumes in the vicinity of the Port of Tacoma in 2011. I-5 is a primary artery through the area, carrying 180,000 plus daily vehicles. SR 509, which traverses two sides of the Tideflats, carries 30,000 vehicles per day. The Port is served by three main interchanges with I-5 at Port of Tacoma Road, 54th Avenue E, and Portland Avenue. 54th Avenue E currently carries 16,000 daily vehicles between the Port and I-5. Port of Tacoma Road carries 11,000 daily vehicles on the segment between SR 509 and I-5. Portland Avenue carries 14,000 daily vehicles between I-5 and SR 509.

A key regional connection is River Road E (SR 167). This principal arterial travels along the west side of the Puyallup River and connects I-5 with the SR 167 freeway in Puyallup.

Trucks rely on all three interchanges to access the shipping terminals within the Port. While Port of Tacoma Road carries less overall traffic than the other two roadways that serve the Port, it carries more truck traffic. For example, between Pacific Hwy and SR 509 during the PM peak hour, Port of Tacoma Road handles 21 percent more truck trips compared to 54th Avenue E, and 4 percent more than Portland Avenue. Port of Tacoma Road is designated as a T1 Freight Corridor and a heavy haul route.

Figure 4.2 on page 37, shows existing traffic "hot spots" near the Port. The Port of Tacoma Road and 54th Avenue E corridor, and interchanges with I-5 experience congestion, due in large part to the high truck volumes and close spacing of the intersections. These corridors provide critical access to I-5, as well as destinations to the south. Other problematic operations occur along the Portland Avenue corridor between the SR 509 and I-5 interchanges.

Figure 4.1 - Daily Traffic Volumes

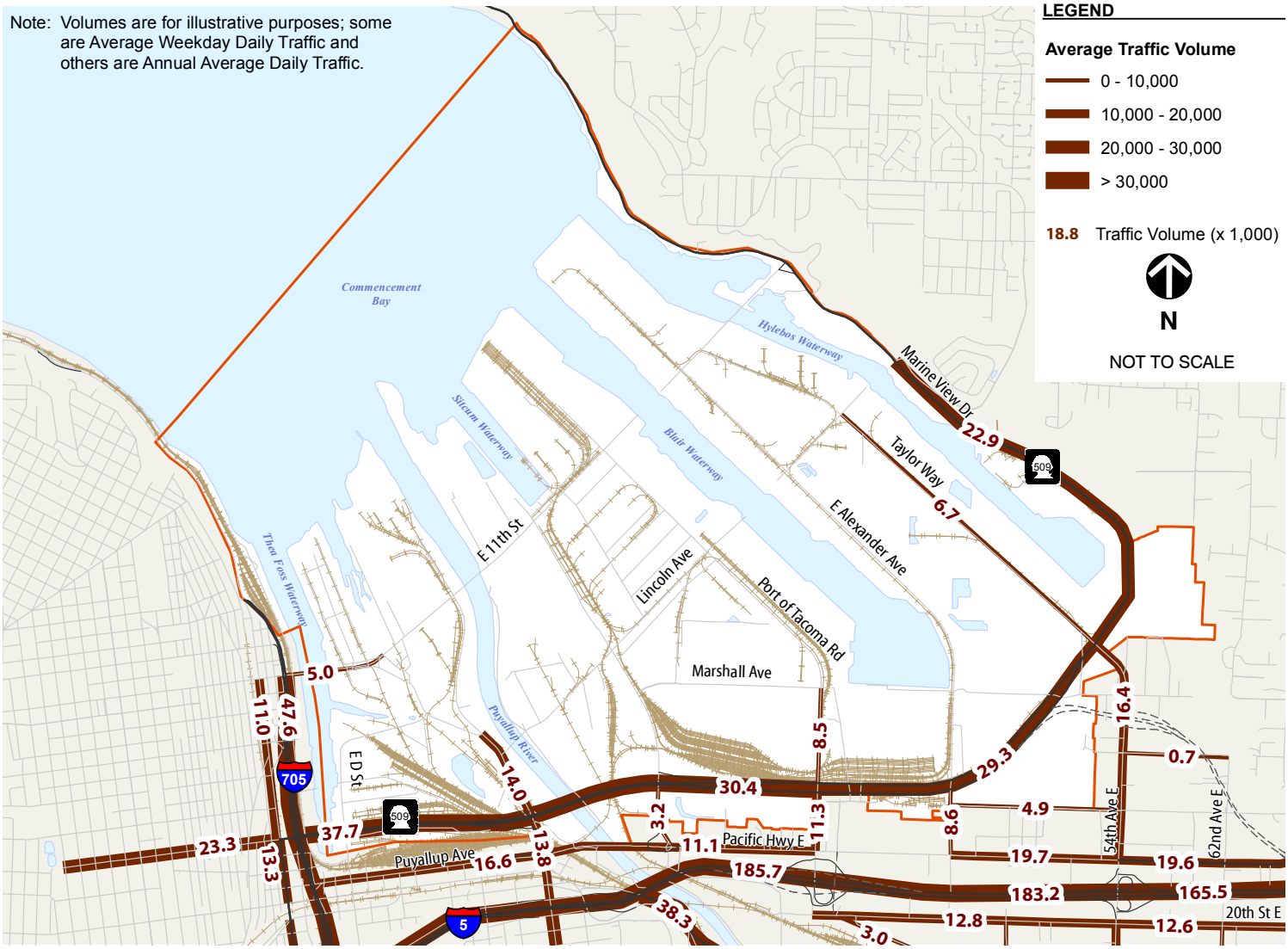
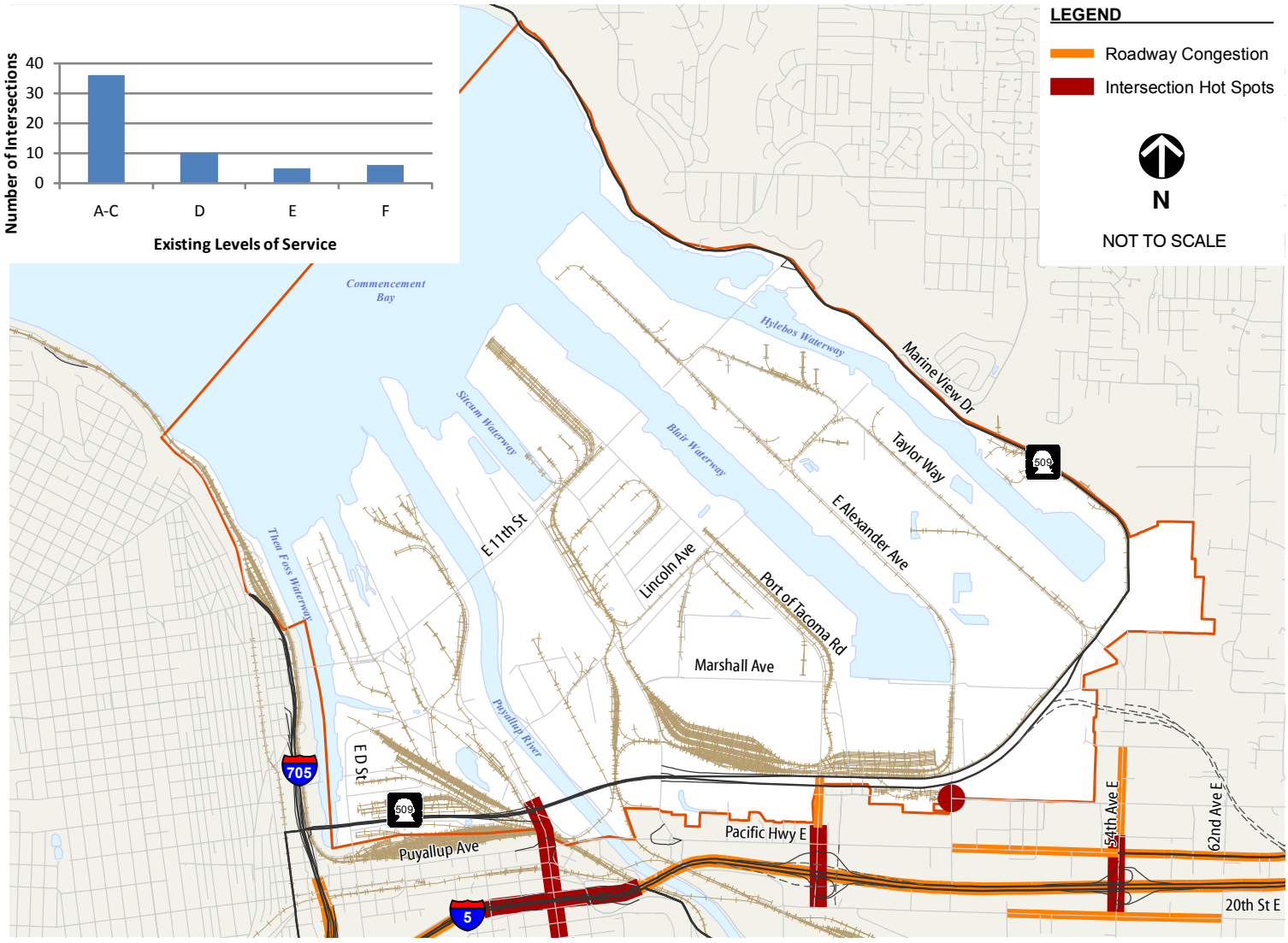


Figure 4.2 - Existing Traffic "Hot Spots"



Within the Port, excessive queues tend to form at the following locations:

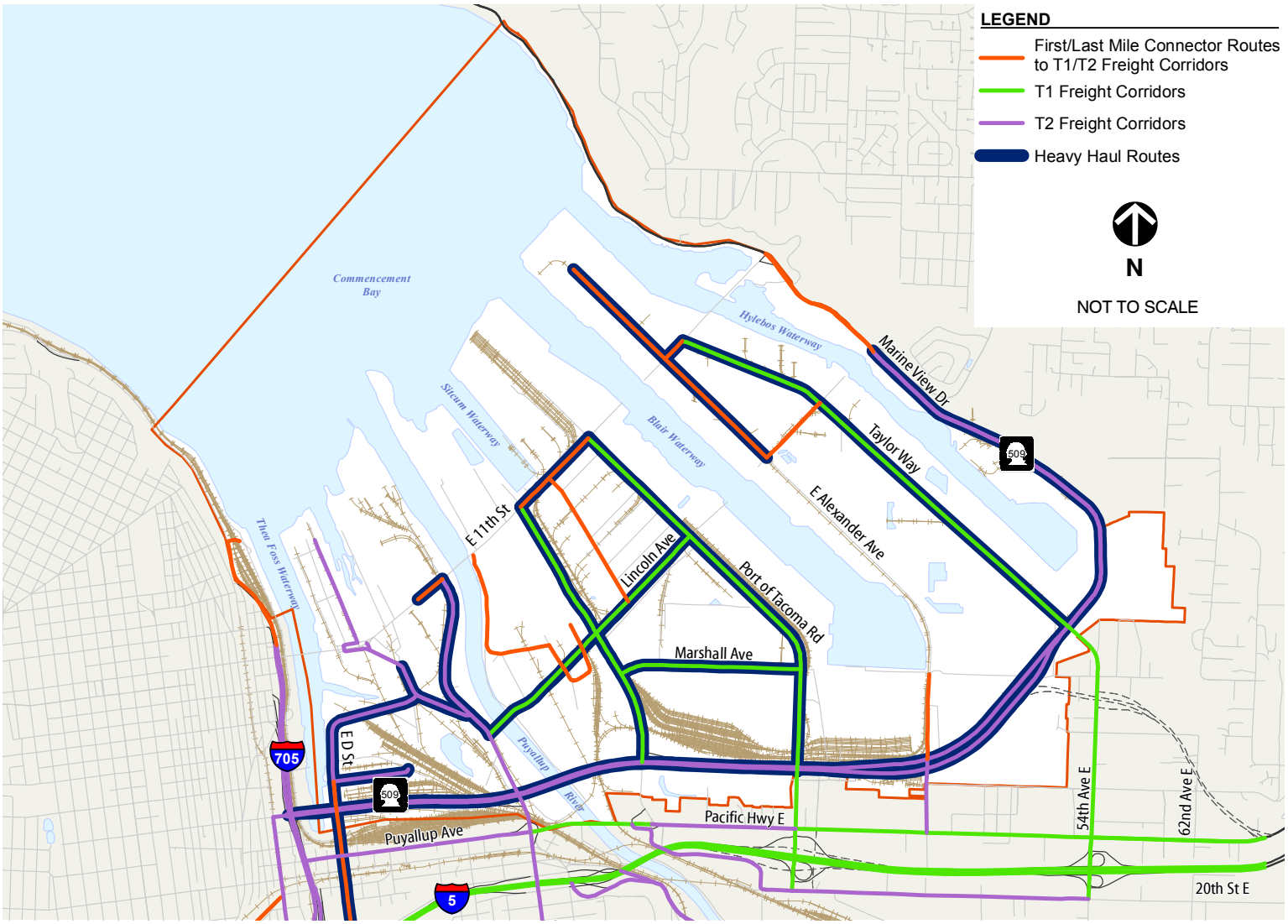
- Northbound Port of Tacoma Road between Marshall Avenue and E 11th Street
- SR 509 and Taylor Way/54th Avenue E
- Alexander Avenue E/SR 509

The presence of the Port creates substantial freight activity (both trucks and rail) with unique operations and a key relationship to the economic vitality of the region.

Trucks rely heavily on Portland Avenue, Port of Tacoma Road, and 54th Avenue E to access the shipping terminals within the Port. Much of the truck traffic is traveling between the Port and warehousing and distribution centers located in Kent Valley, Fife/Puyallup/Sumner, Tacoma, Frederickson, Dupont, Lacey/Olympia, and Centralia/Chehalis.

Figure 4.3 summarizes truck routes. Most of the principal and minor arterials are approved truck routes, and are heavily used by Port-related traffic. Truck traffic into and out of the Port of Tacoma is sustained throughout the day with trucks arriving before the terminals open at 8 AM, causing queues mainly within the Tideflats.

Figure 4.3 - Truck Routes



Opportunities & Challenges

One key objective is to develop a Land Use and Transportation Plan that is implementable, flexible, and simple. This Plan must respond to the dynamic context that the Port operates in – it is unknown who the Port's tenants will be 10 and 20 years out and by what mode they will want to transport their goods. The Port must remain competitive as a desirable goods movement hub both within the region and amongst west coast ports. In a transportation context, this means that investments should be made to increase capacity, efficiency, and reliability. Recommendations should not bias Port operations to one mode versus another (e.g., rail versus truck). Moreover, recommendations should point to transportation investments that maintain sufficient connectivity, while minimizing footprint to ensure that Port land can be focused on revenue-generating uses, such as terminal space. The targets and goals included in the Port's 2013 Strategic Plan will also be used to help guide and direct the capital improvement recommendations that will be presented in the Land Use and Transportation Plan. Below, we summarize some of the opportunities and challenges discussed by Port staff during a January 2013 tour:

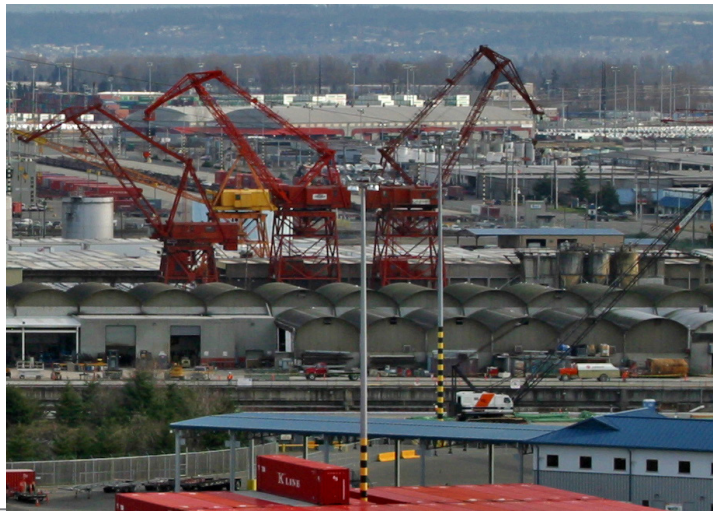
- **At-Grade crossings** – At-grade crossings are very prevalent at the Port and most crossings do not include flashing lights or crossing arms. These at-grade crossings sever connectivity and also create potential traffic conflict points. This plan should evaluate solutions for key at-grade crossings.

- **Road vacations** – Port staff identified several candidates for road vacations, including sections of E 11th Street, Maxwell Avenue, and Ross Way. The issues surrounding road vacations on Port property are complex and go beyond the typical transportation considerations in most road vacation analyses (such as roadway ownership). However, from a transportation perspective, it will be important to understand how potential road vacations influence connectivity between Port uses and key transportation corridors (like I-5 and SR 167) and affect congestion levels on other facilities within the Port.

- **Connectivity** – Consider additional transportation connections when evaluating potential roadway vacancies.

- **Pavement Conditions** – Driving around the Port, one of the most immediately apparent deficiencies is the poor condition of the roads. The high proportion of heavy vehicles makes it imperative that pavement be constructed to a very durable standard. This plan makes recommendations about roadway construction, including materials, design life, and other truck-accommodating designs (Appendix 2). New concrete roads near the APM terminal may provide a sound example.

- **Coordination with the City of Tacoma and other entities** – The Port of Tacoma owns approximately 40 percent of the land in the Tideflats, with the remainder owned by a patchwork of other entities, including city, state, federal, tribal, and miscellaneous private entities. Close collaboration with these varied stakeholders will be critical in selecting, prioritizing, and phasing projects.



4.3 Regional & Port Access

The Plan categorizes roadway improvement projects according to user group they most benefit. The projects that benefit regional access are highlighted here.

Action Strategies

- Provide regional leadership in securing the funds needed to complete SR 167.
- Support the City of Fife in its efforts to secure funding for the Port of Tacoma Road/I-5 interchange.
- Ensure that Portland Avenue from SR 509 to Lincoln Avenue is preserved and maintained for freight.

SR 167 Completion

SR 167 is the primary freeway connecting the Kent and Puyallup River valleys to the Seattle/ Tacoma/Bellevue metropolitan area. The original planned route for the highway ran from Renton to Tacoma, but construction halted near Puyallup in the 1980s before the freeway could be completed to Tacoma.

The project is currently only partially funded, but has been identified as a critical missing link in the state's highway network. A proposed SR 167 completion plan, including the number of lanes and inclusion of tolling, was presented to the Legislature in the 2013 session. WSDOT has identified the following project benefits:

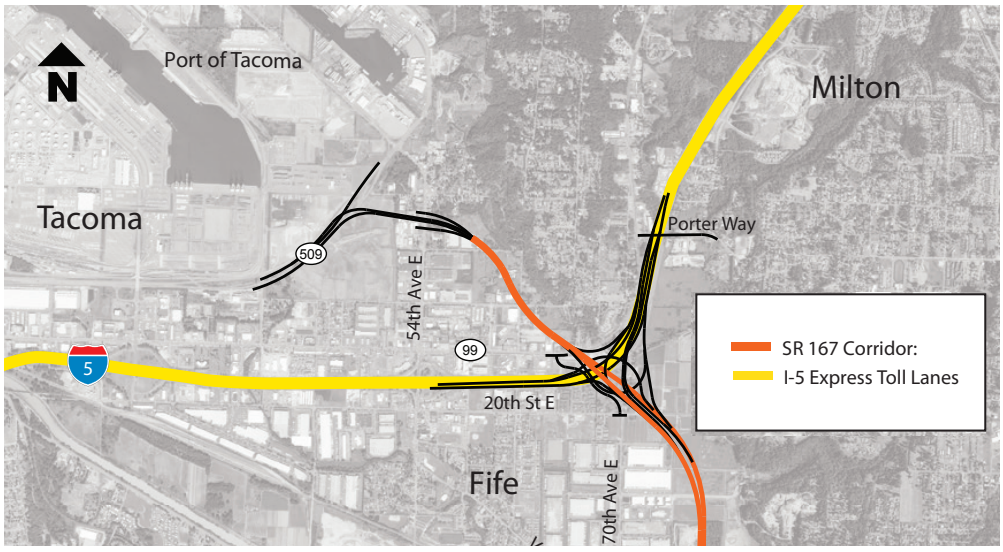
- Relieve congestion on local roads and other highways by providing new travel options
- Move freight faster, and more economically
- Improve regional mobility
- Enhance surface water quality and improve stream habitat feeding into Commencement Bay

For the Port, the extension of SR 167 would provide a much improved connection to key warehousing and trans-loading centers in Fife, Sumner, and Kent. The SR 167 project was identified as the highest priority regional project in the TATS.

I-5 Tacoma/Pierce County HOV Program

WSDOT is currently working to extend High-Occupancy Vehicle (HOV) lanes from 54th Avenue E interchange to SR 16 on I-5. The end goal of this project is to provide continuous HOV lanes on the SR 16/I-5 corridor between Gig Harbor and Everett. According to WSDOT, I-5 will be widened to accommodate the new HOV lanes, rather than converting existing general purpose lanes. While HOV lanes tend not to serve Freight-related traffic, the addition of these lanes would increase highway capacity and reduce traffic congestion, which increases the efficiency of Port-related operations.

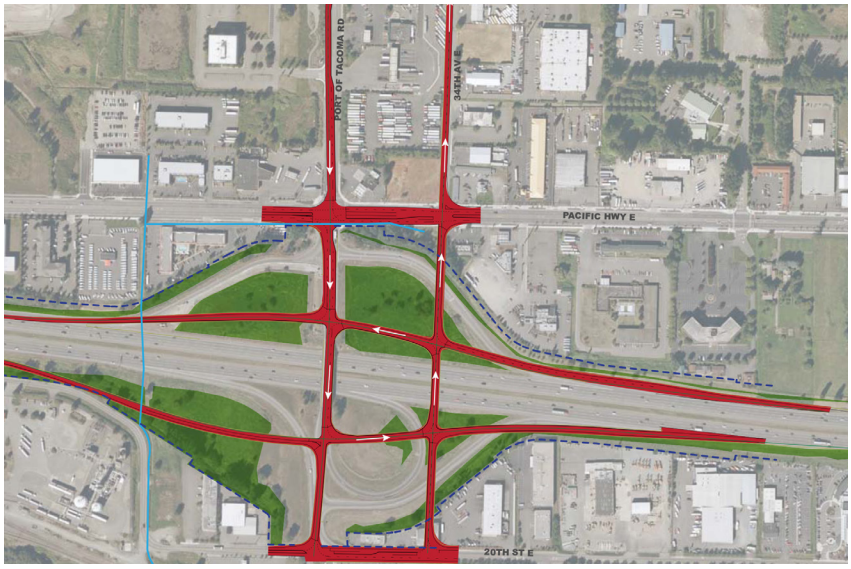
SR 167 Future Phases



Source: WSDOT, October 2013

Port of Tacoma Road/ I-5 Interchange Project

This project will increase the capacity of the Port of Tacoma Road interchange, which is a pinch point for trucks accessing the Port. The project would create a one-way couplet with Port of Tacoma Road serving southbound traffic and 34th Avenue E serving northbound traffic (below). Port of Tacoma Road could feature a southbound truck-only lane from Marshall Avenue to the I-5 on-ramps. Planning for this project began in the mid-1990s. Construction of this interchange would occur in phases, with the final stages completed in 2020, assuming funding is available.



I-5/54th Avenue E Interchange Project

The 54th Avenue E interchange with I-5 is currently a major gateway from I-5 to the Blair Peninsula/Taylor Way area of the Port, is a major access to and from SR 509, and is located in Fife's proposed city center. The City of Fife, through a Downtown City Center Visioning planning process, is looking to dramatically change the character of its city center, introducing housing, retail, and other businesses, and developing a more transit and pedestrian-centric downtown. This project proposes to re-configure the current 54th Avenue E interchange to reduce traffic volumes on 54th Avenue E and provide more localized traffic access within Fife. This interchange would become less focused on Port access. Major Port-related traffic would be served by the improved Port of Tacoma Road interchange with I-5 and SR 167 completion. In order to maintain suitable access to the Port, careful consideration needs to be given to the phasing of the improvements/modifications planned at the I-5 and 54th Avenue E interchange as to not adversely affect Port access. Ideally, the improvements planned at the I-5 and Port of Tacoma interchange and the SR 167 completion project would be completed at the same time as the improvements/modifications planned at the I-5 and 54th Avenue E interchange. It is recognized that the I-5 and 54th Avenue E interchange improvements will be completed in phases over time as funding becomes available. As each phase of the I-5 and 54th Avenue E interchange is completed, an evaluation should be completed on the effects on Tideflats and Port area access.

4.4 Tideflats Circulation & Preservation

The Plan categorizes transportation improvement projects according to user group they most benefit. The projects that benefit Port circulation and preservation are highlighted here.

Action Strategies

- Prioritize rights-of-way for preservation, maintenance, and improvements.
  - Port of Tacoma Road
  - Portland Avenue
  - Thorne Road – Heavy haul improvements

- Identify and prioritize desired street vacations.
  - E 11th Street
  - Maxwell Avenue
  - Milwaukee Way
  - Alexander Avenue E

- The City of Tacoma is currently updating its pavement management system. Once updated, this system will provide maintenance management strategies which can be used to reduce life-cycle costs. In addition, the City of Tacoma's Street Design Standards include recommendations for Port-specific facilities. The Port will work with the City of Tacoma to establish a pavement condition index and other benchmarks for maintenance and preservation for Tideflats area roadways and potential area-wide funding strategies.

- Develop and implement Intelligent Transportation System (ITS) improvements.

Pavement Maintenance & Preservation

Proper pavement design, maintenance, and rehabilitation are crucial for roads at the Port of Tacoma. Roads that meet industrial-area standards enjoy a longer lifetime, require fewer repairs, and have a lower lifecycle cost in the long run. By collaborating with City of Tacoma on design standards, the Port of Tacoma can improve the safety, efficiency, and cost of its roadways.

Key aspects of an effective asset management approach can be found in Appendix 2.

Street Vacations

The Port of Tacoma should consider petitioning for street vacations in some areas of the Port to facilitate supportive development, circulation, and other long term public benefits. Vacating certain streets will allow development of land parcels to their highest and best use and enable the Port to pursue further operational efficiencies. In order to apply for a street vacation, the Port of Tacoma must show that vacating the selected streets would meet:

- Public Trust Functions including, but not limited to, circulation, access, utilities, light, air, open space, and view conditions of the right-of-way

- Land use designations consistent with existing city land use policies and future visions for the right-of-way

- Public benefit in the long term, rather than private benefit, must be the focus of the vacation

The City of Tacoma Municipal Code also specifies that all revenue received as part of a street vacation in the Tideflats area shall be devoted to transportation projects in the Tideflats area.

In 2009, the Port of Tacoma and City of Tacoma entered into an Interlocal Agreement whereby the Port agreed to purchase up to $10 million in City right-of-way and the City was to apply the funds to the Hylebos Bridge Rehabilitation Project.

Each category of Public Trust Functions above has specific guidelines that apply to allowable street vacations. The following conditions particularly apply to the Port of Tacoma:

- Vacations must not impede circulation and access of vehicles and pedestrians, varying by street classification. In general, streets with low traffic volumes that are not the sole access point to properties on the block and will not result in significant traffic diversion, especially of truck, commercial, or public transit traffic, are appropriate candidates for vacation.

- Vacations must not encourage traffic code violations.

- Utility lines and facilities must be adequately protected via easement, relocation, fee ownership, or a similar agreement with the utility owner.

Potential development resulting from a street vacation must also coincide with existing city land use policies. Specifically, the City Council will compare the highest and best use of a land parcel developed under a street vacation against its current development potential. The increased development following vacation must meet the City's land use and transportation neighborhood elements of the Comprehensive Plan as they apply to the area.

Benefits to the public must exceed basic requirements for development in the area to qualify for street vacation. In addition, the petitioner for street vacation must demonstrate benefits to the public proportional to the benefits gained by the petitioner.

The Emergency Response Plan described in Section 3.6, together with the Intelligent Tranportation Strategy described in Section 4.4, will be of critical importance in identifying when and where future street vacations can be considered.

Industrial Area Street Design Standards

Trucks and other heavy vehicles require special consideration for safe and efficient operation on roadways with a mix of other vehicles. The additional size and weight of trucks compared to passenger automobiles results in the need for increased lane width, pavement thickness, and curb return radii. Depending on adjacent land uses and roadway characteristics, designs should also allow additional space in driveways and turn-arounds as applicable. These design guidelines have elevated importance in port areas where freight vehicles make up a larger portion of daily traffic. The Port of Tacoma should work with City of Tacoma in updating the City's Design Manual to include industrial area design standards to facilitate safe and efficient truck movement through and around the Tideflats area.

The WSDOT Design Manual M 22-01.10 provides specific guidance for geometric design of roadways that serve multiple purposes. These guidelines, discussed in detail in Appendix 2, will ensure safe and efficient roadway designs for travelers using all modes of transportation by accounting for the presence of goods movement vehicles.

Clean Truck Program

The Port of Tacoma Drayage Truck Emission Reduction Program (Clean Truck Program) was created to reduce diesel particulate emissions from drayage trucks serving the Port of Tacoma. The program is based on goals set in the Northwest Ports Clean Air Strategy for diesel fleet modernization and improved port efficiency. Fleet modernization directly reduces truck emissions but also increases operating costs of fleet operators. Drayage truck fleet operators become increasingly dependent on reliable and efficient access to tideflat businesses to maintain profitability.

Tideflat circulation and road surface conditions are important to maintain drayage truck traffic flow and reduce emissions from inefficient truck operations. Congestion management through transportation planning and roadway preservation serves to reduce unnecessary idling, reduce marine terminal pre-gate queuing times, and improve on-terminal turn times. Improved tideflat circulation and road surface preservation to reduce excess diesel emissions from inefficient truck operations is consistent with the goals set in the Clean Truck Program, Northwest Ports Clean Air Strategy, and Port of Tacoma's 2012-2022 Strategic Plan.

Intelligent Transportation System Improvements

The Port strives to create highly efficient terminals inside and outside the gate working with Port tenants and other stakeholders. Intelligent Transportation Systems (ITS) can allow Port of Tacoma users to transport goods with greater efficiency using the existing physical infrastructure. Passenger transportation already benefits from ITS through traveler information, trip planning, and active traffic management. ITS projects can improve goods movement via communications, data sharing, and coordination strategies.

In order to optimize freight movement within the Port area, the Port of Tacoma has a number of ITS strategies available:

- Automatic Vehicle Locator System: collects anonymous truck data via commercial systems or RFID tags
- Advanced Transportation Management Information System: detects traffic through real-time traffic data and video images from detection devices installed in the Tideflats area
- Truck/Rail messaging-reroute for blockages
- Variable Message Signs: communicates transportation system delays to drivers as they enter the Tideflats providing alternative routing to avoid congestion and blockages
- Railroad Crossing Monitoring System: gathers video and detection data from at-grade railroad crossings and alerts drivers to route blockage delays
- Real Time Information: identifies individual trucks as they enter the Port and delivers information such as incidents, road closures, and queuing times to coordinate route guidance
- Reversible Lane Operations: in order to address truck queuing on Port of Tacoma Road within the Port, convert the outside northbound lane to a truck queuing lane and designate the inside southbound lane to reversible operations during peak periods

These Intelligent Transportation Systems technologies will allow the Port of Tacoma to reduce delays in goods movement due to:

- Train blockages
- Congestion
- Queuing
- Breakdowns
- Traffic collisions

Intelligent Transportation Systems technologies will also assist with emergency response planning and service delivery.

Source: Manitoba Infrastructure and Transportation, 2011

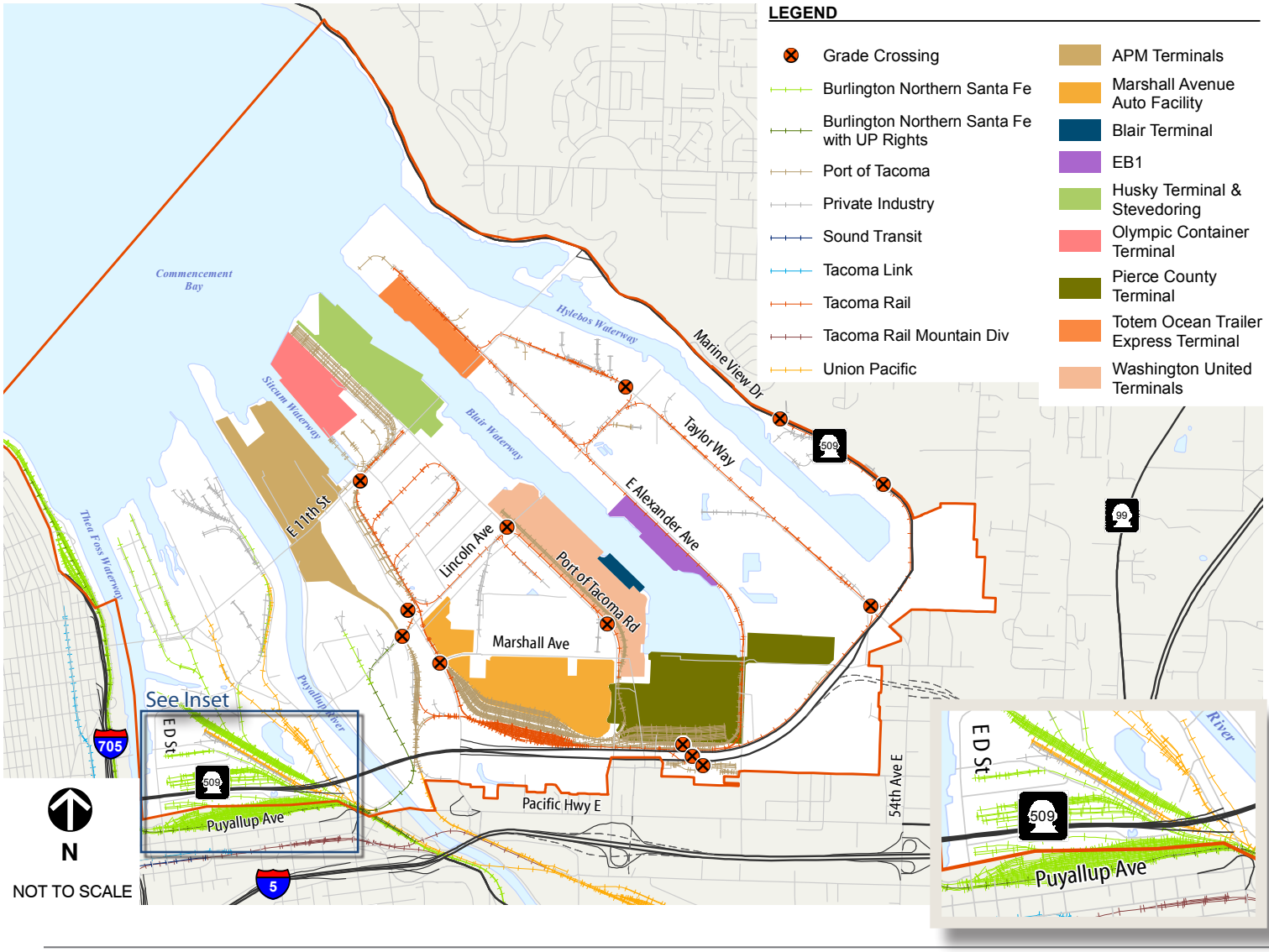
4.5 Rail

In the Tacoma Tideflats area, the Burlington Northern Santa Fe (BNSF) Railway and the Union Pacific (UP) Railroad interchange freight railcars with Tacoma Rail who serves as the short-line railroad provider of railcar switching services to the North Intermodal Yard (NIM), Washington United Terminal (WUT), the Pierce County Terminal (PCT), as well as other Port break bulk facilities and area businesses. Tacoma Rail is owned by the City of Tacoma, and is an operating division of Tacoma Public Utilities.

The Port notes the importance of the City of Tacoma's Puyallup River Bridge Replacement project, which is designed for the passage of double-stack rail transport, should a future BNSF rail track be built.

Figure 4.4 depicts most of the current configuration of railroad facilities and public grade crossings located in the vicinity of the Port, including the intermodal terminals within the Port. The BNSF and UP are the regional Class I railroads providing the furtherance of commodities flowing through the Port of Tacoma, with BNSF handling the majority volume. Tacoma Rail is a Class III short-line railroad that provides train classification and assembly services to both Class I carriers in addition to railcar switching to the NIM, WUT, and PCT terminals and a variety of other area businesses in Pierce and Thurston Counties. Figure 4.5 shows proposed rail improvement projects, briefly described on page 48.

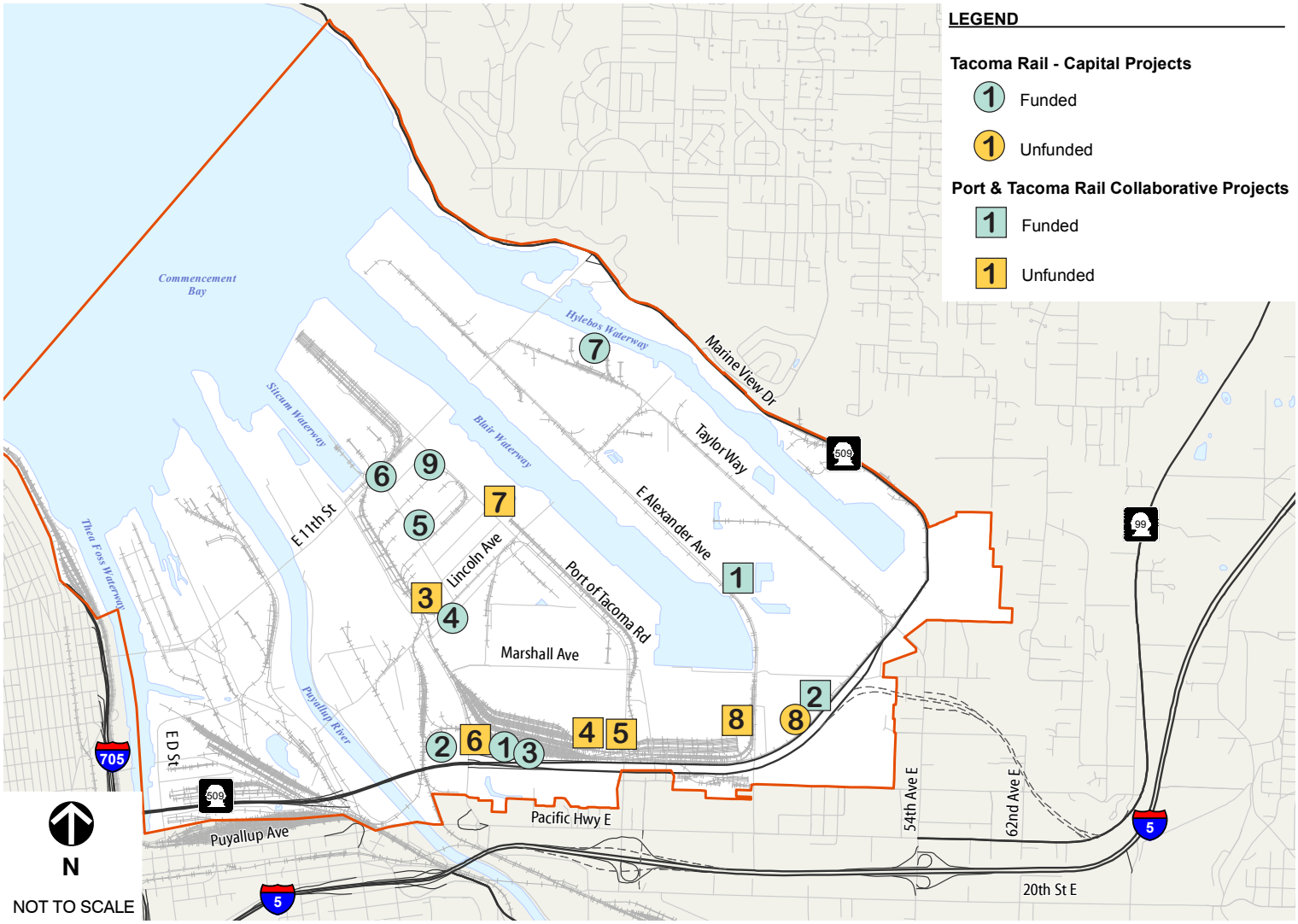
Figure 4.4 - Existing Rail Facilities & Grade Crossings



Action Strategies

- Support Tacoma Rail in renewing infrastructure periodically to support current and attract new freight rail customers.
- Install new system capacity and/or features within the existing right-of-way designed to improve operational flexibility and efficiency.
- Collaborate with the Puyallup Tribe of Indians to develop rail infrastructure on the Blair-Hylebos peninsula.
- Support improvements by others, as appropriate.

Figure 4.5 - Rail Projects



The following listed rail improvement projects are being developed by the Port of Tacoma, in partnership with Tacoma Rail, and once implemented will enhance freight rail operational flexibility and increase overall rail capacity in the Tideflats area. Those projects are described below:

1 EB-1 Connection to General RR System

Connection to the general railroad system will enhance investments already made by the Port of Tacoma by providing additional on dock freight rail access in support of existing break-bulk operations and attract new customers.

2 North Leads

This project will construct industrial lead tracks to support future cargo customers on the Blair Peninsula.

3 Transfer Yard Connection to Lincoln

This project would install a new connection from the Port Transfer Yard to existing tracks along Lincoln Avenue providing a direct access route to US Oil and reduce road/rail congestion on Port of Tacoma Road.

4 Culvert Erdahl Ditch

The retaining walls supporting the Erdahl Ditch in the main rail yard are deteriorating and in need of repair. The prudent alternative to repairing the existing configuration is to culvert this segment of the Erdahl Ditch thereby enabling the reconfiguration of the railroad tracks to increase capacity and make adjustments to improve operational flexibility and efficiency.

5 Arrival & Departure (A&D) Track Extension & East End Yard Reconfiguration

The project would install additional railroad track capacity and make adjustments designed to improve operational flexibility and efficiency by allowing congruent train movements in support of existing Port terminals and/or other local freight rail customers simultaneously.

6 West End Yard Reconfiguration

The project would install additional railroad track capacity and make adjustments designed to improve operational flexibility and efficiency by allowing congruent train movements in support of existing Port terminals and/or other local freight rail customers simultaneously.

7 Washington United Terminal – Double Ending

The project would mirror the configuration of the current access into the terminal tracks on the North end to allow trains to make a "through movement" thereby dramatically increasing operational flexibility and efficiencies. The project would establish a new connection point into the general railroad system on the North end of the terminal.

8 Pierce County Terminal – Double Ending

The project would mirror the configuration of the current access into the terminal tracks on the West end to allow trains to make a "through movement" thereby dramatically increasing operational flexibility and efficiencies. The project would establish a new connection point into the general railroad system on the East end of the terminal..

Additional Tacoma Rail Projects Include:

1. Yard Tracks 5 and 6 Rail Relay Project
2. Port Pass Track Upgrade
3. Yard Tracks 8 and 9 Rail Relay
4. Lincoln Avenue "wye" Installation
5. East Loop Rehabilitation and 17th Street Expansion
6. NIM Yard Lead Track Upgrade
7. Taylor Way Track Rehabilitation and Expansion (McPip area track upgrade)
8. SR 509 Track Rebuild Project (south lead)
9. West Loop Track Rehabilitation (concrete tech area)

4.6 Priorities

The Port of Tacoma is a major center for container cargo, bulk, break-bulk, autos, and heavy-lift cargo and has become one of the largest container ports in North America. The Port expects to grow and evolve guided by the recently adopted Strategic Plan, which outlines growth targets that call for doubling container volume and dry bulk throughput, increasing break-bulk volume by 30 percent, increasing auto import volume by 20 percent, while adding port-related direct jobs by 4,700 over the next 10 years.

The Port of Tacoma and the Tideflats area are the heart of the area's industrial activity serving a diverse set of stakeholders and transportation modes. The Port of Tacoma has developed transportation priority strategies to help accommodate this expected growth by focusing on the different user groups: regional and Port access projects; Tideflats circulation and preservation; rail improvements; and priorities for its waterways.

This section provides the necessary information, goals and policies, performance metrics, and ratings to support the anticipated growth, while providing decisions makers with rational capital project investment information designed to guide development over the next 10 to 20 years.

4.7 Criteria/Performance Measures

The evaluation of candidate projects was completed in two steps. The first level was a preliminary screening of candidate road projects by the Technical Advisory Committee (TAC) to identify projects that are important to the Port and would likely receive support.

The first level screening criteria is shown in Table 4.1. The purpose of this step was to ensure that the team selected only projects that directly related to the goals of the study.

Categories considered include transportation system performance, potential to improve safety, physical feasibility, partnerships, consistency with the Strategic Plan, and level of Port support.

There was no formal threshold needed to pass the screening process. Rather, the ratings were used as a tool for the project team to weigh the benefits and disadvantages, and make a determination as to whether the project warranted further inclusion in this Plan.

The second level of evaluation (see Table 4.2) involved more detailed analysis in terms of delay, rail bottlenecks, safety, etc., and also tied the metric to the Strategic Plan values, targets, and goals. The more detailed analysis for the transportation projects was completed in the Tideflats Area Transportation Study, June 2011.

Table 4.1 - First Level of Evaluation

Project Description	Criteria
Transportation System Performance	• Potential to improve traffic "hot spots" • Potential to improve truck operations
Safety	• Potential to improve high collision locations
Physical Feasibility	• Ability to be constructed; environmental feasibility
TAC Review	• Likelihood of receiving Port support
Partnerships	• Support by public and private sectors
Strategic Plan Consistency	• Consistent with mission, values, targets and goals of the Strategic Plan

Table 4.2 - Second Level of Evaluation

Performance Metrics Transportation	Measurement xxxxxxxxx Quantitative xxxxxxxxx Qualitative
1. Delay/Travel Time/Wait Times for Trucks	• Congestion on key truck corridors and within Port roadway system (estimated using travel model) • Gate turn times
2. Rail Bottleneck Delay	• Project eliminates a rail conflict or at-grade crossing
3. Mobility/Accessibility/ Connectivity	• Congestion on key truck corridors and within Port roadway system (estimated using travel model) • Transportation network completeness (evaluation of gaps in transportation network for all modes)
4. Reliability	• Comparison of how congestion levels change by time of day and day of week
5. Safety	• Locations with accident rates above the state-wide average involving trucks • Addresses a location with identified safety challenge • Reduces conflicts between modes (e.g., truck/pedestrian, rail/truck, truck/car)
6. Route Redundancy	• Increases number of viable routes between key destinations

7. Partnerships	• Higher scores assigned for projects that are:
	  • "On the books"
	  • Have identified funding
	  • Agency approvals
	  • MOU agreements
	  • Public/Private Partnerships

8. Benefit-Cost Ratio	• Key benefits such as miles of roadway, minutes of travel time saved, number of at-grade crossings removed per dollar spent on overall project or by POT
9. Maintenance/Preservation	• IRI or BHI Index • High scores assigned for projects that reduce overall maintenance/ preservation costs or offer maintenance/preservation benefits
10. Environment/GHG Emissions	• Pounds of GHG Emissions • Hours of stop and go traffic (estimated using travel model) • Project's ability to encourage greener modes of travel • Project's ability to increase shipping efficiency
11. Percent of Capital and Operating Costs Covered From Project Revenues	• Ratio of estimated operating cost to estimated project revenues • Ratio of capital cost to project revenues

Strategic Plan Consistency		
Values	**Target**	**Achieve Goals**
• Customer focus • Competitive spirit	• Increase production • Reduce diesel pollutants • Increase port-related jobs	• Enhance competitive position • Provide reliable and efficient infrastructure
• Customer focus • Competitive spirit	• Increase production • Reduce diesel pollutants • Increase port-related jobs	• Enhance competitive position • Provide reliable and efficient infrastructure
• Customer focus • Courage • Competitive spirit	• Increase production • Reduce diesel pollutants • Increase port-related jobs	• Enhance competitive position • Provide reliable and efficient infrastructure • Strenghten community connections
• Customer focus • Competitive spirit	• Increase production • Reduce diesel pollutants • Increase port-related jobs	• Enhance competitive position • Provide reliable and efficient infrastructure
• Integrity • Courage	• Increase port-related jobs	• Increase organizational capabilities
• Customer focus • Competitive spirit	• Increase production • Reduce diesel pollutants • Increase port-related jobs	• Enhance competitive position • Provide reliable and efficient infrastructure
• Integrity • Customer focus • Teamwork	• Increase port-related jobs	• Provide reliable and efficient infrastructure • Increase organizational capabilities • Strengthen community connections
• Customer focus • Competitive spirit • Sustainability	• Increase operating margin • Increase net income • Increase return on assets • Increase port-related jobs	• Improve financial performance
• Sustainability	• Increase operating margin • Increase net income • Increase return on assets • Increase port-related jobs	• Improve financial performance
• Integrity • Courage • Sustainability	• Reduce diesel pollutants • Increase port-related jobs	• Advance environmental stewardship
• Sustainability	• Increase operating margin • Increase net income • Increase return on assets • Increase port-related jobs	• Improve financial performance

4.8 Ratings

Throughout the screening and evaluation process, improvement concepts were classified by the user group which would experience the most benefit. Those user groups and the type of travel they represent (regional and Port access and Tideflats circulation and preservation) are summarized in Table 4.3.

The improvement projects were then screened through a Transportation Strategy process and prioritized as shown in Table 4.4.

Table 4.3 - User Groups

Category	Criteria
Regional/Port Access	• To/From Port • To/From Distribution Centers • To/From Industries • Between Port and Local Warehouses • Between Port and Consolidators • Between Port and Rail (Dray)
Port Access/Tideflats Circulation	• Port to Port Travel • Tideflats Roadways • Street Modifications
Rail Facilities	• Increase Efficiency • Increase Capacity • Lower Operating Costs
Waterways	• Maintain and Improve Navigation • Increase Safety • Environmental Protection

Table 4.4 - Strategy Table

Proposed Strategies	Regional/Port Access						Port Access/ On-Port Circulation			Rail Facilities	
	Delay/Travel Time	Mobility/ Connectivity	Reliability	Benefit/Cost	Partnerships	Route Redundancy	On-Port Circulation	Maintenance Preservation	Excess Capacity/ Development Potential	Rail Capacity	Rail Bottleneck Delay
	Transportation										
Transportation Strategies											
Regional/Port Access											
1. SR 167 Completion	●	●	●	◔	●	●					
2. Port of Tacoma Road Interchange	●	●	●	◔	●	◑					
Port Access/Tideflats											
1. Milwaukee Way Street Vacation							N/A	N/A	●		
2. Port of Tacoma Road Rehabilitation							◔	●	N/A		
3. Portland Avenue/Preservation & Maintenance							◔	●	N/A		
4. Thorne Road-Heavy Haul Improvements							◑	●	N/A		
5. Marshall Avenue/Port of Tacoma Road							●	◑	N/A		
6. Maxwell Avenue Street Vacation							N/A	N/A	●		
7. 11th Avenue Street Vacation							◔	N/A	●		
8. Alexander Avenue Street Vacation							N/A	N/A	●		
9. Promote Industrial Area Street Standards							◔	◔	N/A		
10. ITS Improvements							◔	◔	N/A		

Legend: Magnitude

Low

High

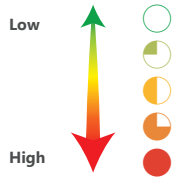
N/A = Not Applicable

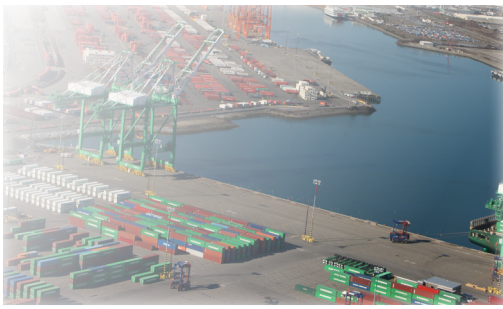
Proposed Strategies Table from Previous Page

Table 4.4 - Strategy Table (Continued)

Rail Facilities (FUNDED)											
1. Yard Tracks 5 & 6 Rail Relay Project										●	N/A
2. Port Pass Track Upgrade										◐	◔
3. Yard Tracks 8 and 9 Rail Relay										◐	●
4. Lincoln Avenue "wye" Installation										◐	◔
5. NIM Yard Lead Track Upgrade										◐	●
6. East Loop Rehabilitation & 17th Street Expansion										◐	◐
7. Taylor Way Track Rehab & Expansion										●	N/A
8. West Loop Track Rehabilitation										◐	◐
9. EB-1 Connection to General RR System										●	N/A
10. North Leads										●	N/A
Rail Facilities (NOT or PARTIALLY FUNDED)											
1. Transfer Yard Connection to Lincoln										◐	◐
2. Culvert Erdahl Ditch (16 & 17 Realignment)										◐	●
3. A&D Tracks Extension & East End Reconfiguration										◔	◔
4. West End Yard Reconfiguration										◐	●
5. Washington United Terminal - Double End RR Tracks										◐	N/A
6. Pierce County Terminal - Double End RR Tracks										◐	N/A
7. SR-509 Track Rebuild Project (South Lead)										◐	◐

Legend: Magnitude N/A = Not Applicable





4.9 Waterways

Waterways were not a focus area of the Land Use and Transportation Plan; therefore, specific waterway improvement projects were not developed. The following Best Practices are consistent with the Port's Strategic Plan.

Policies for transportation in Washington State Waterways reflect various broad goals, some of which derive directly from transportation needs, and others that protect additional interests. The overarching mission of waterways policy is to strengthen the regional economy by increasing economic and environmental sustainability. As part of its land use and transportation plan, the Port of Tacoma should consider several categories of marine policy:

Transportation

- Maintain and improve navigation efficiencies
- Increase the safety and security of the region's transportation system
- Enhance navigation and multi-modal freight mobility for ports, waterways, rail, and roads
- Protect trust funds to ensure collection and dedication of transportation user fees

Economic Development

- Expand international and domestic trade and tourism opportunities
- Encourage efficient cargo movement through maintenance of navigation, rail, roadway, intermodal corridors, marine highways, and pipelines

Environment

- Protect the environment while preserving regional economic vitality

Safety

- Safety factors include fleet composition, traffic conditions, navigational conditions, and waterway configuration

By considering these policy criteria, the Port of Tacoma can ensure that the Land Use and Transportation Plan satisfies the requirements for transportation in Washington State Waterways. Goods movement projects at the Port should follow these priorities consistent with the Washington State Freight Mobility Plan.

Action Strategies

- Expand/maintain navigable waterways to support terminals and increasing vessel size.
- Modernize wharves.
- Protect and improve environmental quality of waterways.
- Promote safe navigation.


SWL UNDER SPREADER 50LT
SWL UNDER CARGO BEAM 60LT
ZPMC
45
45
MAINTAIN 20 FT
BETWEEN HOSTLERS
36
CAPACITY

Glossary

Barge – Flat-bottomed vessels used for marine transport of goods, typically pulled behind another vessel.

Berth – The waterfront side of a wharf that is used for mooring vessels.

Bulk Cargo – Unpackaged goods shipped in bulk carriers.

Breakbulk Cargo – Cargo packed in packing units, such as boxes, bales, drums and others, but not containerized. Typical breakbulk cargos include goods such as lumber, steel, pulp, and machinery.

Containers – A single shipping unit measuring 20' by 8' by 8' that is used to contain bulk and break-bulk cargo.

Heavy Lift Cargo – Oversized cargo typically transported and lifted or installed into place. Transport is not standardized.

Intermodal – The movement of cargo by means of multiple interconnected methods including, rail, water and road.

Jobs – Direct, Indirect, Induced:

- **Direct Jobs**: Employment that can be attributed to the operation and management of the Port of Tacoma and associated logistical system.
- **Indirect Jobs**: Employment in non-maritime industries that results from activity at the Port of Tacoma. For example, employment at a hardware warehouse that supplies ship chandlers would be considered indirect employment.
- **Induced Jobs**: Employment generated because of expenditures by individuals employed indirectly or directly. For example, if a longshoreman decides to expand or re-model his/her home, this would result in additional (induced) employment hours in the general economy.

Liquid Bulk Cargo – Liquid cargo that is poured or pumped into ships, such as petroleum, edible oils and petrochemicals.

Main Line – The part of a railroad exclusive of switch tracks, branches, yards and terminals.

Marine Terminal – A wharf where vessels dock to receive and offload cargo, including both deep-sea terminals and non-deep-sea terminals.

Post Panamax – A vessel larger than the dimensions of a Panama Canal lock. A Post Panamax ship exceeds 965 feet in length, 106 feet in width and has a draft of more than 39.5 feet.

Puget Sound Regional Council (PSRC) – Regional planning agency for the four-county Puget Sound region containing King, Pierce, Snohomish and Kitsap counties.

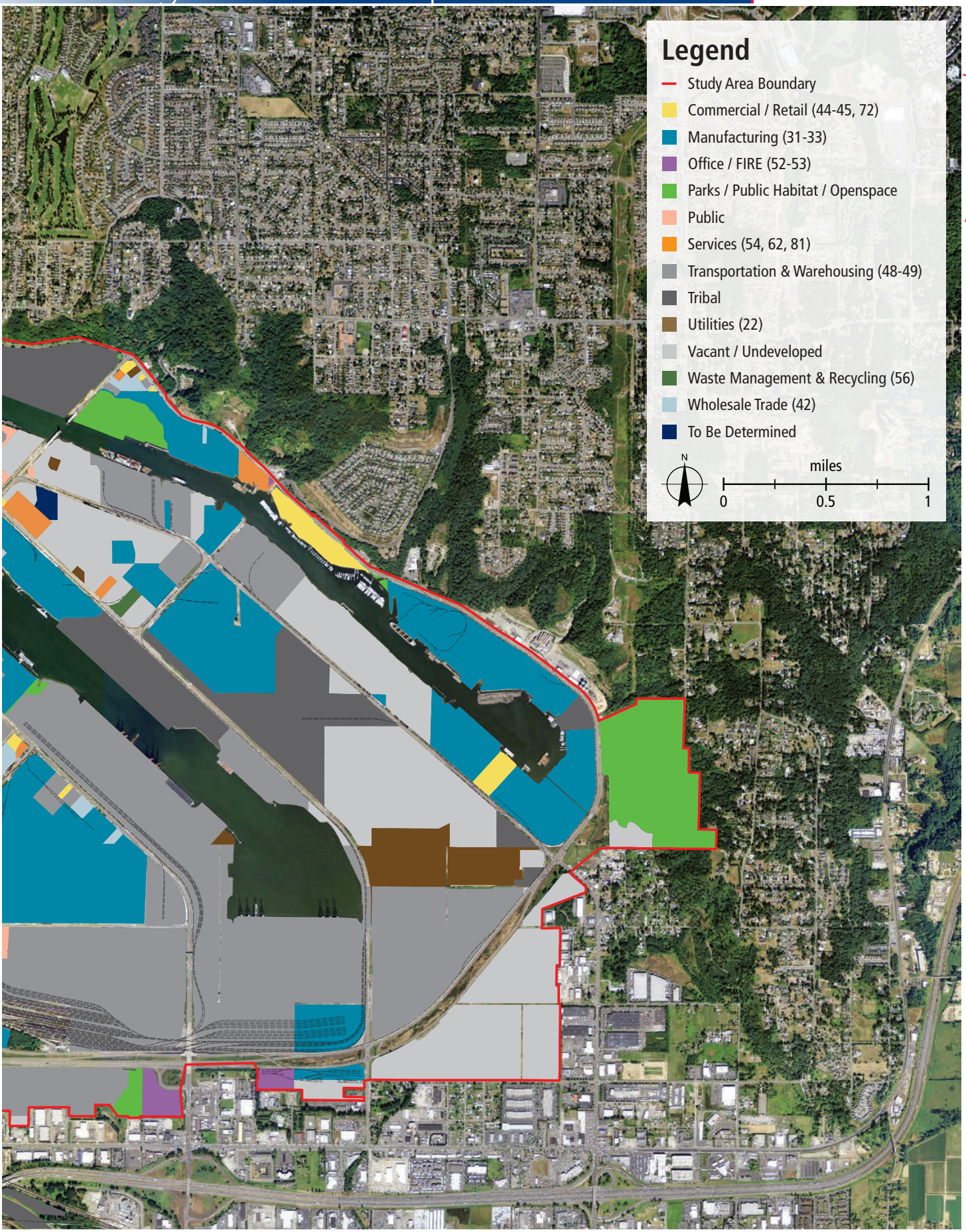
TEU – The standard measurement for containers, standing for twenty-foot equivalent units. Containers come in different sizes – 20 feet, 40 feet and 45 feet. A 40-foot container would equal two TEUs.

Throughput – The movement of cargo through a marine terminal over a given period of time.

Washington Growth Management Act (GMA) – The Washington Growth Management Act (GMA) is a statewide statute defining a comprehensive approach to protecting natural resources, identifying where growth occurs and ensuring that services are available to support planned growth.

Yard – The part of a railroad exclusive of switch tracks, branches, yards and terminals.

Existing Land Use Map



Pavement Maintenance & Preservation

Key aspects of an effective asset management approach for pavement can be broken down into categories of initial design and maintenance and rehabilitation. Design factors that the Port of Tacoma should employ include:

- Selected materials should minimize lifecycle cost over the entire design period
- Layers and depths of base and surface materials must meet minimum design standards
- Subgrade soils require testing to avoid settling, rutting, or cracking of surface pavement
- Pavement layers must meet the design life and equivalent single-axle load (ESAL) minimums
- Areas that experience frost should lay pavement at least half as deep as the maximum expected depth of freeze for frost susceptible soils
- Permeable pavement has less longevity than traditional pavements when loaded with frequent heavy vehicles
- Employ dowel bars on Portland Cement Concrete roads and space them properly

After building roads, or when maintaining existing pavement, long term care practices include:

- The City of Tacoma is currently updating its pavement management system. Once updated, this system will provide maintenance management strategies which can be used to reduce life-cycle costs. In addition, the City of Tacoma's Street Design Standards include recommendations for Port-specific facilities. The Port will work with the City of Tacoma to establish a pavement condition index and other benchmarks for maintenance and preservation for Tideflats area roadways.
- Early rehabilitation on distressed pavement is better than trying to repair pavement in poor condition
- Correcting short sections of severely distressed pavement can decrease the need to rehabilitate a longer section
- Short term maintenance can keep a road performing safely until rehabilitation funds are available while preventing eventual full reconstruction
- Practices such as chip seal on low-volume roadways, dowel bar retrofits on PCC roadways, pavement recycling, warm-mix asphalt, performance graded binders, infrared thermography, and in-place recycling can all maintain pavement quality at reduced cost

Design Guidelines to Support Trucks

Freight trucks and goods movement vehicles require special consideration for safe and efficient operation on roadways with a mix of other vehicles. The additional size and weight of goods movement vehicles compared to passenger automobiles require increased lane width, pavement thickness, and curb return radii. Depending on adjacent land uses and roadway characteristics, designs should also allow additional space in driveways and turn-arounds as applicable.

These design guidelines have elevated importance in port areas where freight vehicles make up a larger portion of daily traffic. The Port of Tacoma serves as a major gateway for goods shipped to the Puget Sound region, as well as the greater western United States. The Port also supports and benefits from commerce with the City of Tacoma, the City of Fife, and other neighboring cities that have jurisdiction over area roads. The WSDOT Design Manual M 22-01.10 and City of Tacoma design standards provide specific guidance for geometric design of roadways that serve multiple purposes. The guidelines detailed here will ensure safe and efficient roadway designs for travelers using all modes of transportation by accounting for the presence of goods movement vehicles.

Lane Width

Travel lanes must be sufficiently wide for all vehicles to safely negotiate turns and other roadway movements. Large vehicles require additional width for side clearance, visibility, and turning movements. The WSDOT Design Manual provides detailed requirements for principal arterials, minor arterials, collectors, and managed access highways in urban areas. The guidelines account for many factors, including:

- Hourly traffic volumes
- Roadway access control
- Design speed
- Number of lanes
- Other right-of-way characteristics

Based on these characteristics, this plan recommends 12-foot travel lanes for all roadways except undivided multi-lane principal arterials, minor arterials, and urban managed access highways in urban areas. The guide states that these roadways may use 11-foot lanes but should consider 12-foot lanes when significant truck volumes travel the roadway. The high volume of goods movement vehicles in the vicinity of the Port of Tacoma makes 12-foot travel lanes appropriate for many of the roads that provide access to the Port. Some high speed roads with tight horizontal curvature could require greater lane widths.

Pavement Thickness

Roads must employ pavement durable enough to withstand expected traffic loads. Adequately thick pavement reduces the need for maintenance and improves safety over the life of a roadway. Pavement thickness for new or reconstructed pavements in the State of Washington is based on the number of Equivalent Single-Axle Loads (ESALs) during the design period. Table A2.1 summarizes the recommended pavement thicknesses for different ESALs below.

Table A2.1 provides example layer thickness. The City of Tacoma street design standards also provide pavement standards for traffic loads.

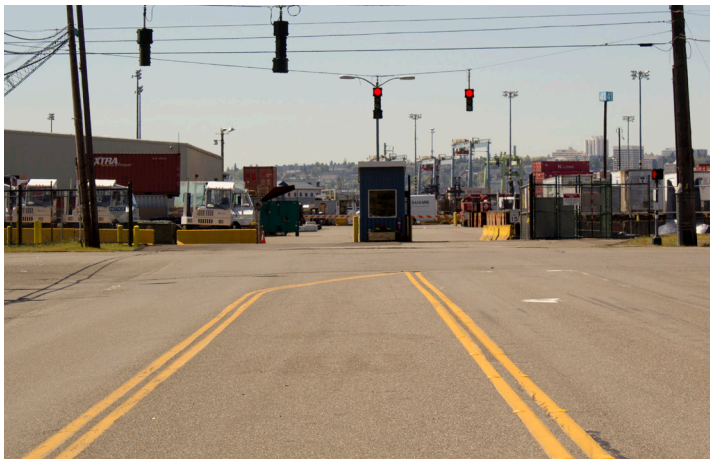


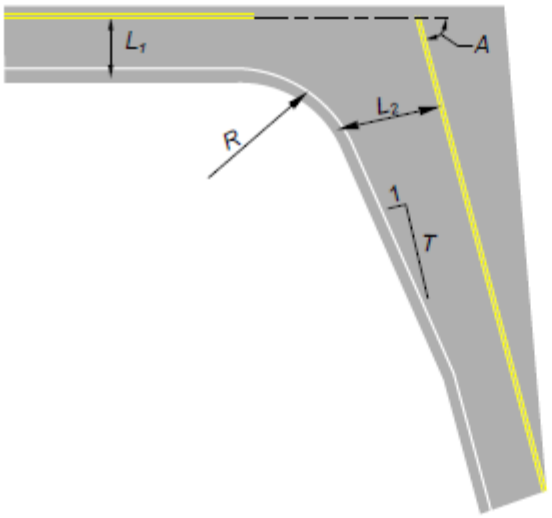
Table A2.1 - Flexible & Rigid Pavement Layer Thickness for New or Reconstructed Pavements

Design Period ESALs	Layer Thicknesses, ft				
	Flexible Pavement		Rigid Pavement		
	HMA	CSBC Base	PCC Slab	Base Type and Thickness	
< 5,000,000	0.50	0.50	0.67	CSBC only	0.35
5,000,000 to 10,000,000	0.67	0.50	0.75	HMA over CSBC	0.35 + 0.35
10,000,000 to 25,000,000	0.83	0.50	0.83	HMA over CSBC	0.35 + 0.35
25,000,000 to 50,000,000	0.92	0.58	0.92	HMA over CSBC	0.35 + 0.35
50,000,000 to 100,000,000	1.00	0.67	1.00	HMA over CSBC	0.35 + 0.35
100,000,000 to 200,000,000	1.08	0.75	1.08	HMA over CSBC	0.35 + 0.35

Curb Return Radius

Another crucial design element for large vehicles is curb return radius, which provides clearance for turns. When intersections lack a large enough curb radius, large vehicles must turn into oncoming traffic on cross-streets and mount curbs to negotiate turns. These movements, when not properly designed for, cause unsafe conditions, interrupt traffic flow, and degrade physical infrastructure more quickly. The following diagram displays recommended curb returns at right-turn corners.

Given the heavy flow of truck traffic, the Port of Tacoma should design its intersections using a 67-foot wheelbase semitrailer truck for the design vehicle and opt for large curb return radii when possible. These guidelines will be especially important on designated truck corridors and roads that serve the Port. The Port of Tacoma will work with surrounding jurisdictions to ensure that intersections can support the passage of goods movement vehicles without interfering with the safety and mobility of other road users.



L_1 = Available roadway width [2] that the vehicle is turning from

L_2 = Available roadway width [2] for the vehicle leaving the intersection

R = Radius to the edge of traveled way

T = Taper rate (length per unit of width of widening)

A = Delta angle of the turning vehicle

Vehicle	A	R	L_1[1]	L_2[2]	T
P	All	30	11	11	25
SU-30 & CITY-BUS	All	50	11	11	25
WB-40	All	55	11	15	7.5
WB-67	All	50-85	11	22-24	7

Notes:

[1] When available roadway width is less than 11 ft, widen at 25:1.

[2] Available roadway width includes the shoulder, less a 2-ft clearance to a curb, and all the same-direction lanes of the exit leg at signalized intersections.

General:

All distances given in feet and angles in degrees.

Land Use & Transportation Plan 2014

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Port of Tacoma

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