

TACOMA || TIDEFLATS

SUBAREA PLAN & EIS

DRAFT BASELINE REPORT
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KEY TAKEAWAYS

The Tacoma Tideflats Subarea is a regionally designated Industrial/Manufacturing Center located in Commencement Bay and adjacent to downtown Tacoma. Anchored by the Port of Tacoma, the subarea is developed with a range of industrial, manufacturing, and support uses with a primary focus on port maritime industrial activities. The Tideflats is also a unique natural environment, containing shoreline, river deltas, tidal creeks, marshes, naturalized creeks, and river channel corridors. Much of the area is within Puyallup Indian Reservation boundaries and is an important location for cultural traditions and the practice of tribal treaty rights. The City of Fife and Pierce County adjoin the Tideflats Subarea to the south and east.

Several governments have an active interest in planning for the future of the Tacoma Tideflats Subarea, including the City of Tacoma, Port of Tacoma, Puyallup Tribe of Indians, City of Fife and Pierce County. These governments have partnered together to develop the Tideflats Subarea Plan for adoption by the City of Tacoma as part of the City's Comprehensive Plan.

This document is an early step in the planning process and is intended to describe existing conditions in the study area. Topics addressed in this report include:

- Air Quality
- Earth
- Stormwater and Water Quality
- Plants and Animals
- Floodplains
- Climate Change Vulnerability Assessment
- Land and Shoreline Use/Plans and Policies
- Population, Employment, and Housing
- Economic Development
- Cultural Resources
- Transportation
- Public Services
- Utilities

While each chapter in the report explores a unique aspect of the study area, some recurring themes cut across chapters. A short summary of these overarching themes and key findings associated with each of the topics is included below.

Overall Themes

Local and regional significance of the Tideflats. The study area is an active industrial area with significant existing jobs in core industrial sectors. With a long history of industrial employment, the Port of Tacoma Manufacturing Industrial Center (MIC) is a key component of a regional system of manufacturing and industrial centers that stretches from the Cascade Industrial Center in the north to the Frederickson (MIC) in the south. Future planning will continue to recognize and support the Tideflats subarea as an active industrial center.

Changing industrial needs. While established local and regional industry strengths are reflected in the study area, the growing importance and role of ports, trends in sectors such as logistics, warehousing, transportation, and utilities and manufacturing, changes to shipping technology, and growing interest in environmental sustainability will influence and shape the development and composition of the area in the years to come.

Mix of interests and activities. The Tideflats area includes an active marine port, an industrial/manufacturing center, part of the Puyallup Indian Reservation, and unique natural environment, among other features. These many interests result in a diverse range of interests and priorities. Development of a shared vision for the future that considers and balances these interests will be a focus of the upcoming planning process.

Relationship to surrounding uses. Effective buffers and transitions between the industrial center and surrounding areas are needed to minimize potential negative impacts and land use conflicts as identified in the City of Tacoma Comprehensive plan. The implications of future development in the surrounding area on the Tideflats subarea, such as the Tacoma Dome Station, should also be considered as part of the planning process.

Risks and vulnerabilities. Historically a tidal marsh area, portions of the Tideflats study area are characterized by seismic and landslide hazard areas. In addition, while the study area is currently protected from flooding by levees on both sides of the Puyallup River, overtopping of levees and inundation of the study area in future decades as a result of climate change are a real possibility. Future inundation could result in significant impacts to existing transportation, surface water, wastewater and other infrastructure, private and public development, and marine ecosystem and intertidal habitats.

Air Quality

- The primary pollutant of concern for the Tacoma Tideflats study area is diesel particulate matter (DPM), primarily as a consequence of the number of diesel-fueled vehicles and equipment operating within and near the MIC. On road vehicles, primarily heavy-duty trucks, nonroad equipment, vessel operations, and locomotive operations are existing sources of air pollutants including DPM. Additionally, the Tideflats area is encompassed by I-705 and State Highway 509, which carry a high volume of diesel truck traffic. As a consequence, care should be taken to maintain buffer areas between sensitive land uses such as residences, schools, and hospitals and sources of DPM.
- The closest sensitive receptors to the study area include residential uses northeast of Marine View Drive, west of I-705, south of I-5, and potentially live-aboard vessels in the marinas. Industrial and manufacturing uses in the study area should be located as far from these sources as possible.
- The Tideflats Subarea Plan should seek to help further local and regional plans to reduce GHG emissions, such as the Northwest Ports Clean Air [Strategy](#). Given that 67% of GHGs generated within the City of Tacoma inventory are from transportation sources, policies that would reduce vehicle miles travelled, reduce the use of single-occupancy vehicles, and promote the use of electric vehicles and infrastructure, including shoreside power within the Port facilities could all be primary considerations.

Earth

- Future planning should consider the locations of confirmed and suspected contaminated sites, and potential limitations on remediated sites, that are present throughout the Tideflats. Site-specific evaluation prior to development or redevelopment is recommended.
- Seismic hazards area in the Tideflats area are associated with the major fault zones that traverse the Puget Sound region. Thick deposits of unconsolidated materials and the presence of unknown fill areas, as found in the study area, can amplify earthquakes waves and cause far more damage to structures than the same waves passing through bedrock. The entire study area is also susceptible to liquefaction hazards, which has often been the cause of damage to structures during past earthquakes. This risk should be considered in future land use planning and building code standards.
- Due to potential geohazard risks, critical facilities should be located outside of the Tideflats area when possible. Critical facilities include emergency services (such as police stations and fire stations), medical facilities (such as hospitals and nursing homes), schools and daycare centers, or facilities that store toxic materials. Some critical facilities may not be located outside of the Tideflats such as port terminals and the fire stations that serve them. If located in the Tideflats, critical facilities may require additional protection from geohazard risks.

- Many of the uses are water-dependent and inherently located in areas that are exposed to geohazards and are subject to environmentally critical areas regulations. The Subarea Plan should take into account the Environmental Policy Elements in the City of Tacoma Comprehensive Plan and the City of Tacoma and City of Fife municipal codes for environmentally critical areas including landslide hazards areas found on the steep hillsides on the east and west sides of the study area and along much of the shoreline area within the study area.
- There may be funding sources available for clean-up work through local, state, and federal agencies. These may include grants or low-interest loans, including funding for Brownfields development through special agency programs. Additional funding for removal of commercial underground storage tanks and associated contaminated soils is available through the Washington state Pollution Liability Insurance Agency (PLIA).

Stormwater and Water Quality

- Depending on the land ownership, discharge point, and type of project, stormwater infrastructure reviews and permitting may fall under the jurisdiction of some combination of federal agency, state agency, City of Tacoma, Port of Tacoma, and/or the Puyallup Tribe of Indians.
- The Puyallup Tribe of Indians reviews and comments on projects near and within the Reservation. The Tribe works with the City of Tacoma, the City of Fife, and the Port of Tacoma cooperatively to protect water quality and ensure that appropriate stormwater BMPs are implemented for projects. Other coordinating processes include Section 106 consultation and other communication protocols set up with the City of Tacoma.
- The City of Tacoma applies an Infrastructure Protection Requirement for flow control on many projects in the Tideflats study area.
- Federal review of projects is required when developing or filling along a navigable waterway.
- State review is required for projects placing hydraulic structures or potentially impacting water quality.
- Properties with industrial, manufacturing, and transportation uses typically require a discharge permit for stormwater; the Industrial Stormwater General Permit is issued by Ecology to ensure compliance with water quality standards. Over 70% of waterfront operations have stormwater treatment/filtration systems installed and operational to capture pollutants from their properties. There are 123 facilities subject to and in compliance with the Industrial Stormwater General Permit in the Tideflats.

Plants and Animals

- Habitat for plants and animals is very limited in the Tideflats study area due to existing intense industrial and port land uses, and past conversion of the estuary to a working waterfront.

- The study area continues to be an important location for anadromous fish and shellfish connected to Puyallup Tribal Fisheries restoration and management.
- Documented shellfish resources include Dungeness crab and geoduck clams, although the Washington State Department of Health has closed all of Commencement Bay shoreline to shellfish harvesting due to a combination of marine biotoxins and pollution.
- There is limited potential for improving habitat for plants and animals while maintaining industrial land uses, with the exception of City, Tribe, and Port-managed habitat mitigation sites or other restoration areas. These areas provide substantial habitat for fish and wildlife species, particularly salmonids, and are critical to maintaining or improving conditions for plants and animals.
- The Subarea Plan should not restrict any restoration activities and, if possible, should strive to provide more opportunities for new sites through policies, programs, or funding.

Floodplains

- Critical facilities should be located outside of the Tideflats area when possible to avoid issues similar to those faced by the City of Tacoma wastewater treatment plant. Critical facilities include emergency services (such as police stations and fire stations), medical facilities (such as hospitals and nursing homes), schools and daycare centers, or facilities that store toxic materials.
- Some critical facilities may not be located outside of the Tideflats such as port terminals and the fire stations that serve them. If located in the Tideflats area, critical facilities may require additional protection such as flood infrastructure similar to the wastewater treatment plant.
- The Subarea Plan should take into account increased flood levels in the future with sea level rise and changing hydrology. The Subarea Plan should assume that overtopping of levees and inundation of the Tideflats area is a real possibility in future decades. Climate change projections should be considered in relation to the design lifetime of infrastructure in the area, Plan components, and the Plan itself.
- The resilience of the transportation network providing access to the Tideflats area should be considered in the Subarea Plan. Blocking of access to the Tideflats area is the primary threat posed by flooding under current conditions. Transportation access is critical to support maritime, industrial, and manufacturing businesses, as well as for emergency response during a flood event.

Climate Change Vulnerability Assessment

- Flood projections under 1% annual chance conditions within the Tideflats largely remain limited to select low-lying areas up to the 3ft Relative Sea Level Rise (RSLR) scenario, where

projections become widespread. This magnitude of RSLR is beyond a 20-year planning horizon and has approximately a 1% chance of being exceeded by 2070.

- Flooding due to inundation within the Tideflats during normal tidal cycles is not projected to occur until 4ft and greater RSLR scenarios. RSLR of this magnitude is not projected within a 20-year planning horizon and has only a 5% chance of being exceeded by 2100.
- Climate vulnerability is low to moderate over a 20-year planning horizon for the majority of resources within the study area.
- Wastewater infrastructure has the highest hazard vulnerability and risk due to projected flooding of the Central Wastewater Treatment Plant under short-term RSLR scenarios. The City of Tacoma has taken action to mitigate this risk by constructing a flood wall at the facility. Continued evaluation of flood protection infrastructure and projections at this site is warranted due to the critical nature of the infrastructure.
- Projected impacts over a 20-year planning horizon are primarily driven by increased flood projections during extreme flood events, leading to temporary flooding of roadways and development in low-lying areas. Resources such as stormwater infrastructure or wetlands that are sensitive to tidal elevations may also experience gradual loss of function over the short term.

Land and Shoreline Use/Plans and Policies

- The study area includes a large and diverse set of land uses. These uses span a range of activities and sectors. This assorted mix of uses reflect the presence of a working port, a large and diverse industrial support sector, and a range of uses that share a need for buffering from residential uses, transportation access, and outdoor storage.
- Industrial uses along with manufacturing, warehousing, and transportation uses account for about 70% of the land use in the Tideflats.
- Existing state, regional, and local policies and regulations support the area as a location of concentrated industrial activity and its role as a manufacturing industrial center (MIC).
- Existing zoning within the Tideflats continues to allow some uses that may be considered incompatible with industrial activity. Allowed and prohibited uses will need to be evaluated to ensure that they tie into a shared vision for the future of the area and reduce land use conflicts.
- In 2014, the City of Tacoma adopted in collaboration with the Port of Tacoma a Container Port element, a new element to its Comprehensive Plan. Policy guidance in the One Tacoma Container Port Element will be considered during this subarea planning process.
- Future land use policies will consider the inherent geographical needs of a seaport and significant past public investment in infrastructure in the Tideflats and surrounding region.
- In 2015 The Northwest Seaport Alliance (NWSA) was formed as an innovative public partnership between the Port of Tacoma and the Port of Seattle to manage the container

cargo operations. The success of this partnership is largely tied to the success of the Port of Tacoma because about 80% of the Tacoma port activities are managed by the NWSA.

- Topics that should be evaluated further as part of the land use analysis include transition areas between the study area and surrounding areas, implications of existing plans and public investments in the surrounding area, public shoreline access in the study area, and potential opportunities associated with public land ownership in the study area.

Population, Employment, and Housing

- Tacoma's adopted growth target is for 127,000 new residents and 97,000 new jobs by 2040. Allocations for the MIC anticipate 7,555 jobs by 2040.
- With roughly 10% of the city's total employment and almost half of its manufacturing/industrial employment, the study area accounts for a significant portion of both the City of Tacoma's and Pierce County's industrial employment.
- Ensuring job growth and retention in the study area will be an important piece of realizing the City's Comprehensive Plan housing and employment targets.
- Existing policies support access to a wide range of employment opportunities, growth and competitiveness as a West Coast trade and freight hub, a regional center of diverse manufacturing and a widely accessible base of living wage jobs, particularly for underserved and underrepresented people.
- Fisheries sector employment remains a critically important treaty related activity for Puyallup Tribal Members and the various supportive industries (canning, processing, storage).

Economic Development

Current Economic Activity

- The study area is an active industrial area with significant existing jobs in core industrial sectors. The area has a long history of industrial employment and is a key component of a regional system of manufacturing and industrial centers that stretches from the Cascade Industrial Center in the North to the Frederickson MIC in the south.
- The study area's industrial strengths center around the wholesale trade, transportation, and utility (WTU) sector which is closely related to the Port of Tacoma's presence in the study area. Industrial activities rely on a diverse and concentrated support cluster present in the study area, including business engaged in fueling operations, marine electronics, refrigeration and gear manufacturers, naval architects, and other industrial services. The study area also includes a range of industrial services and repair, metal fabricators and machine shops, and commercial, residential, and civil construction contractors and builders.

- As of 2019, total employment within the Port of Tacoma MIC was 10,161, an increase of 735 jobs over the past 10 years.
- The fisheries sector, while diminished due to decreasing yields, continues to be invested in heavily through mitigation in the Hylebos, Wapato, and Puyallup watersheds. The study area supports fish buying, processing, canning, and storage activities. The study area continues to have active geoduck and crab fisheries. Geoduck being an internationally significant export for the region.

Future Trends

- A key industrial strength of the study area is the wholesale trade, transportation, and utilities (WTU) sector which includes logistics. Logistics is a fast-growing sector that is anticipated to see increased demand.
- Based on employment projections by Puget Sound Regional Council (PSRC) through 2040, employment in the Port of Tacoma Manufacturing Industrial Center (MIC) is expected to grow to 16,792 jobs, an increase of around 6,600 jobs from 2019 estimated employment.
- The study area supports a range of industrial activities. Some high-impact businesses, such as metal fabrication, smelters, quarries, chemical and petroleum product facilities, are unlikely to be able to find locations that are an easy substitute for the study area. Potential displacement of these businesses in the face of growing demand for sites for port-related uses should be addressed.
- The use of space for manufacturing in the study area is declining, with new warehousing and logistics development mainly providing the pressure for redevelopment.
- A range of advances in automation has increased productivity in recent decades. Like containerization, technology advances in automation may reduce employment densities, but the resultant productivity increases are likely to grow sectors.
- While established local and regional industry strengths are reflected in the study area, the increasing importance and role of ports, trends in sectors such as logistics, wholesale trade, transportation, and utilities and manufacturing, changes to shipping technology, and growing interest in environmental sustainability will influence and shape the development and composition of the area in the years to come.
- These trends include the consolidation of manufacturing in fewer locations, technological changes such as growing containerization and automation, changing workforce needs, and environmental concerns. Investments in transportation improvements, workforce development, and investments in facilities and changed operations to address environmental concerns are all key parts of a holistic economic development strategy.
- The Puyallup Tribe of Indians is one of the largest holders of vacant land in the Tideflats. The Tribe continues to explore fisheries, manufacturing, warehouse, and port maritime related activities for its properties.

Cultural Resources

- Depending on the relative depths of site burial and ground disturbances caused by historic and recent development, this area has the potential to still contain Holocene archaeological sites.
- DAHP's Statewide Predictive Model classifies the study area as Very High risk for precontact-era archaeological sites (DAHP 2010).
- The recorded Spuyaləpabš place names and identified burial locations are located within the study area.
- The Spuyaləpabš have lived in and utilized the study area since time immemorial. The Spuyaləpabš continue to live and practice traditional lifeways in this area such as hunting, fishing, and gathering. There are 19 recorded named places known to be within or near the study area; these include locations of important events, village sites, and geographical features (Exhibit 11-8) and should be considered when planning.
- There are three recorded archaeological sites within the study area and seven within 200 feet of the study area (Exhibit 11-9).
- Thirteen NRHP-listed and/or determined Eligible to be listed in the NRHP historic-aged built environment resources have been recorded within the study area. A comprehensive inventory of the study area has not been conducted in 10 years.
- The Subarea Plan should take into account its location within the Maritime Washington National Heritage Area as well as documented submerged resources identified within the study area.
- Compliance with 4(f) of the Department of Transportation Act is required for recommendations that would result in the construction of transportation facilities funded by the U.S. Department of Transportation, including the Federal Aviation Administration, Federal Highway Administration, Federal Motor Carrier Safety Administration, Federal Railroad Administration, Federal Transit Administration, and Maritime Administration. Section 4(f) applies to all historic sites and to publicly owned parks, recreational areas, and wildlife and waterfowl refuges. Any project that affects Section 4(f) land must include a Section 4(f) assessment. A transportation program or project requiring the use of such land will be approved only if there is no prudent and feasible alternative to using that land and if the program or project includes all possible planning to minimize harm to the land or resource.

Transportation

- Roadways that connect I-5, Pacific Highway E, and SR 509 to the study area experience high levels of vehicular delay and queuing, as Tideflats-related traffic accesses regional facilities that are congested for long periods of the day. Within the Tideflats area, localized congestion can develop during shorter high activity periods at specific warehouses, distribution centers, or terminals.

- Congestion on I-5 is present on segments connecting to I-705 and between 54th Avenue E and Port of Tacoma Road, which can slow the movement of freight to and from the study area.
- Truck queuing on the public right-of-way can be an issue during certain periods of the day. Off-street truck queuing facilities, similar to the Port's Lot F facility, could minimize the queuing that occurs on public roadways.
- The Port of Tacoma Road and 54th Avenue E/Taylor Way corridors serve as essential Power Projection Platform (PPP) routes connecting JBLM via I-5 to the Port of Tacoma. Studies have found that these roadways currently provide adequate access as part of the Strategic Highway Network, but it will continue to be essential ensure large deployments can be supported along these corridors.
- Many of the roadways in the study area, both local and regional, are classified as Strategic Freight Corridors by the Freight Mobility Strategic Investment Board (FMSIB), meaning they are transportation corridors of great economic importance eligible for FMSIB grants.
- Limited over-water connections to the Tideflats subarea limit mobility and resiliency within the subarea, and are intensified by the multi-year closure of the 11th street bridge and viaduct.
- There is substantial rail infrastructure within and near the Tideflats to support the intermodal terminals and other facilities. With this infrastructure come many at-grade crossings that can delay vehicle traffic along local arterials and access roads and create the potential for conflicts between trains and other users in the right-of-way.
- The Tacoma Dome Station is a key regional transportation facility where Pierce Transit and Sound Transit services converge and that generates many regional commute trips. Tacoma Dome Link Extension will bring additional light-rail service to the station area by 2030. The industrial core of the study area is not currently served by transit.
- Sidewalks are generally present on one or both sides of the roadway on streets outside the industrial area, however there are issues with connectivity, substandard condition and/or width, and lack of ADA ramps at crossings. Additional street lighting and crossings could improve the pedestrian environment. Pedestrian facilities are lacking within the industrial areas.
- There are gaps in the pedestrian and bicycle networks, with the primary needs being improving local connections to land uses within the Tideflats as well as addressing major gaps between non-industrial uses that are separated by the Tideflats (for example, Downtown, Northeast Tacoma, and Fife).
- The study area currently has an abundance of both on and off-street parking for general purpose vehicles outside of the industrial area, though demand is high in certain areas like the Tacoma Dome during certain times of day. Parking options for large trucks, which are a critical component of the freight activity in the subarea, are more limited.

Public Services

Police and Fire

- Police and fire services for the Tideflats study area are provided by the City of Tacoma.
- Enforcement officers commissioned by the Puyallup Tribe may also enforce Puyallup Tribal Law in the portion of the Tideflats study area overlapping the Puyallup Reservation.
- Call load for police and fire service continues to increase as development occurs. About two-thirds of fire emergency response each year are for emergency medical service (EMS) incidents.
- Both departments are currently meeting LOS standards established in the One Tacoma Public Facilities and Services Element.
- Regular planning for future capital facility and staffing needs will likely minimize impacts and meet future demand. The City of Tacoma is also currently considering if fire impact fees could help meet the need for additional fire protection infrastructure generated by new development.
- Will this plan address access / response time? Given the above transportation impacts of rail and relatively few access routes, emergency vehicle response times and evacuation times are lengthy.
- The Port of Tacoma has its own security team with port officers that monitor facilities, rail and road systems, respond to calls, and have authority to access all marine terminals and cargo at the Port. The port patrol coordinate with many government agencies that also provide public services in the Tideflats.
- The Port of Tacoma is one of 17 federally-designated Strategic Seaports that coordinate efficient port operations during peacetime and national emergencies. The Port is a key support facility for Joint Base Lewis McChord (JBLM).

Parks

- Park and open space services for the study area are provided by the City of Tacoma and Metro Parks. One urban park (View Point Park) and one open space (qwiqwəlut “Little Marsh” formerly known as Rhone Poulenc) are within the study area. The City of Tacoma’s Puyallup River Levee and Marine View Drive signature trails also run within and adjacent to the study area.
- No Metro Parks facilities are within the study area, though 19 facilities are within 1 mile, including the 60-acre Julia’s Gulch site which borders the northeastern edge of the study area. Several City of Fife parks, natural, areas or trails are also within 1 mile of the study area, including the Hylebos Natural Area and trails.

Utilities

- Utility infrastructure needs are generally evaluated on a site-specific basis as individual projects are developed and permits are issued. All new proposals will need to be evaluated

for compliance with the goals and policies within the One Tacoma: Comprehensive Plan, Public Facilities and Services Element, including impacts on existing levels of service.

- Additional coordination with utility service providers will be needed to ensure that infrastructure currently exists for planned development, or that upgrades needed to support the development alternatives are not prohibitive. In some cases, working with the providers to upgrade services prior to development may be a way to facilitate the City's goals for growth within the Tideflats.
- Future corridor improvement projects should coordinate with utilities to identify joint opportunities. Even if there is not a demand for buried communications infrastructure, there may be benefits in laying conduit as part of a 'Dig Once' strategy.
- Updates to the Port of Tacoma Strategic Plan should be considered when evaluating utility needs within the Tideflats.

1 INTRODUCTION

1.1 What is the Tideflats Subarea?

The Tacoma Tideflats Subarea is a regionally designated Industrial/Manufacturing Center (MIC) located in Commencement Bay and adjacent to downtown Tacoma (see Exhibit 1-1). Anchored by the Port of Tacoma, the subarea is developed with a range of industrial, manufacturing, and support uses with a primary focus on port maritime industrial activities. The Tideflats is also a unique natural environment, containing shoreline, river deltas, tidal creeks, marshes, naturalized creeks, and river channel corridors. Much of the area is within the Puyallup Tribe survey boundaries and is an important location for cultural traditions and the practice of tribal treaty rights. The City of Fife and Pierce County adjoin the Tideflats Subarea to the south and west.

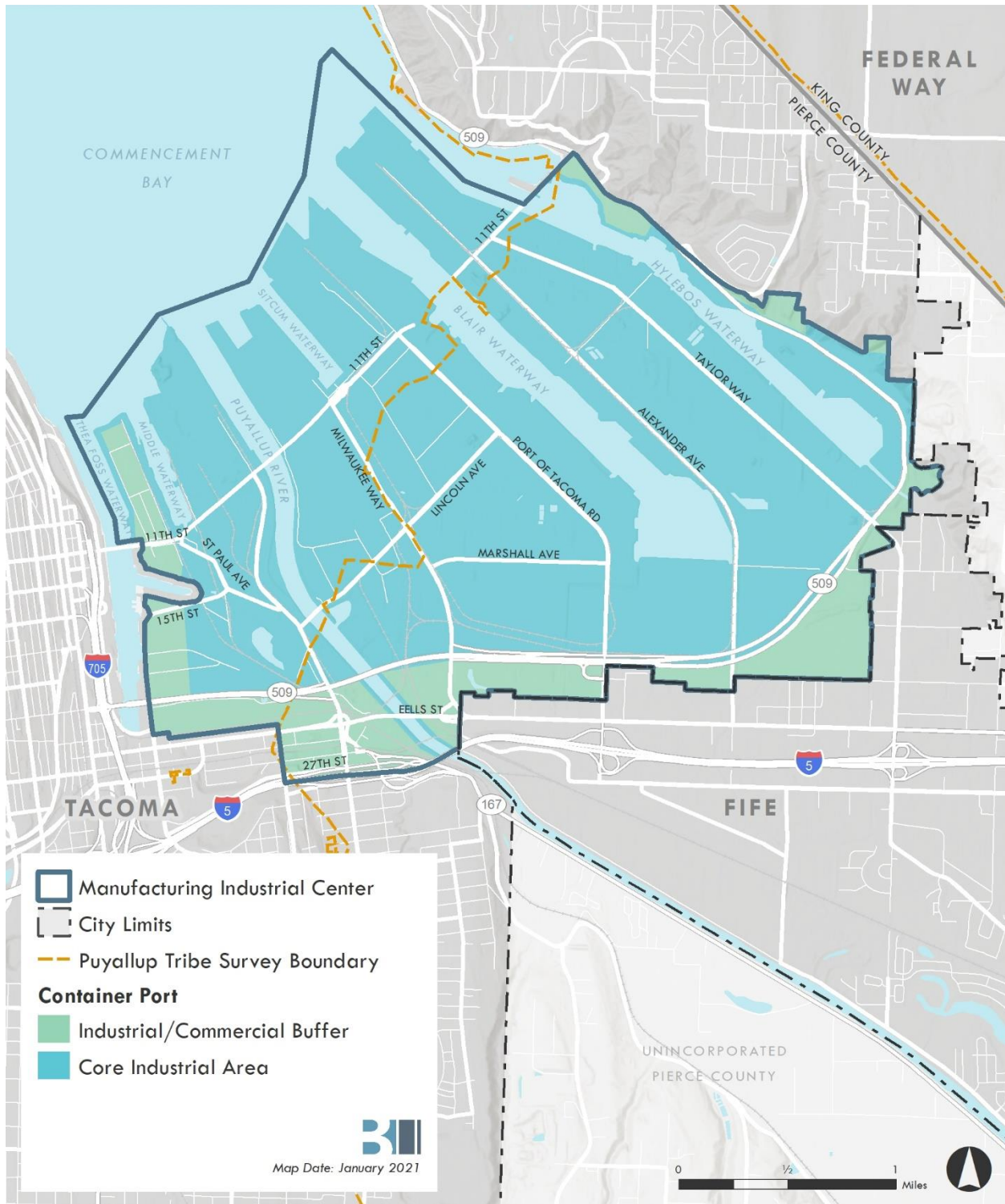
Puget Sound Regional Council Centers

The Tacoma Tideflats MIC is part of a regional system of manufacturing and industrial centers that stretches from the Cascade Industrial Center in the North to the Sumner Pacific MIC in the south. The center framework is a key component of the Puget Sound Regional Council's (PSRC) regional growth strategy and guides regional growth allocations, informs transit service planning, and represents priority areas for PSRC's federal transportation funding.

PSRC designates two types of centers – Regional Growth Centers and Manufacturing/Industrial Centers. Regional Growth Centers are locations of more compact, pedestrian-oriented development with a mix of housing, jobs, retail, services, and other destinations. Manufacturing/Industrial Centers, on the other hand, are locations with a concentration of a diverse set of industrial and manufacturing jobs and/or key infrastructure assets; they are regional resources that create and sustain economic diversity and support national and international trade.



See <https://www.psrc.org/centers> for more information and a map of all regional centers.

Exhibit 1-1 Tideflats Subarea

Sources: City of Tacoma, 2020; BERK, 2020.

1.2 What is the Subarea Plan?

As established by the partnering agencies in the Tideflats Subarea Work Plan,¹ the future subarea plan is intended to establish a shared long-term vision and a more coordinated approach to development, environmental review and protection, and strategic capital investment in the area. Subarea planning will also meet the requirements of the Washington Growth Management Act and support the continued designation of the study area as a regional Manufacturing/Industrial Center by the Puget Sound Regional Council. Potential impacts of the subarea plan will be evaluated through a Planned Action Environmental Impact Statement (EIS). Completion of the EIS will also support a streamlined environmental review process for qualifying projects.

Several agencies have an active interest in planning for the future of the Tacoma Tideflats Subarea, including the City of Tacoma, Port of Tacoma, Puyallup Tribe of Indians, City of Fife and Pierce County. These agencies have partnered together to develop the Draft Tideflats Subarea Plan for consideration by the City of Tacoma as part of the City's Comprehensive Plan.

1.3 What is in This Report?

This document is an early step in the planning process and is intended to describe existing conditions in the study area. Topics addressed in this report are listed below. It should be noted that the order of topics in this report is based on the SEPA elements of the environment as listed in WAC 197-11-444.² This was done for convenience only and does not reflect importance or relative priority of any of the topics.

- Air Quality
- Earth
- Stormwater and Water Quality
- Plants and Animals
- Floodplains
- Climate Change Vulnerability Assessment
- Land and Shoreline Use/Plans and Policies
- Population, Employment, and Housing
- Economic Development
- Cultural Resources

¹ Tideflats Subarea Planning Work Plan. Approved February 2019 by the City of Tacoma, Port of Tacoma, Puyallup Tribe of Indians, City of Fife, and Pierce County.

² The climate change vulnerability assessment and economic development are not specifically identified as SEPA elements of the environment and have been inserted near related topics.

- Transportation
- Public Services
- Utilities

This Baseline Study fulfills the commitment to prepare an analysis of existing conditions, as described in the Tideflats Subarea Plan Work Plan. The information in this report was compiled from existing available data and research findings; primary research was not conducted as part of this effort. In general, data is from the time-period prior to the COVID-19 pandemic and does not reflect changed or reduced levels of activity as a result of pandemic public health measures, including work-from-home, business and school closures/restrictions, and other similar measures.

It is anticipated that this report will continue to be updated and revised as additional information is identified during the planning process. Ultimately, information in this report will help inform the future subarea plan and will serve as a basis for the affected environment in the Environmental Impact Statement. Future opportunities for public comment on this information will occur as part of the public review of the draft subarea plan and draft EIS.

A short summary of overarching themes and key findings associated with each of these topics is included in the section preceding this introduction. The balance of this report contains more detailed discussion of existing conditions for each topic area.

2 AIR QUALITY

This section describes the relevant local, state, and federal regulations and regulatory agencies that guide air emissions within the Tideflats study area, including the federal Clean Air Act and Washington Clean Air Act, Washington State Department of Ecology (Ecology), the Puget Sound Clean Air Agency (PSCAA), and other relevant policies. This section also presents an estimate of general criteria air pollutant emissions and greenhouse gas (GHG) emissions from mobile, stationary, and area sources within the study area as compiled by relevant agencies including Pierce County, the City of Tacoma, Port of Tacoma, City of Fife, and the Puyallup Tribe of Indians (Puyallup Tribe). The section focuses on those existing environmental conditions and regulatory policies specifically relevant to development within the Tideflats study area.

2.1 Existing Policies, Regulations, and Goals

Air quality in the Tideflats study area is regulated and enforced by federal, tribal, state, and local agencies: U.S. Environmental Protection Agency (EPA), Ecology, the Puyallup Tribe and the PSCAA; each has its own role in regulating air quality within the region.

Both the City of Tacoma and Port of Tacoma support goals and programs to reduce air emissions. The City of Tacoma has policies within its Comprehensive Plan regarding air pollutants (City of Tacoma 2019). The Puyallup Tribe exercises its own air quality program on its lands. The Port of Tacoma, Port of Seattle, Northwest Seaport Alliance (the marine cargo operating partnership of the Port of Seattle and the Port of Tacoma) and the Port of Vancouver, British Columbia have published an existing Northwest Ports Clean Air Strategy (NWPCAS), a voluntary program that supports the alignment of emissions strategies between different Pacific Northwest regional ports of the Salish Sea and are in the process of preparing an updated version. These local policies are described further in Section 2.2.

U.S. Environmental Protection Agency

The 1970 Clean Air Act (last amended in 1990) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled to achieve all standards by the deadlines specified in the Act. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, and people weak from other illness or disease or persons engaged in strenuous work or exercise.

As required by the 1970 Clean Air Act, the EPA initially identified six criteria air pollutants for which state and federal health-based ambient air quality standards have been established. EPA calls these *criteria air pollutants* because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon oxide (CO), particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead are the six criteria air pollutants originally identified by the EPA. Since then, subsets of PM have been identified for which permissible levels have been established. These include particulate matter that is less than or equal to 10 microns in aerodynamic diameter (PM₁₀) and particulate matter that is less than or equal to 2.5 microns in aerodynamic diameter (PM_{2.5}).

The Clean Air Act established National Ambient Air Quality Standards (NAAQS), with primary and secondary standards, to protect the public health and welfare from air pollution.³ Areas of the U.S. that do not meet the NAAQS for any pollutant are designated by the EPA as *nonattainment areas*. Areas that were once designated nonattainment but are now achieving the NAAQS are termed *maintenance areas*. Areas that have air pollution levels that meet the NAAQS or are cleaner are termed attainment areas. In nonattainment areas, states must develop plans to reduce emissions and bring the area back into attainment of the NAAQS.

An area remains a nonattainment area for that pollutant until concentrations are in compliance with the NAAQS. Only after measured concentration design values have fallen below the NAAQS can the state apply for re-designation to attainment, and it must then submit a 20-year plan for continuing to meet and maintain air quality standards. During this 20-year period, the area implements a NAAQS maintenance plan.

Exhibit 2-1 identifies the primary NAAQS for the seven criteria pollutants. Ecology, PSCAA, and the Tribe have authority to adopt more stringent standards, although many of the state and local standards are equivalent to the federal mandate.

³ The primary standards are designed to protect the health of 'sensitive' populations such as asthmatics, children, and the elderly. The secondary standards are concerned with protecting the environment.

Ch. 2 Air Quality

The primary criteria air pollutants that have historically been of concern in the Puget Sound airshed are CO, ozone, PM₁₀, and PM_{2.5}. Although urban portions of the Puget Sound region have historically violated the CO standard, CO levels have decreased significantly, primarily due to emissions controls on car engines. EPA designated the Puget Sound region as a CO attainment area in 1996 (PSCAA 2020) and its maintenance period expired in October of 2016.⁴

With respect to the County's status relative to monitored concentration trends of ozone, Pierce County currently meets the federal 8-hour standard for ozone. Like CO, the region was redesignated as attaining the ozone NAAQS in 1996 and the corresponding maintenance period expired in 2016.⁵

Exhibit 2-1 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Federal Standard	State of Washington Standard	Puyallup Tribe Standard	Form of the Standard
Ozone (O ₃)	8-hour	0.070 ppm	0.070 ppm	0.070 ppm	(1)
Carbon monoxide (CO)	1-hour	35 ppm	35 ppm	35 ppm	(2)
	8-hour	9 ppm	9 ppm	9 ppm	(2)
Nitrogen dioxide (NO ₂)	1-hour	0.100 ppm	0.100 ppm	0.100 ppm	(3)
	Annual	0.053 ppm	0.053 ppm	0.053 ppm	(4)
Sulfur dioxide (SO ₂)	5-minute			1.0 ppm	(11)
	1-hour	0.075 ppm ⁽⁵⁾	0.075 ppm ⁽⁵⁾	0.075 ppm ⁽⁵⁾ 0.4 ppm ⁽¹⁰⁾ 0.25 ppm ⁽¹²⁾	See Standard
	3-hour	0.5 ppm	0.5 ppm	0.5 ppm	(2)
	24-hour		0.14 ppm ⁽²⁾	0.10 ppm ⁽¹⁰⁾	(2)
	30-day			0.04 ppm	(10)
	Annual		0.02 ppm ⁽⁶⁾	0.02 ppm ⁽¹⁰⁾	See Standard
Particulate matter (PM ₁₀)	24-hour	150 µg/m ³	150 µg/m ³	150 µg/m ³	(7)
Fine particulate matter (PM _{2.5})	24-hour	35 µg/m ³	35 µg/m ³	35 µg/m ³	(8)
	Annual	12 µg/m ³	12 µg/m ³	12 µg/m ³	(9)
Lead	Rolling 3-month average	0.15 µg/m ³	0.15 µg/m ³	0.15 µg/m ³	(10)

⁴ Summary of Central Puget Sound Area Carbon Monoxide (CO) Attainment and Maintenance Plans, US EPA, <https://www.epa.gov/sips-wa/summary-central-puget-sound-area-carbon-monoxide-co-attainment-and-maintenance-plans>

⁵ Summary of Seattle-Tacoma Puget Sound Area Ozone Maintenance Plan, USEPA, <https://www.epa.gov/sips-wa/summary-seattle-tacoma-puget-sound-area-ozone-maintenance-plan>

ppm: parts per million; µg/m³: micrograms per cubic meter

(1) Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years

(2) Not to be exceeded more than once per year

(3) 98th percentile of 1-hour daily maximum concentrations averaged over 3 years

(4) Annual Mean

(5) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

(6) Not to be exceeded in a calendar year

(7) Not to be exceeded more than once per year, averaged over 3 years

(8) 98th percentile, averaged over 3 years

(9) Annual mean, averaged over 3 years

(10) Not to be exceeded

(11) Once in any 8 consecutive hours

(12) Twice in any 7 consecutive days

Source: 40 CFR part 50, Washington Administrative Code (WAC) 173-476-900, Puyallup Tribal Codes 10.12.400

The Tideflats area was designated as nonattainment for PM₁₀ at the time the 1990 Clean Air Act Amendments were enacted.⁶ In 1999 the region had demonstrated attainment with the PM₁₀ NAAQS and the EPA approved the maintenance plan in 2001. With the region's continued compliance with the PM₁₀ NAAQS, the maintenance plan expires in May 2021.

The Tacoma-Pierce County area was designated as nonattainment for the 24-hour PM_{2.5} NAAQS in 2009.⁷ As part of this designation, the area was required to adopt attainment planning requirements. However, in 2012, the region's PM_{2.5} design values demonstrated compliance with the NAAQS and the EPA suspended the need for attainment plans. Despite this suspension, Ecology elected to continue with the plans, with a particular focus on reducing residential wood smoke. The region's maintenance plans identified wood smoke as a primary driver to the elevated concentrations of PM_{2.5} and, historically, PM₁₀. The ongoing attainment planning proved to correspond with decreasing PM_{2.5} concentrations in the region and in 2015, the EPA redesignated the Tacoma-Pierce County nonattainment area to attainment. The area currently operates under a maintenance plan that will expire in March of 2035.

In addition to the federal standard, the PSCAA Board of Directors adopted a more stringent health goal for 24-hour PM_{2.5} of 25 µg/m³ in 1999, based on recommendations from the PSCAA Particulate Matter Health Committee. Monitors in King, Kitsap, Pierce, and Snohomish counties exceeded the local health goal of 25 µg/m³ on 22 days, which were during winter months in 2019 (PSCAA 2020).

Washington State Department of Ecology

Ecology maintains an Air Quality Program with a goal of safeguarding public health and the environment by preventing and reducing air pollution. Washington's main sources of air pollution are motor vehicles, outdoor burning, and wood smoke associated with home heating during fall and winter (Washington State Department of Health 2020). Summertime wildfire smoke also

⁶ Summary of Tacoma Particulate Matter (PM₁₀) Attainment and Maintenance Plans. USEPA, <https://www.epa.gov/sips-wa/summary-tacoma-particulate-matter-pm-10-attainment-and-maintenance-plans>

⁷ Tacoma-Pierce County Fine Particulate Matter (PM_{2.5}) Standard Attainment Planning, US EPA, <https://www.epa.gov/sips-wa/tacoma-pierce-county-fine-particulate-matter-pm25-standard-attainment-planning>

contributes to unhealthy air. Ecology strives to improve air quality throughout the state by overseeing the development of and conformity with the State Implementation Plan (SIP), which is the state's plan for meeting and maintaining NAAQS. Ecology has maintained its own air quality standard for 1-hour ozone concentrations and established its own more stringent air quality standards for annual NO₂, SO₂, and PM concentrations, as shown in Exhibit 2-21.

Puget Sound Clean Air Agency

The PSCAA has local authority for setting regulations and permitting of stationary air pollutant sources and construction emissions. PSCAA also maintains and operates a network of ambient air quality monitoring stations throughout its jurisdiction. There are currently three monitoring station within the City of Tacoma, including one in the Tacoma Tideflats study area that only monitors PM_{2.5}. The other Tacoma stations are located on South L Street (PM_{2.5} only) and South 36th Street (PM_{2.5} and NO₂).

Puyallup Tribe

The Puyallup Tribe has authority for setting air quality regulations with its jurisdiction. The ambient air quality concentration standards are focused on sulfur dioxide. The tribe is also responsible for enforcing the federal standards. The other tribe-specific air quality standards are directed toward curtailing emissions at a source.

2.2 Current Conditions

Climate and Air Quality

Pierce County is in the Puget Sound lowland. Buffered by the Olympic and Cascade mountain ranges and Puget Sound, the Puget Sound lowland has a relatively mild, marine climate with cool summers and mild, wet, and cloudy winters.

The prevailing wind direction in the summer is from the north or northwest. The average wind velocity is less than 10 miles per hour (Weather Spark 2020). Persistent high-pressure cells often dominate summer weather and create stagnant air conditions. This weather pattern sometimes contributes to the formation of photochemical smog and can contribute to a mixing of odors from the region's industrial and natural processes. During the wet winter season, the prevailing wind direction is from the south or southwest.

There is sufficient wind most of the year to disperse air pollutants released into the atmosphere. Air pollution is usually most noticeable in the late fall and winter, under conditions of clear skies, light wind, and a sharp temperature inversion. Temperature inversions occur when cold air is trapped under warm air, thereby preventing vertical mixing in the atmosphere. These can last

several days. If poor dispersion persists for more than 24 hours, the PSCAA can declare an “air pollution episode” or local “impaired air quality.”

Pollutants of Concern

Air quality is affected by pollutants that are generated by both natural and manmade sources. The largest manmade contributors to air emissions are transportation vehicles and power-generating equipment, both of which typically burn fossil fuels. The main criteria pollutants of interest for land use development are CO, PM, ozone, and ozone precursors (volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]). Both federal and state standards regulate these pollutants, along with two other criteria pollutants, SO₂ and lead. However, the Puget Sound region is in attainment and not a maintenance area for ozone, NO₂, lead or SO₂.

The major sources of lead emissions nationwide have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions, and lead concentrations are not currently monitored in most monitoring sites in the PSCAA jurisdiction (including the Tideflats area). Therefore, lead is not further considered in this analysis of criteria air pollutants. Emissions of NO₂ are typically associated with petroleum refining but are also a component of NO_x, a precursor to ozone formation. The nearest NO₂ monitoring station to the study area operated by PSCAA is located in south Tacoma (South 36th Street), and available data indicate that monitored values have been approximately 60% below the federal standard (PSCAA 2020).

SO₂ is produced by the combustion of sulfur-containing fuels, such as oil, coal, and diesel. Historically, Washington has measured very low levels of SO₂. Because the levels were so low, most monitoring was stopped. SO₂ emissions have dropped over the past 20 years because control measures were added for some sources, some larger SO₂ sources shut down, and the sulfur content of gasoline and diesel fuel was cut by nearly 90% (Ecology 2011). The nearest SO₂ monitoring station to the study area operated by PSCAA is located in the Beacon Hill area of Seattle (more than 20 miles to the north), and available data indicate that monitored values have been approximately 80% below the federal standard (PSCAA 2020).

The largest contributors of pollution related to land development activity are construction equipment, motor vehicles, and off-road construction equipment. The main pollutants emitted from these sources are CO, PM, ozone precursors (VOC and NO_x), GHGs, and Toxic Air Pollutants (TAPs). Motor vehicles and diesel-powered construction equipment also emit pollutants that contribute to the formation of ground-level ozone. These pollutants are described in more detail below.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The largest sources of CO are motor vehicle engines and traffic, and industrial activity and wood stoves. Exposure to high concentrations of CO reduces the oxygen-

carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. The federal CO standards have not been exceeded in the Puget Sound area for the past 20 years (PSCAA 2014), but the Puget Sound region continues to be in maintenance for CO.

Particulate Matter

Particulate matter (PM) is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from manmade and natural sources. PM is measured using two distinct cut-points: particles with an aerodynamic diameter of 2.5 micrometers or smaller (PM_{2.5}; fine particles) and particles with an aerodynamic diameter of 10 micrometers or smaller (PM₁₀). Fine particles are emitted directly from a variety of sources, including wood burning (both outside and indoor wood stoves and fireplaces), vehicles, and industry. They also form when gases from some of these same sources react in the atmosphere.

Exposure to particle pollution is linked to a variety of significant health problems, such as increased hospital admissions and emergency department visits for cardiovascular and respiratory problems, including non-fatal heart attacks and premature death. People most at risk from PM_{2.5} and PM₁₀ pollution exposure include those with heart or lung disease (including asthma), older adults, and children. Pregnant women, newborns, and people with certain health conditions, such as obesity or diabetes, also may be more susceptible to PM-related effects.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving VOCs (also sometimes referred to by regulating agencies as reactive organic gases, or ROG) and NO_x. The main sources of VOC and NO_x, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. Ozone levels are usually highest in the afternoon because of the intense sunlight and the time required for ozone to form in the atmosphere.

Elevated concentrations of ground-level ozone can cause reduced lung function and respiratory irritation and can aggravate asthma. Ozone has also been linked to immune system impairment. People with respiratory conditions should limit outdoor exertion if ozone levels are elevated. Even healthy individuals may experience respiratory symptoms on a high-ozone day. Ground-level ozone can also damage forests and agricultural crops, interfering with their ability to grow and produce food. The Puget Sound region is designated as an attainment area for the federal ozone.

Ecology currently monitors ozone from May through September because this is the period of concern for elevated ozone levels in the Pacific Northwest. No violations of the NAAQS for ozone have occurred at the Tacoma Tideflats monitoring station since monitoring commenced there in 1987.

Toxic Air Pollutants

Other pollutants known to cause cancer or other serious health effects are called toxic air pollutants (air toxics). The Clean Air Act identifies 188 air toxics; the EPA later identified 21 of these air toxics as mobile source air toxics (MSATs) and then extracted a subset of seven priority MSATs: benzene, formaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, naphthalene, polycyclic organic matter, and 1,3-butadiene. Exposure to these pollutants for long durations and sufficient concentrations increases the chances of cancer, damage to the immune system, neurological problems, and reproductive, developmental, respiratory, and other serious health problems.

Diesel particulate matter poses the greatest potential cancer risk (70% of the total risk from air toxics) in the Puget Sound area (PSCAA 2011). This pollution comes from diesel-fueled trucks, cars, buses, construction equipment, rail, marine, and port activities. Particulate matter from wood smoke (a result of burning in wood stoves and fireplaces or outdoor fires) presents the second-highest potential cancer health risk. Wood smoke and auto exhaust also contain formaldehyde, chromium, benzene, 1,3-butadiene, and acrolein. Chromium is also emitted in industrial plating processes. The EPA prioritizes the reductions of these air toxics.

Ecology began monitoring air toxics at the Tacoma Tideflats in 1987. In 2010, Ecology prepared the Tacoma and Seattle Area Air Toxics Evaluation. The results of this study demonstrate that in addition to having elevated PM_{2.5} concentrations, residential areas of south Tacoma (at the L Street monitoring station) have elevated air toxics concentrations which, at the time in 2010, violated the 24-hour PM_{2.5} standard,⁸ was found to have the highest cancer risk attributed to monitored air toxics in this study (excluding diesel and wood smoke particulate estimates). It is noteworthy that south Tacoma areas have observed higher levels of risk from air toxics compared to other areas, including the industrial centers like the Tacoma Tideflats area.

Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the following: the elderly and the young; population subgroups with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease; and populations with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. Sensitive receptors may be defined as children, adults, and seniors occupying or residing in residential dwellings, schools, day care centers, hospitals, and senior-care facilities. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the Occupational

⁸ While not classified as a TAP, PM_{2.5} contains diesel particulate matter, which is a TAP. Since 2011, neither the L Street monitoring station nor the Tideflats monitoring station have recorded a violation of the federal 24-hour PM_{2.5} standards through 2019, after adjusting for wildfires (PSCAA 2020).

Safety and Health Administration (OSHA) to ensure the health and well-being of their employees (BAAQMD 2011).

There are generally no sensitive receptors within the Tideflats study area. The closest sensitive receptors to the area include residential uses northeast of Marine View Drive, west of I-705, south of I-5, and potentially live-aboard vessels in the marinas.

Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere are referred to as GHGs because, like a greenhouse, they capture heat radiated from the earth. The accumulation of GHGs is a driving force in global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community. Generally, climate change can be described as the changing of the earth's climate caused by natural fluctuations and anthropogenic activities (i.e., activities relating to, or resulting from the influence of, human beings) that alter the composition of the global atmosphere.

Increases in GHG concentrations in the earth's atmosphere are believed to be the primary cause of human-induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space. This trapping of heat is called a "greenhouse effect." Some GHGs occur naturally and are necessary for keeping the earth's surface habitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in an increase of global average temperature.

The principal GHGs of concern are CO₂, methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs) (EPA 2020). Electric utilities, including Tacoma Power, use SF₆ in electric distribution equipment. Each of the principal GHGs has a long atmospheric lifetime (1 year to several thousand years). In addition, the potential heat-trapping ability of each of these gases varies. CH₄ is 25 times as potent as CO₂ at trapping heat, while SF₆ is 22,800 times more potent than CO₂. Conventionally, GHGs have been reported as CO₂ equivalents (CO₂e). CO₂e takes into account the relative potency of non-CO₂ GHGs and converts their quantities to an equivalent amount of CO₂ so that all emissions can be reported as a single quantity.

The primary human-made processes that release GHGs include the combustion of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release CH₄, such as livestock production and crop residue decomposition; and industrial processes that release smaller amounts of high global warming potential gases such as SF₆, PFCs, and HFCs. Deforestation and land cover conversion also contribute to global warming by reducing the earth's capacity to remove CO₂ from the air and altering the earth's albedo (surface reflectance), thus allowing more solar radiation to be absorbed.

Like global mean temperatures, U.S. temperatures also warmed during the 20th century and have continued to warm into the 21st century. According to data compiled by the National Oceanic and Atmospheric Administration (NOAA), average annual temperatures for the contiguous U.S. (or lower 48 states) are now approximately 1.25°F Fahrenheit (F) warmer than at the start of the 20th century, with an increased rate of warming over the past 30 years (EPA 2009). The rate of warming for the entire period of record in the U.S. (1901–2008) is 0.13°F per decade, while the rate of warming increased to 0.58°F per decade for the period 1979–2008. The last ten 5-year periods were the warmest 5-year periods (i.e., pentads) in the period of record (since 1901), which demonstrates the anomalous warmth of the last 50 years (EPA 2009b).

Ecology estimated that in 2018, Washington produced about 100 million gross metric tons (MMT; about 106 million U.S. tons) of CO₂e (Ecology 2021). Ecology found that transportation is the largest source, at 45% of the state's GHG emissions, followed by residential, commercial, and industrial energy use at 23%, and electricity consumption (both in-state and out-of-state) at 16%.⁹ The sources of the remaining 15% of emissions are agriculture, waste management, and industrial processes.¹⁰

In December 2010, Ecology adopted Chapter 173-441 Washington Administrative Code (WAC) – Reporting of Emissions of Greenhouse Gases. This rule institutes mandatory GHG reporting for the following:

- Facilities that emit at least 10,000 metric tons of GHGs per year in Washington; or
- Suppliers of liquid motor vehicle fuel, special fuel, or aircraft fuel that supply products equivalent to at least 10,000 metric tons of CO₂ per year in Washington.

Regional and Local Planning and Inventories for Air Pollutants

City of Tacoma's One Tacoma Plan

The One Tacoma Plan is the City's Comprehensive Plan that guides the community's development over the long term and describes how its vision for the future is to be achieved (City of Tacoma 2019). The Environment and Watershed Health Book of the plan contains the following specific Policies that address air quality:

⁹ Transportation sources include on-road vehicles, marine vessels, jet fuel and aviation gasoline, rail operations, and natural gas for transportation. Washington GHG emissions from the transportation sector have been fairly constant for several years, with on-road gasoline continuing to contribute over 50% of transportation sector emissions. Marine vessel emissions include emissions from recreational, commercial, and ocean-going vessels, but exclude marine bunker fuels consumed in international waters.

¹⁰ The industrial sector includes fugitive GHG emissions that are released during the production, processing, transmission, and distribution of fossil fuels. These emissions are typically fugitive methane due to leakage and venting from natural gas pipelines, and petroleum systems.

***Policy EN–4.7.** Ensure that plans and investments are consistent with, and advance, efforts to improve air quality and reduce exposure to air toxics, criteria pollutants, and urban heat island effects. Consider air quality related health impacts on all of the Tacoma residents.*

***Policy EN–4.8.** Achieve criteria air pollutant reductions in both municipal operations and the community.*

Pierce County

The Pierce County 2017 Sustainability Report contains the trends and goals with respect to air quality in the county. The plan commits the County to maintaining its attainment status with respect to PM_{2.5} that was granted by the EPA in 2015. While the county has very good air quality, and has substantially reduced its wood smoke contributions from residents of the county, recent summer wildfire activity has contributed to exceedances in daily PM_{2.5} standards.

Tacoma Rail Repower Project

Rail operations in the Tideflats study area include operation of yard locomotives in rail yards owned and operated by the City of Tacoma (Tacoma Rail) as well as two tenants. Working with PSCAA as part of a voluntary action, Tacoma Rail implemented the Locomotive Engine Repower Project to reduce pollutant emissions beginning in 2009. Three yard locomotives were retrofitted with new, cleaner engines, while five other locomotives were retrofitted with emission-reduction technology. It is estimated that these upgrades resulted in a reduction of 32 tons per year of NO_x, 2 tons per year of PM_{2.5}, and 127 tons per year of carbon dioxide.

Northwest Ports Clean Air Strategy

In 2007, the Port of Seattle, Port of Tacoma, and Port of Metro Vancouver (BC, Canada) engaged in a collaborative, voluntary effort to reduce seaport-related air emissions in the Salish Sea (which includes the Puget Sound and Georgia Basin airsheds and emissions from cargo-handling equipment, rail, harbor craft, ocean-going vessels, and trucks). The Northwest Ports Clean Air Strategy (NWPCAS) was updated in 2013. The voluntary actions in this Strategy Update were developed to complement existing regulations and, together with the regulations, achieve the following emission reductions relative to a 2005 baseline:¹¹

- Reduce diesel particulate matter (DPM) emissions per ton of cargo by 75% by 2015 and 80% by 2020, to decrease immediate and long-term health effects on adjacent communities.

¹¹ Importantly, the emission reduction performance for the Port of Tacoma would be assessed using the airshed-wide emission inventory, not just emissions from the Port of Tacoma's on-port (i.e., Tideflats-specific) emissions that are summarized in this report.

- Reduce GHG emissions per ton of cargo by 10% by 2015 and 15% by 2020, to limit contributions to climate change and reduce associated environmental, health, and economic impacts.

Action and performance targets for reducing emissions to reach the NWPCAS emission-reduction goals for DPM and GHGs are organized by six port-related emission source sectors:

1. Ocean-going vessels (OGVs)
2. Harbor vessels
3. Cargo-handling equipment (CHE)
4. Trucks
5. Locomotives and rail transport
6. Port administration

Exhibit 2-2 below presents the latest (2016) on-port emission inventory for the Port of Tacoma and the South Harbor of the NWSA, while Exhibit 2-3 shows the reduction in emissions achieved from a baseline year of 2005 and since 2011.¹² These, in part, show the influence of the NWPCAS on emissions in on near the MIC.

Exhibit 2-2 2016 Emissions (tons per year)

Sector	NO _x	VOC	CO	PM ₁₀	PM _{2.5}	DPM
Ocean-going vessels	633.1	25.97	58.84	14.84	13.99	11.5
Harbor vessels	275	8.7	45.3	9	8.3	9
Recreational vessels	0	0	0	0	0	0
Locomotives	476.3	30.68	83.2	14.59	13.35	14.59
Cargo handling vessels	165.2	17.45	109.03	7.8	7.6	7.8
Heavy duty vehicles	77.3	8.53	23.68	3.71	3.41	3.71
Fleet vehicles	1	0.2	4.77	0	0	0
Totals	1627	91.52	324.91	50.05	46.76	46.7

Note: NO_x = oxides of nitrogen (ozone precursor); VOCs = volatile organic compounds (ozone precursor); CO = carbon monoxide; PM_x = particulate matter of a given diameter size in microns; DPM = diesel particulate matter. Columns may appear to not total precisely due to rounding.

Source: Puget Sound Maritime Emission Inventory, 2016.

¹² Adapted from the results presented in Tables 9.21 and 9.39 of the 2016 Puget Sound Maritime Emissions Inventory, a distinct and separate document from the NWPCAS.

Exhibit 2-3 Emission Trends per 10,000 TEUs

Year	NO _x	VOC	CO	PM ₁₀	PM _{2.5}	DPM
2005 (tpy)	8.7	0.49	1.8	0.54	0.47	0.47
2011 (tpy)	8.1	0.47	1.7	0.55	0.47	0.48
2016 (tpy)	7.3	0.41	1.5	0.23	0.21	0.21
Reduction since 2005	16%	15%	20%	58%	55%	56%
Reduction since 2011	10%	11%	15%	59%	55%	56%

Note: NO_x = oxides of nitrogen (ozone precursor); VOCs = volatile organic compound (ozone precursor); CO = carbon monoxide; PM_x = particulate matter of a given diameter size in microns; DPM = diesel particulate matter. Columns may appear to not total precisely due to rounding.

Source: Puget Sound Maritime Emission Inventory, 2016.

Northwest Ports Clean Air Strategy – Clean Truck Program

The Northwest Seaport Alliance (NWSA) is a marine cargo operating partnership between the Port of Tacoma (South Harbor) and Port of Seattle (North Harbor). As part of the NWPCAS, both the South and North Harbors undertook the Clean Truck Program over the past decade. As of 2019, trucks serving the international container terminals must have an active identification tag and have a 2007 (or newer) engine, or a certified equivalent emission control system. Tags must be updated with driver information, vehicle ID number, company name, and license plate information. The Clean Truck Program requirements reduce DPM emissions by up to 90% per truck.

Northwest Ports Clean Air Strategy – Shore Power

The NWSA has a goal to implement shore power to the extent feasible by 2030 (i.e., installing shore power infrastructure on marine terminals for connecting container ships to the grid, allowing them to shut down their engines while at dock). At the Port of Tacoma, TOTE Maritime has used shore power in Tacoma for its Alaska-bound ships since 2010. The NWSA has plans to install marine shore power connection systems at two more cargo ship berths to provide auxiliary power to some container vessels while at berth. The shore power infrastructure will be used by a diverse fleet of container vessels that visit the South Harbor. Shore power is a component of the NWPCAS to reduce air pollutants and GHG emissions. This project supports reduced diesel emissions and improved air quality within the Tacoma-Pierce County PM_{2.5} maintenance zones.

Regional and Local Planning and Inventories for Greenhouse Gases

Pierce County

Sustainability 2020 Plan and Draft 2030 Plan

Pierce County adopted the Sustainability 2020 Plan in 2016. The plan implements commuter trip reduction objectives, reduced water use at municipal facilities, installation of electric vehicle infrastructure, investment in electric and hybrid fleet vehicles, and reduced waste generation as well as a variety of other measures.

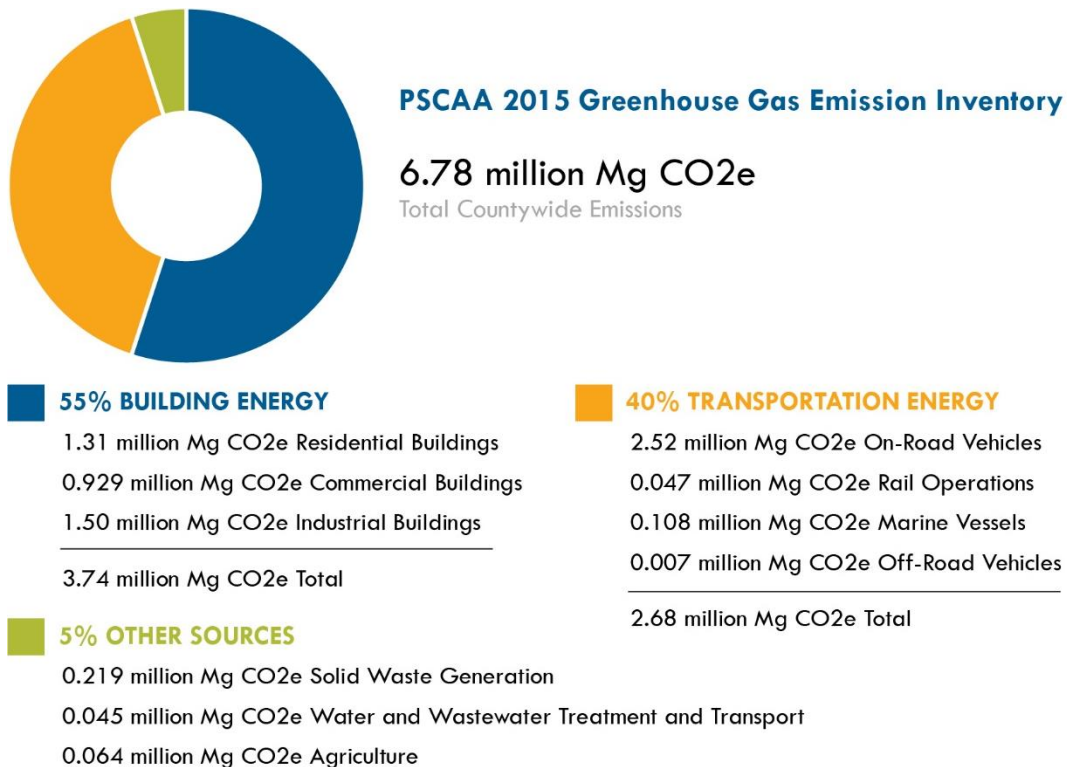
The County has also prepared a draft update to the plan, the Sustainability 2030: Pierce County's Greenhouse Gas Reduction Plan. This plan builds on prior County sustainability efforts to respond to the State of Washington goals that call for a 45% reduction of GHG emissions by 2030, a 70% reduction by 2040, and a 95% reduction by 2050. In alignment with the state mandates, the Sustainability 2030 Plan calls for Pierce County to reduce government operational and communitywide GHG emissions by 45% by 2030. This plan establishes strategies to ensure the County meets this goal through five areas of focus: energy, transportation, waste reduction, carbon sequestration, and education.

Climate Change Resilience Strategy

The Pierce County Climate Change Resilience Strategy (Pierce County 2017) was prepared pursuant to the Sustainability 2020 Plan and guides the County in preparing for the impacts of climate change. Changes considered in the plan include sea level rise, increases in ocean acidity, increases in stream water temperature, decreases in glaciers and snowpack, extreme heat and wildfire, landslides, flooding, and extreme weather phenomena.

PSCAA 2015 Greenhouse Gas Emission Inventory

In 2018, the PSCAA published the most recent (2015) GHG inventory for Pierce County. Total countywide emissions were estimated to be 6.78 million Mega grams of carbon dioxide equivalents (Mg CO₂e). The Inventory is broken down by sector (Exhibit 2-4).

Exhibit 2-4 PSCAA 2015 Greenhouse Gas Emissions Inventory

Building Energy. In 2015, building energy represented 55% of countywide emissions comprised of 1.31 million Mg CO₂e from residential buildings, 0.929 million Mg CO₂e from commercial buildings, and 1.50 million Mg CO₂e from industrial buildings, for a total of 3.74 million Mg CO₂e.

Transportation Energy. In 2015, transportation energy represented 40% of countywide emissions comprised of 2.52 million Mg CO₂e from on-road vehicles, 0.047 million Mg CO₂e from rail operations, 0.108 million Mg CO₂e from marine vessels, and 0.007 million Mg CO₂e from off-road vehicles, for a total of 2.68 million Mg CO₂e.

Other Sources. In 2015, other sources of GHGs represented the remaining 5% of countywide emissions and included solid waste generation (0.219 million Mg CO₂e), water and wastewater treatment and transport (0.045 million Mg CO₂e), and agriculture (0.064 million Mg CO₂e).

City of Tacoma***Tacoma Environmental Action Plan 2016***

The Environmental Action Plan (EAP) is a list of actions that the City of Tacoma and the community has been taking between 2016 and 2020 to meet the environmental goals outlined in the Tacoma 2025 Strategic Plan. The EAP replaces the City's 2008 Climate Action Plan (CAP) that laid the

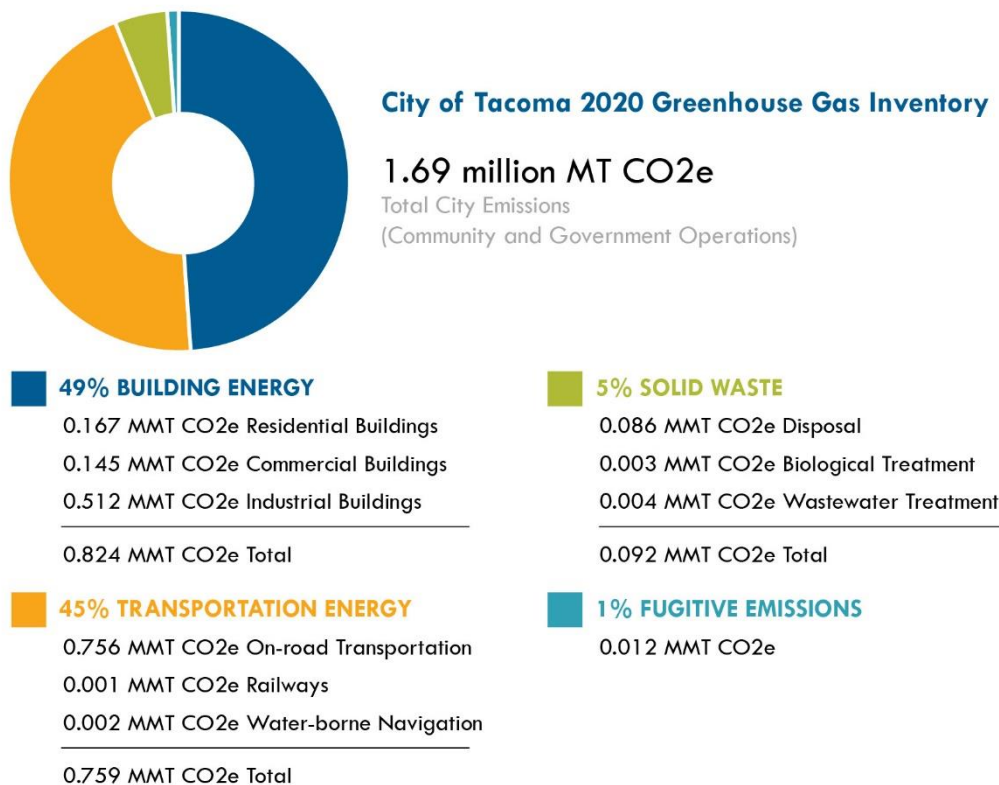
groundwork for reducing GHG emissions in Tacoma, setting a goal of reducing GHG emissions 40% over 1990 levels by the year 2020.

The EAP consolidates the priorities of multiple City departments, providing a centralized plan and reporting system for tracking progress toward environmental goals. The EAP contains 13 actions addressing the building energy sector, 15 actions addressing reductions in the transportation sector, 13 actions addressing reductions in the materials management sector, nine actions addressing reductions in the natural systems sector, and eight actions addressing reductions in the air and local food sector. The EAP also addresses climate resiliency. Annual Progress Reports are prepared that evaluate the success of each action in the plan, with the most recent having been prepared in 2019.

City of Tacoma 2016 Greenhouse Gas Inventory

In the most recent (2020) compiled GHG inventory for the City of Tacoma, total city emissions (community and government operations) were estimated to be 1.69 million metric tons of carbon dioxide equivalents (MMT CO₂e). The Inventory is broken down by sector (Exhibit 2-5):

Exhibit 2-5 City of Tacoma 2020 Greenhouse Gas Inventory



Building Energy. In 2020, building energy represented 49% of citywide emissions comprised of 0.167 MMT CO₂e from residential buildings, 0.145 MMT CO₂e from commercial buildings, and 0.512 MMT CO₂e from industrial buildings, for a total of 0.824 MMT CO₂e.

Transportation Energy. In 2020, transportation energy represented 45% of citywide emissions comprised of 0.756 MMT CO₂e from on-road transportation, 0.001 MMT CO₂e from railways, and 0.002 MMT from water-borne navigation, for a total of 0.759 MMT CO₂e.

Solid Waste. In 2020, the solid waste generation sector represented 45.5% of citywide emissions, contributing 0.092 MMT CO₂e.

Fugitive Emissions. In 2020, fugitive emissions represented less than 1% of citywide emissions, contributing 0.012 MMT CO₂e.

Climate Emergency Resolutions

In December 2019, the City of Tacoma passed a Climate Emergency Resolution, declaring a climate emergency in Tacoma, and affirming the City Council's support of initiatives that mitigate climate change impacts. The resolution calls for the EAP to be updated by April of 2021 and directs that the EAP include a significant focus on climate and environmental justice initiatives, as well as City staff education.

The Puyallup Tribe also passed a Climate Emergency Resolution in December 2019 outlining several steps to address the current climate crisis including; prohibiting the expansion and siting of all new fossil fuel infrastructure and developing resiliency strategies for the study area.

Northwest Ports Clean Air Strategy

In 2021, a significant update to the Northwest Ports Clean Air Strategy (NWPCAS) was published that lays the groundwork for phasing out seaport-related emissions by 2050. This goal is largely fueled by a desire to reduce community health impacts, address climate urgency, work toward social equity, and a desire to for the ports to lead and be competitive. The NWPCAS 2050 goal is driving by three distinct themes: 1) efficiency, fleet modernization, and lower-emission fuels, 2) zero-emission technology infrastructure, and 3) adoption of zero-emission technology. A summary of some of the specific objectives are detailed in Exhibit 2-6.

Exhibit 2-6 Summary of NWCAS Actions and Performance Targets by Sector

Sector	Objective	Target
Ocean Going Vessels	Fraction of calls using emission reduction technologies while underway (e.g., tier 3, cleaner fuels, battery)	Continuous improvement
	Percent major cruise and container berths with shore power	100% by 2030
	Fraction of shore power use by capable vessels and fraction of all ships using shore power	Continuous improvement

Cargo Handling Equipment	Percent of CHE fleet meeting Tier 4i emission standards	80% by 2020
	Fraction of zero-emission equipment adoption	100% by 2050
Trucks	Percent of container trucks meeting or surpassing EPA standards for model year 2007 for PM	100% by 2017
	Fraction of zero-emissions container trucks adopted	100% by 2050
Harbor Vessels	Percent of zero-emission commercial vessels	100% by 2050
Rail	Retrofit/replacement of unregulated engines	20% by 2020, relative to 2013
	Percent zero-emissions switcher engines adopted	100% by 2050
Facilities	Absolute emissions from buildings and lighting	Zero by 2050
	Light-duty vehicle fleet in use with zero emissions or renewable fuels	100% by 2050
	Percent of port authority fleet that are zero-emissions	100% by 2050

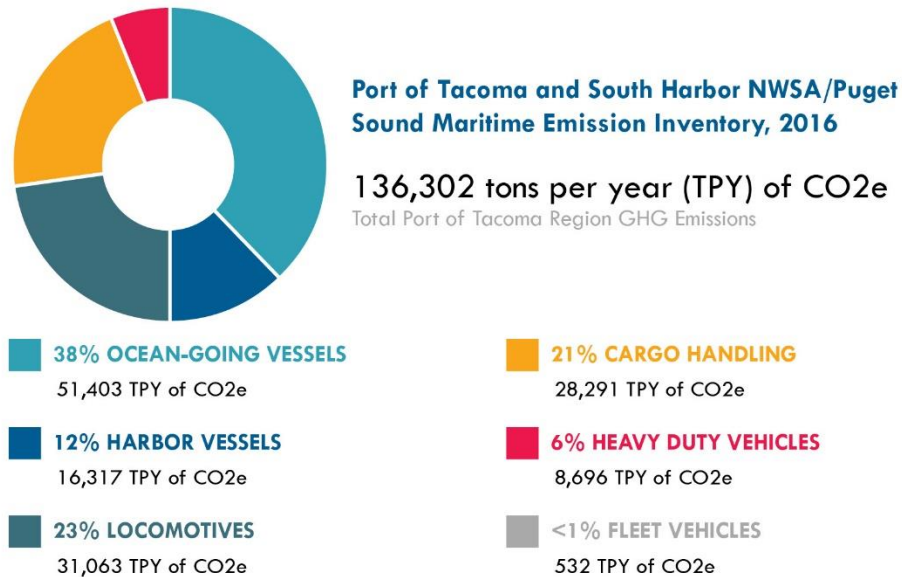
Source: Northwest Ports Clean Air Strategy, 2021.

Puget Sound Maritime Emissions Inventory – 2016 Inventory

The latest Puget Sound Maritime Emission Inventory (2016) provides estimates for the individual ports in the Georgia Basin airshed. For the Port of Tacoma and South Harbor of the NWSA on-port total emissions (i.e., not including emissions off port property) are reported as 136,302 tons per year (TPY) of CO₂e.¹³ These emissions are further broken down by sector (Exhibit 2-7).

Ocean-going vessels account for 51,403 TPY of CO₂e, or 38% of total emissions. Harbor vessels account for 16,317 TPY of CO₂e, or 12% of total emissions. Locomotives account for 31,063 TPY of CO₂e, or 23% of total emissions. Cargo handling equipment account for 28,291 TPY of CO₂e, or 21% of total emissions. Heavy duty vehicles account for 8,696 TPY of CO₂e, or 6% of total emissions. Fleet vehicles account for 532 TPY of CO₂e, or less than 1% of total emissions.

¹³ Taken from Tables 9.21 and 9.39 of the report. We assume the CO₂e is reported in short tons, similar to the other pollutants, and not metric tonnes as is typical of CO₂e emissions.

Exhibit 2-7 Port of Tacoma and South Harbor NWSA/Puget Sound Maritime Emission Inventory, 2016**Puyallup Tribe of Indians Climate Change Assessment and Adaptation Options**

The Puyallup Tribe and its consultants conducted a Climate Change Impact Assessment in 2015 and 2016 to identify options for adaptation. The assessment aimed to help Tribal staff and members better understand and prepare to proactively manage climate risks to ensure that Tribal customs and the Tribal community can thrive for many generations to come, despite a changing climate.

Tribal staff developed a shortlist of potential adaptation measures for further consideration and evaluation. These options are presented at the end of the document, and they fall into five broad categories: (1) Implement protection, restoration, and management practices; (2) Provide education and guidance; (3) Reevaluate policies, plans, and protocols; (4) Gather additional information; and (5) Leverage partnerships.

Priority resources and sectors targeted for protection by adaptation options include fisheries and hatcheries, shellfish, wildlife restoration sites, water quality, cultural and archaeological sites, transportation, and public health and safety. The following strategies are relevant with respect to development within the Tideflats area:

Strategy #1: Implement protection, restoration, and management practices.

- Implement on-the-ground habitat and water quality restoration projects that enhance floodplain connectivity.
- Provide refuges for fish from summer high temperature and winter/spring high-energy flows.

- Reduce discharge of warm water and stormwater into rivers and streams (e.g., from irrigation, point source discharges from industry and power plants).
- Reduce forest susceptibility to severe fire, insect outbreaks, and drought by establishing or enhancing planned treatments of forest sites that specifically manage for these impacts.
- Restore high-quality freshwater habitat through the reintroduction of beavers, wetland mitigation and restoration, groundwater recharge, and flow augmentation.
- Maintain and increase biological diversity and connectivity to increase large-scale resilience of vulnerable landscapes to droughts, wildfires, and flooding.
- Diversify vegetation and enhance water-retaining areas, such as by abutting wetland projects to agricultural areas to reduce flood vulnerability.
- Provide corridors between conservation areas to help plants and animals migrate to new locations with suitable habitat.
- Protect undeveloped areas that are up-gradient from tidal wetlands to allow wetland migration and buffer intact ecosystems;
- Restore badly eroded streams at coastal outfalls.
- Accommodate and facilitate inland/upland migration of tidal freshwater habitats by creating/restoring wetlands in place with boundary protection (e.g., sill, rock), planned elevation increases, and considering development upstream that could affect species migration.
- Use vegetation species for restoration that are more flood- and drought-tolerant and that can withstand higher salinity.

Strategy #2: Provide education and guidance.

- Educate landowners and stakeholder groups about the importance of conservation and restoration of key corridor habitats, such as buffer areas along riparian systems and critical winter range habitat for elk.
- Use public access points, nature centers, and hunting and fishing regulation guides to inform people of climate change impacts on wildlife, and what they can do to help.

Strategy #3: Reevaluate policies, plans, and protocols.

Strategy #4: Gather additional information.

Strategy #5: Leverage partnerships.

- Work with partner jurisdictions to leverage seed funding for habitat restoration projects. For example, fund the design phase internally and partner for the construction phase.
- Encourage the City of Tacoma and the Port of Tacoma to remove bulkheads and shore defense works to restore shoreline, preserve natural processes, and help adapt to sea level rise.

2.3 Key Findings and Implications for the Plan

To the extent practicable, the Tideflats Subarea Plan could directly or indirectly implement plans and/or policies of the stakeholder groups to address air quality maintenance, air pollution reduction, and reduction in GHGs within the Plan Area. The Plan could represent a self-mitigating document that would reduce the potential for identification of adverse effects on the environment.

Plan Consideration with Respect to Air Quality

The key pollutant of concern for the Tacoma Tideflats study area is DPM, primarily as a consequence of the amount of diesel-fueled equipment operating within and near the MIC. Cargo-handling, vessel operations, and locomotive operations are existing sources of air pollutants including DPM. Additionally, the Tideflats area is encompassed by I-705 and State Highway 509, which carry a high volume of diesel truck traffic. As a consequence, care should be taken to maintain buffer areas between sensitive land uses such as residences, schools, and hospitals and sources of DPM. Particulate matter emissions (both PM₁₀ and PM_{2.5}) are also pollutants of interest given the history of elevated concentrations in the region. The ongoing work to reduce residential wood smoke, should continue to alleviate some of the PM concerns. Policy EN-4.7 of the One Tacoma Plan seeks to ensure that plans and investments are consistent with, and advance, efforts to improve air quality and reduce exposure to air toxics, criteria pollutants, and urban heat island effects.

The closest sensitive receptors to the Plan Area includes residential uses northeast of Marine View Drive, west of I-705, south of I-5, and potentially live-aboard vessels in the marinas. Development of land uses that may be associated with new vessel, rail, or heavy-duty truck operations should be identified and these areas located as far from these receptors as is reasonable (CARB 2005). If a development is not clearly defined, and it is unknown if it will include considerable emissions of PM or DPM, then a development policy that provides for a minimum buffer distance of 1,000 feet or more from residential receptors should be considered. It is expected that facilities within the MIC will achieve this buffer without issue.

Plan Consideration with Respect to GHGs

Unlike DPM and other air pollutants described above, GHGs do not represent an acute or chronic localized exposure risk. As a result, the context for the Tideflats Subarea Plan with respect to GHGs is consistency with plans by the five stakeholder groups to reduce GHG emissions in their control.

Given that 67% of GHGs generated within the City of Tacoma inventory are from transportation sources, policies that would reduce vehicle miles travelled, reduce the use of single-occupancy vehicles, and promote the use of electric vehicles and infrastructure, including shoreside power within the Port facilities could all be primary considerations. Transportation demand management measures that might be identified in the Transportation section would also help in this effort.

Other policy considerations may include the promotion of clean sources of alternative energy generation, promotion of the use of clean electricity, promotion of the use of light-emitting diode (LED) lighting, and consideration of Leadership in Energy and Environmental Design (LEED) for commercial buildings in excess of 100,000 square feet.

3 EARTH

This section describes existing conditions for earth/contamination and remediation within the Tacoma Tideflats study area, as well as existing policies, plans, and regulations, potential geologic hazards, and key findings and implications for the Subarea Plan. Introductory information on hazardous materials is also included.

3.1 Existing Policies and Regulations

This section describes the existing regulatory environment (at the federal, state, and local levels) for earth-moving and contamination/remediation activities in the study area, as well as programs that oversee cleanup actions.

Federal Regulatory Requirements

Environmental Protection Agency

The United States Environmental Protection Agency (EPA) through regulatory authority from laws passed by Congress has enacted regulations including the Clean Air Act, the Clean Water Act, and the Toxic Substances Control Act, and others. As part of compliance of these regulations, the EPA helps regulated entities meet federal requirements and holds entities legally accountable for environmental violations. The EPA also monitors and regulates hazardous materials used in structural and building components and their effects on human health that can arise during renovation or demolition activities.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly referred to as Superfund, is a federal law administered by EPA governing the cleanup of hazardous substance contaminated sites. CERCLA enabled modifications to the National Contingency Plan to include guidelines and procedures for responding to releases of hazardous

substances, and to establish a National Priorities List (NPL). The NPL is a management tool used by EPA to prioritize sites with known or threatened releases of hazardous substances, pollutants, or contaminants. Ongoing CERCLA remedial actions, and remedial action effectiveness monitoring, are being conducted within the Commencement Bay Nearshore/Tideflats area under the direction of EPA. More information on these actions and sites is provided later in this memo.

Resources Conservation and Recovery Act (RCRA)

The Resource Conservation and Recovery Act (RCRA) was adopted in 1976. RCRA Subtitle C regulates the generation, transportation, treatment, storage, and disposal of hazardous waste by “large-quantity generators” (1,000 kilograms per month or more) as well as “small quantity generators” (under 1,000 kilograms) through comprehensive life cycle or “cradle-to-grave” tracking requirements. The requirements include maintaining inspection logs of hazardous waste storage locations, records of quantities being generated and stored, and manifests of pick-ups and deliveries to licensed treatment/storage/disposal facilities. RCRA also identifies standards for treatment, storage, and disposal, which is codified in 40 Code of Federal Regulations (CFR) Part 260.

State Regulatory Requirements

Growth Management Act

Washington State’s Growth Management Act (GMA) requires all cities and counties to identify critical areas within their jurisdictions and to formulate development regulations to protect these areas (Chapter 36.70A Revised Code of Washington [RCW]). Among the critical areas designated by the GMA are geologic hazard areas, which are areas susceptible to erosion, sliding, earthquake, or other geologic events. These hazards could affect the design, construction, and operation of future development.

As required by the GMA, local jurisdictions have codes (including building codes) regulating development in or near geologic hazard areas. These codes and local policies require measures to address hazards such as slope instability, largely through avoidance by adhering to setbacks (unless a geotechnical slope stability investigation can demonstrate feasibility). Projects are not allowed to increase the potential for slope failure. Feasibility is typically demonstrated through a site-specific geotechnical investigation that identifies the underlying soil and bedrock properties, geotechnical hazards, and whether identified hazards can be overcome through the application of geotechnical engineering recommendations.

State Building Code

The Washington State Building Code Council (SBCC) was created to advise the Legislature on building code issues and to develop the building codes used in Washington State. These codes

help to ensure that buildings and facilities constructed in the state are safe and healthy for building occupants, workers, and the public. The current code of 2015 became effective July 1, 2016. The anticipated effective date for the updated 2018 code was July 1, 2020 but has been extended to February 1, 2021 (Title 51 Chapter 51-50). The state building code is modeled on the International Building Code and is combined with Washington State amendments. The building code includes requirements for site preparation and foundations for aboveground improvements that represent new loadings (i.e., placement of new structures that require bearing more weight than previously).

Model Toxics Control Act (MTCA)

Accidental spills and unauthorized releases of hazardous materials and wastes from past business practices have contaminated land and water throughout Washington. The Toxics Cleanup Program works to remedy these situations, which range from cleaning up leaking underground storage tanks (USTs), to large, complex projects requiring engineered solutions. The Model Toxics Control Act (MTCA), Washington's cleanup law (Chapter 173-340 WAC), is the engine that powers that effort to improve the subsurface environment and reduce threats to human health from exposure. The Washington State Department of Ecology (Ecology) manages contaminated soil cleanups under MTCA, which sets strict cleanup standards to ensure the quality of the cleanup and the protection of human health and the environment.

USTs are regulated by Ecology and the Tacoma-Pierce County Health Department. UST removal is also regulated by the City of Tacoma (Chapter 5.47 of the Tacoma Municipal Code [TMC]) and by Pierce County (Chapter 8.34 of the Pierce County Code [PCC]).

Local Plans, Policies, and Regulatory Requirements

City of Tacoma Comprehensive Plan – Environmental Policy Element

The Environment + Watershed Health Policy Element of Tacoma's Comprehensive Plan is intended to be a comprehensive, single source of Tacoma's environmental policies (City of Tacoma 2019). The Environment + Watershed Health Policy Element established a range of policies that provide mitigation for adverse impacts. The Element states: *"Managing growth within potentially hazardous natural areas prevents environmental problems as well as preserves open space. For example, steep slopes and floodplains that are potentially hazardous when developed provide scenic corridors and greenbelts when retained in a natural state. Development patterns and practices that preserve or enhance natural features add to community quality as well as protect water quality, wildlife, and property."* Developments in potentially hazardous areas need to be subject to standards that may be stricter than the standards which apply in areas where natural constraints are not present. Where developments are permitted in these potentially hazardous areas, the developments need to be designed in harmony with natural systems. This approach is intended to protect the public health, safety, and welfare by averting potential problems associated with development, and

may also reduce needless public and private expenditures related to landslides, flooding, erosion, uneven settlement, or other disruptions. Lastly, one of the purposes of the Policy Element is to ensure that if development activities occur, undue hardships are not imposed on adjacent property owners, and that land owners, developers, and buyers are made aware of natural constraints. Ord. No. 27295, adopted Nov. 16, 2004 and amended by Ord. No. 27996 of June 14, 2011.

The Environmental Policy Element includes the following policies that relate to earth and environmentally critical areas:

- **E-GD-2 Development Hazards:** Discourage development on lands where such development would pose hazards to life or property, or where important ecological functions or environmental quality would be adversely affected: (a) floodways of 100-year floodplains, (b) erosion hazard areas, (c) landslide hazards areas, (d) unique or significant wetlands or stream corridors, (e) fish and wildlife conservation areas, and (f) seismic hazard areas.
- **E-GD-3 Manage Development:** Encourage development standards in critical areas in accordance with the severity of natural constraints to reduce risks, minimize damage to life and property, and mitigate potential hazards.
- **E-ENF-4 Natural Features and Unstable Soil:** Carefully plan residential development in order that the city's natural features are preserved, if at all possible, and areas of unstable soil are not disturbed.

Local Laws, Regulations, and Policies Related to Geologically and Seismic Hazard Areas

The City of Tacoma and the City of Fife both include protection areas for geologically hazardous areas and seismic hazard areas as part of their environmentally critical areas governance as listed below.

- Tacoma Municipal Code (TMC) Chapter 13.11 governs areas of Tacoma that provide habitat for plants and animals including critical aquifer recharge areas, fish and wildlife habitat conservation areas, flood hazard areas, geologically hazardous areas, stream corridors, and wetlands.
- Fife Municipal Code (FMC) Title 17 protects areas in the city identified as critical areas from adverse impacts and incompatible land use. Critical areas include wetlands, critical aquifer recharge areas, fish and wildlife habitat conservation area, frequently flooded areas, geologically hazardous areas, and seismic hazard areas.

Tribal Law – Puyallup Tribe

Title 10 Chapter 10.04 of the Puyallup Tribal Law outlines the Tribe's Hazardous Waste Control Act for the beneficial stewardship of the land, air, and waters of the Reservation. While the cost of eliminating the potential threat to the environment from many hazardous waste sites in many

cases are beyond the financial means of the Tribal government, the Hazardous Waste Control Act is intended to provide for the cleanup of all hazardous sites and prevent the creation of future hazards from improper disposal of hazardous substances into the Reservation's air, land, and waters. The Act provides for the policy, enforcement, statement of liability, judicial review, and creation of a Toxics Control Account for monies that can be used to fund cleanup efforts.

3.2 Current Conditions

Background and History

The spuyaləpabš have lived on the headwaters of the Puyallup River since time immemorial. The Tribe has traditionally hunted, gathered, and fished throughout the Puget Sound. In 1854 the Treaty of Medicine Creek was signed where the Tribe ceded all of its traditional territory in exchange for a portion of land known today as the Puyallup Reservation. The Treaty set aside most of all the study area. Tacoma Tideflats for benefit of the Tribe and secured the land to house, sustain, and benefit the Puyallup people. Over the next century, the Tribe would see 99% of its lands sold off and taken which paved the way for non-native settlement and development.

Commercial and industrial activity in the Tacoma Tideflats study area dates back at least 140 years. Population and industrial activity first increased at the end of the nineteenth century, as logging, milling, fishing, and freight industries were booming. Land was modified in the study area to increase useable land and maintain shipping channels, as well as for flood control purposes. As elsewhere in Puget Sound, naturally occurring channels were dredged to deepen and straighten them, and sediments were deposited on adjacent lowlands to increase usable dry land. The Port of Tacoma was officially established in 1918, and the agency instituted an ambitious program to dredge and fill 240 acres of Commencement Bay tidelands a year later (Oldham 2020). The historic shoreline was much different than what is seen in recent history. Expansion and renovation of the waterways has been ongoing since its creation. Dredging, filling, and development significantly altered the study area for decades after. The Port undertook several initiatives during the 1920s, including granting a 30-year lease of harbor land to the American Smelters Securities Company to allow for expansion of the copper smelter that opened there in 1890. The Ruston smelter, later operated by the American Smelting and Refining Company (ASARCO), was for many years one of the largest employers in Pierce County and also a significant source of pollution (Magden 2020).

The Great Depression stymied Port of Tacoma development until the waterfront was largely given over to the military effort during World War II. By 1941, the Industrial Waterway located between the Puyallup River and the Hylebos Creek and Waterway had been extended to the southeast and the Department of Defense had constructed an aluminum smelting operation later purchased by Kaiser Aluminum & Chemical Corporation in 1947. In the early 1950s, the Port of Tacoma Commissioners embarked on further improvements to attract more development. They

dredged the Industrial Waterway, now known as the Blair Waterway, to accommodate larger ships. After a period of planning in the 1950s, dredging cranes and landfill reshaped the study area through the 1960s, while warehouses and manufacturing shops were constructed for newly arriving businesses. In 1967, the first Kaiser domes were built to store alumina and bauxite, the raw materials for the production of aluminum.

Geology

The study area is located within the southern end of the Puget Sound basin, an elongated, north-south trending depression in western Washington between the Olympic Mountain Range to the west and the Cascade Mountain Range to the east. The regional topography is characterized by a series of north-south trending ridges separated by deep troughs that were sculpted by thick extensive glaciers that advanced toward the south. As glaciers move, sediment is scraped off the ground and transported on top of, within, beneath, and in front of the ice, creating long and narrow hills and lakes and leaving glacial sediment deposits along the way. Glacial till (sediment deposited directly by the ice) and outwash (sediment deposited by meltwater in front of the glacier) make up most of what is found at or near the surface in these areas. Most glacial sediments in the Puget Sound area were deposited over as many as five different glacial advancements into the Puget Sound area within the last 2 million years, most recently about 15,000 years ago. Although glacial sediment covers a great deal of the Puget Lowland, isolated exposures of bedrock are found throughout. A wide variety of rock types are found in the Puget Lowland including volcanic, metamorphic (rocks that have formed under the extreme temperatures and pressures), and older marine sedimentary rocks that date back almost 400 million years (DNR 2020b). Exhibit 3-1 depicts the geologic deposits that have been mapped in and around the study area, with artificial fill dominating the near surface deposits of much of the study area.

Historically, the study area was a tidal marsh area that was part of a tributary system of streams and tidal channels that formed the lower delta area of the Hylebos Creek, Wapato Creek, and Puyallup River. Within the study area, the underlying deposits generally consist of the following:

- Artificial fill and dredged sediments as well as some debris and industrial waste fill.
- Marsh, tidal, and alluvial deposits including sands, silts, and clays.
- Glacial till and outwash.
- Bedrock.

According to U.S. Geological Survey (USGS) data, the depth to bedrock in the vicinity of the study area is between 500 and 600 meters (approximately 1,640–1,970 feet; USGS 1994). Located adjacent to Commencement Bay, the historic Tacoma Tideflats represents the farthest downstream end of the Puyallup-White River watershed that originates on Mount Rainier.

Exhibit 3-1 Geologic Deposits Mapped in and Around the Study Area

Source: ESA, 2020; BERK, 2020.

Geotechnical Hazards

Municipalities have designated geologically and seismic hazardous areas as part of their environmentally critical areas regulations, including areas within the Tideflats. Additional detail on these hazards is provided in this section.

Geotechnical hazards include the effects caused by seismicity or from geotechnical engineering characteristics of subsurface soils in terms of how capable they are of supporting new loadings (i.e., changes in the support of new structures, improvements, or even newly placed fill materials). Seismic hazards include the primary effects of earthquakes, such as ground displacement from fault rupture and ground shaking, as well as secondary effects, including liquefaction, settlement, tsunamis, and seiche waves, as described below. Volcanic hazard areas, settlement and subsidence, and landslides are also described.

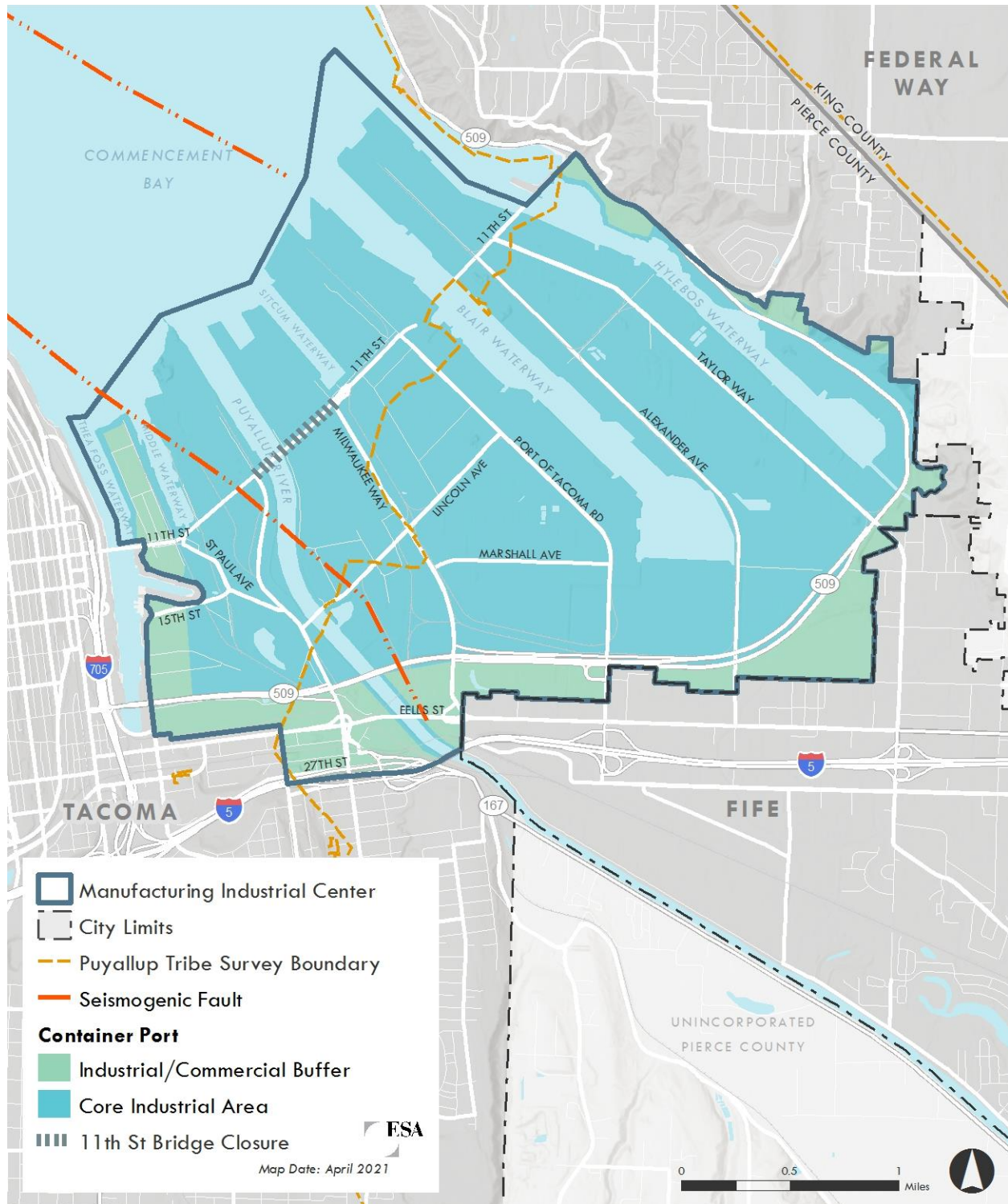
Seismic Hazards

The Puget Sound basin is located within a seismically active area dominated by the Cascadia Subduction Zone, which forms the boundary between two tectonic plates: the North American plate and the Juan de Fuca plate. The Puget Sound region has been subject to earthquakes in the past and will undoubtedly undergo seismic shaking again in the future. Earthquakes in the region result from one of three sources: the Cascadia Subduction Zone off the coast of Washington, the deep intra-slab subduction zone located approximately 20 to 40 miles below the Puget Sound area, or shallow crustal faults.

Several major fault zones traverse the Puget Sound region, including the Seattle Fault Zone and the Tacoma Fault Zone, the southern Whidbey Island Fault, and the Darrington–Devils Mountain Fault Zone (Exhibit 3-2). These faults are capable of producing substantive earthquakes and lie within densely populated areas. Strong ground shaking from a major earthquake can produce a range of intensities experienced at any one location and depend on a number of factors, including distance to the fault, depth of displacement, and characteristics of underlying materials. Ground shaking may affect areas hundreds of miles distant from the earthquake's epicenter.

The closest active crustal source is the Tacoma Fault Zone which falls within the study area. The Tacoma Fault Zone runs roughly east-west from Belfair through Vashon Island to near the city of Federal Way, with the eastern extent beyond Federal Way uncertain (USGS 2010). Local and regional experts have identified several strands of the Tacoma Fault Zone in the southern Puget Sound region, some that reach into and near the study area as seen in Exhibit 3.2. Changes in elevations of coastal marshes indicate that a large (approximately magnitude 7) earthquake occurred in this fault zone about 1,100 years ago. Deep quakes, like the magnitude 6.8 Nisqually, Washington, earthquake in 2001 and others like it in 1965 and 1949, tend to be much less damaging than shallow ones of comparable magnitude, like a surface breaking scenario earthquake that could occur in the Tacoma Fault Zone (USGS 2010). Strong ground shaking from a major earthquake can produce a range of intensities experienced at any one location. Ground shaking may affect areas hundreds of miles distant from the earthquake's epicenter.

Exhibit 3-2 Mapped Seismic Faults in the Study Area



The Seattle Fault Zone runs roughly east-west just south of downtown Seattle and runs roughly parallel to I-90. A fault is considered active when it has shown evidence of displacement within the last 11,600 years. An earthquake on the Seattle Fault poses substantial risk to the Puget Sound region. Deep quakes are the most common large earthquakes that have occurred in the Puget Sound region. Quakes larger than magnitude 6.0 occurred in 1909, 1939, 1946, 1949, 1965, and 2001 (PNSN 2020). However, shallow quakes can create more damage than deep quakes because of the proximity to the epicenter. Resulting damage from earthquakes depends on many factors including distance to epicenter, soil and bedrock properties, and the duration of shaking.

Basins containing thick deposits of unconsolidated materials can amplify earthquakes waves and cause far more damage to structures than the same waves passing through bedrock. As noted above, the depth to bedrock in the study area is relatively deep at between 500 and 600 meters. In addition, the study area includes large areas of undocumented fill where the geotechnical engineering characteristics are unknown and thus may be susceptible to higher ground shaking hazards without either the use of engineered fill, specially designed foundation types, or use of deep foundation systems (e.g., pile supports).

Fault Rupture

Earthquake-induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude, sense, and nature of fault rupture can vary for different faults or even along different strands of the same fault. Ground rupture is more likely along an active fault, which is defined as a fault exhibiting evidence of displacement (such as identified discontinuities within exposed deposits) within the last 11,600 years. The potential for surface fault rupture to adversely affect the study area is considered remote. However, a fault segment of the Tacoma Fault Zone intersects the study area for which Quaternary-age (up to 2.5 million years ago) deformation is suspected, but for which insufficient evidence has been observed to support this determination (Exhibit 3-2). This is considered a Class B fault where the fault might not extend deeply enough to be a potential source of significant earthquakes, or the currently available geologic evidence is not strong enough to assign it as an active fault. Therefore, the potential for fault rupture to occur in the study area is low.

Liquefaction

Liquefaction occurs where surface soils are primarily loose, granular in consistency, and located below the water table. Saturated loose soils that are generally within 50 feet of the ground surface are at most risk of liquefaction. Liquefaction is of particular concern because it has often been the cause of damage to structures during past earthquakes. The consequences of liquefaction include loss in the strength and settlement of the soil. The loss of strength can result in lateral spreading, bearing failures, or flotation of buried vaults and pipes. Typical of marshland and tidal areas, soils in low-lying areas near bodies of water can contain enough saturated sandy sediments that they are commonly susceptible to liquefaction. According to mapping

compiled by the Washington State Department of Natural Resources (DNR), the entire study area is susceptible to liquefaction hazards (DNR 2003).

Tsunami and Seiche Waves

Tsunami and seiche waves are possible secondary effects that can occur from seismic events or other large displacements of materials. Tsunamis, often incorrectly described as tidal waves, are sea waves usually caused by the displacement of the ocean floor. Typically generated by seismic or volcanic activity or by underwater landslides, a tsunami consists of a series of high-energy waves that radiate outward like pond ripples from the area where the generating event occurred. For the Puget Sound region, either a large subduction zone quake off the coast or along the Seattle or Tacoma Faults could produce a tsunami. In the case of a subduction zone quake, a tsunami would travel from the coast through the Strait of Juan de Fuca into Puget Sound, and then south. Numerical modeling of tsunamis generated by earthquakes on the Seattle Fault and the Tacoma Fault show that the City of Tacoma would be subjected to larger and more damaging tsunami waves from a Seattle Fault earthquake (USGS 2010). While the Seattle Fault is considerably more distant than the Tacoma Fault, the Seattle Fault traverses Puget Sound in much deeper water and can therefore displace more water, resulting in bigger tsunami waves.

Seiche waves consist of a series of standing waves of an enclosed body or partially enclosed body of water caused by earthquake shaking, similar to what could be described as sloshing action. Seiche waves can affect harbors, bays, lakes, rivers, and canals. Both Puget Sound and Lake Washington have experienced seiche waves in 1891, 1949, and 1964. The “sloshing” effect of a seiche event can damage facilities close to the water and could potentially be experienced within Commencement Bay.

The Washington Geological Survey’s tsunami hazards database maps inundation extents for a variety of earthquake scenarios, including a Cascadia Subduction Zone magnitude 9.0 scenario, and other scenarios that include modeled inundation extents for local crustal earthquakes on the Tacoma and Seattle Faults. The entire study area is located in an area that could be inundated in a tsunami event (Exhibit 3-3**Error! Reference source not found.**; DNR 2020a). According to a more detailed evaluation, with the modeled scenario of a 7.3 magnitude earthquake on the Seattle Fault (considered the worst-case credible event), the study area would experience inundation ranging from less than 0.5 meter (approximately 1.6 feet) up to as much as 5 meters (approximately 16 feet) (DGER 2009).

Volcanic Hazard Areas

Volcanic hazard areas are subject to debris flow and debris avalanche zones as a result of a volcanic eruption. This study area falls within the volcano hazard area of Mount Rainier. Hazard zones are assessed on the basis of a likely occurrence of a volcanic event occurring on a low or less than 500- to 1,000-year frequency, moderate or 500- to 1,000-year frequency, or high based on a 100- to 500-year frequency. The entire Puyallup River valley is subject to a high or 100- to 500-year volcanic eruption frequency including most of the study area.

Map of Tacoma, Washington, showing modeled tsunami hazard areas. The map includes Commencement Bay to the west, the Puyallup River flowing through the city, and various streets like 11th St, 15th St, and 27th St. A thick black line outlines the Manufacturing Industrial Center. Yellow areas indicate modeled tsunami hazard. A legend in the bottom left defines symbols for the industrial center, city limits, Puyallup Tribe Survey Boundary, Container Port, Industrial/Commercial Buffer, Core Industrial Area, and 11th St Bridge Closure. The map is dated April 2021 and includes a scale bar and north arrow.

AUGUST 2021

Settlement and Subsidence

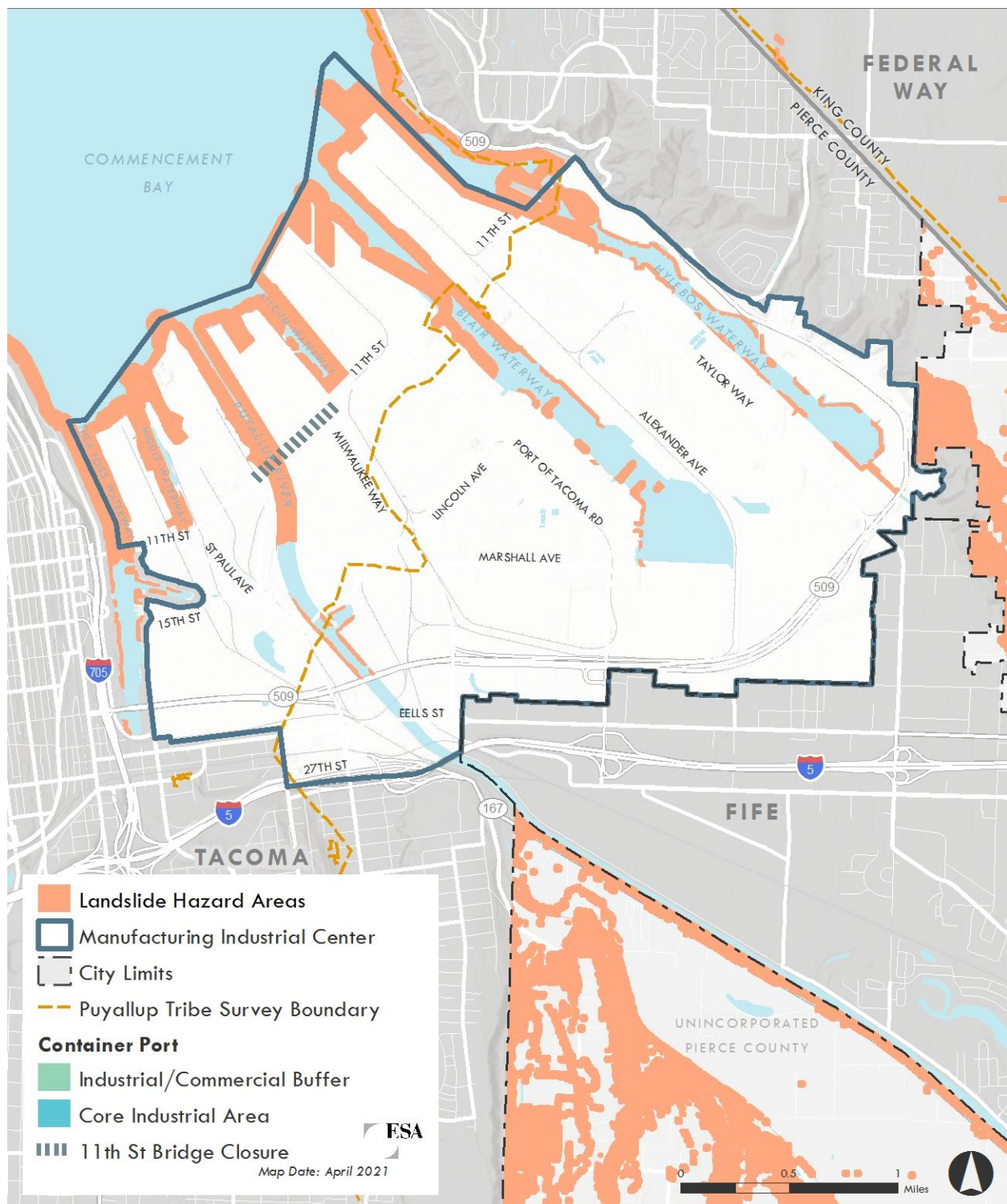
Soft soil conditions can also be a form of geologic hazard, causing subsidence or settlement over the short or long term. Soft soils are characterized by low strengths and are compressible when exposed to exerting forces such as a new building or placement of fill. Without appropriate design consideration, soft soils can lead to embankment failures during construction or long-term settlement after construction if left unaddressed. The presence of soft soils or soils that are not suitable to support new loadings (i.e., placement of buildings or fill) can only be determined on a site-specific basis through geotechnical engineering observation and laboratory testing of subsurface materials typically performed in a geotechnical analysis conducted as part of the building permit.

Landslides

Landslide hazard areas are typically mapped where there is evidence of past landslides, where the slope is 15% to 40% and the soils are underlain by silt or clay that can perch groundwater, or where the slope is steeper than 40%, regardless of soil type. Hillsides that intersect geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock are also considered susceptible to landslides, along with slopes that are parallel or sub-parallel to planes of weakness, such as bedding planes, joint systems, and fault planes in subsurface material. Other types of areas susceptible to landslides include areas with slopes containing soft or liquefiable soils or considered at risk of mass movement due to seismic events, such as much of the shoreline areas of the study area. While largely level with little topographic relief, the study area does in fact include areas mapped as prone to landslides, as shown in Exhibit 3-4.

Hazardous Materials

Due to the past and current industrial uses in the Tideflats, the likelihood of encountering hazardous materials in the Tideflats is high. The Earth section of this baseline report provides basic definitions and information on how hazardous materials may impact earth resources and provides definitions for potential hazardous materials that may be common in the area and how to locate databases to find them. Section 13 on Public Services provides more detailed information on hazardous materials from activities in the Tideflats and discusses licensing, and emergency response plan responses.

Exhibit 3-4 Mapped Landslide Hazard Areas in the Study Area

Source: City of Tacoma, 2019.

Definition

A hazardous material is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. The term hazardous materials refers to both hazardous substances and hazardous wastes. Under federal and state laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). Hazardous wastes are hazardous substances that no longer have practical use, such as materials that have been spent, discarded, discharged, spilled, contaminated, or are being stored until they can be disposed of properly. The Occupational Safety and Health Administration (OSHA) defines a hazardous material as any substance or chemical that is a “health hazard” or “physical hazard,” including the following:

- Chemicals that are carcinogens, toxic agents, irritants, corrosives, or sensitizers.
- Agents that act on the hematopoietic system.
- Agents that damage the lungs, skin, eyes, or mucous membranes.
- Chemicals that are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive, or water-reactive.
- Chemicals that in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists, or smoke that may have any of the previously mentioned characteristics. (29 CFR Subpart H, Section 1910.120).

In addition, according to the City of Tacoma, “Hazardous Materials” means the activity of manufacturing, processing, storing, or disposing of hazardous materials, classified in the UN Hazard Classification System, as follows: (1) Explosives; (2) Gases; (3) Flammable liquids; (4) Flammable solids; (5) Oxidizing substances and Organic peroxides; (6) Toxic and Infectious substances; (7) Radioactive materials; (8) Corrosive substances; and (9) Miscellaneous hazardous materials, products, substances, or organisms in amounts requiring a permit from the Tacoma Fire Department, the Washington State Department of Ecology, the Tacoma Pierce County Health Department, or any amounts requiring a license from the state of Washington.

Potential Receptors/Exposure

The sensitivity of potential receptors in the areas of known or potential hazardous materials contamination is dependent on several factors, the primary factor being the potential pathway for human exposure. Exposure pathways include external exposure, inhalation, and ingestion of contaminated soil, air, water, or food. The magnitude, frequency, and duration of human exposure can cause a variety of health effects, from short-term acute symptoms to long-term chronic effects. Potential health effects from exposure can be evaluated in a health risk assessment. The principal elements of health risk assessments typically include the following:

- Evaluation of the fate and transport processes for hazardous materials at a given site.

- Identification of potential exposure pathways.
- Identification of potential exposure scenarios.
- Calculation of representative chemical concentrations.
- Estimation of potential chemical uptake.

Database Review

The study area has historically been used for industrial and commercial purposes for over 140 years and is currently heavily developed for commercial and industrial use. The transport, storage, use, and disposal of hazardous materials and hazardous waste are commonly associated with these types of land uses. With the long history, there is a high concern for past industrial and commercial land uses to have released hazardous materials and/or wastes to the subsurface. Prior to more modern environmental practices, it was common for industrial activities to dispose of hazardous waste without regard to environmental concerns.

A regulatory database review by GeoSearch (GeoSearch 2020) was conducted for the study area in general accordance with the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments (E 1527-13), with the exception that the search was limited to the study area boundary rather than including areas beyond. The vast number of records identified just within the study area made the search outside of the boundary a reduced concern. The study area was divided into four separate subareas due to the large volume of records that were discovered. The full GeoSearch reports and radius, topographic and orthographic maps for each of the four mapped areas are available in electronic format from the City of Tacoma Planning Department. There is also a GIS resource of the data available for use.

The databases reviewed of the study area for which sites/cases were identified are included in the following summary lists.

Federal

- Brownfields Management System – 1
- Emergency Response Notification System (ERNSWA) List – 876¹⁴
- Engineering Institutional Control Sites– 5
- National Priorities List (NPL) (Superfund) – 2
- No Longer Regulated Corrective Action Treatment, Storage, and Disposal (CORRACTS TSD) Facilities – 1
- RCRA Sites with Controls – 5
- RCRA Corrective Active Facilities – 11
- RCRA Generators List – 45
- RCRA non-CORRACTS TSD Facilities List – 13

¹⁴ Total number of cases includes both locatable and un-locatable database entries. Un-locatable entries refer to database entries that do not have a street address associated with them.

- RCRA Non Generators – 286
- RCRA Subject to Corrective Action Facilities– 3
- Enterprise Superfund Management System – 39
- Enterprise Superfund Management System Archived– 12
- Aerometric Information Retrieval System/Air Facility Subsystem – 31
- Alternative Fueling Stations – 3
- Biennial Reporting System – 152
- Clandestine Drug Laboratory Locations – 2
- EPA Docket Data – 22
- Enforcement and Compliance History System – 442
- Formerly Used Defense Sites – 2
- Hazardous Materials Incident Reporting System – 191
- Hazardous Waste Compliance Docket Facilities – 1
- Integrated Compliance Information System –208
- Integrated Compliance Information System National Pollutant Discharge Elimination System (NPDES) – 190
- Mine Safety and Health Administration Master Index File – 2
- National Pollution Discharge Elimination System – 112
- Polychlorinated Biphenyl (PCB) Activity Database System – 19
- Permit Compliance System – 108
- Record of Decision System – 5
- Section Seven Tracking System – 4
- Toxic Substances Control Act Inventory – 91
- Toxics Release Inventory – 41

State

- Aboveground Storage Tanks – 8
- Brownfield Sites – 3
- Confirmed and Suspected Contaminated Sites List – 146
- Hazardous Sites List – 68
- Institutional/Engineering Controls Registry – 216
- Landfill and/or Solid Waste Disposal Sites – 51
- Leaking Underground Storage Tanks – 80
- Petroleum Technical Assistance Program Sites - 1
- Underground Storage Tanks – 135
- Voluntary Cleanup Sites – 41
- Air Permitted Facilities – 14
- Facility/Site Database – 738
- No Further Action Sites – 94
- Recycling Facilities – 64
- Spills Listing – 1,235
- Underground Injection Control Wells – 8

- Water Quality Permits – 516
- Tacoma Smelter Plume – 1
- Tacoma Pierce County Historic Gas Stations – 45
- Tacoma-Pierce County Closed Landfills – 5

A total of 6,395 database entries were identified in the study area. Many of the databases reviewed include those that list sites with known or reported releases of hazardous materials into the environment (e.g., Brownfields Management System, Emergency Response Notification System, Hazardous Materials Incident Reporting System, NPL, RCRA Corrective Action Facilities, Superfund Enterprise Management System, Confirmed and Suspected Contaminated Sites List, Leaking Underground Storage Tanks, Spills Listing, and Voluntary Cleanup Program Sites).

Other databases focus on sites that have identified uses of hazardous materials or generation of hazardous wastes and not necessarily any known releases (e.g., Biennial Reporting System, Integrated Compliance Information System NPDES, Mine Safety and Health Administration Master Index File, NPDES, PCB Activity Database System, Community Right to Know Tier II reporting, Toxics Release Inventory, Toxic Substances Control Act Inventory, RCRA Generators list, Aboveground Storage Tanks, Underground Storage Tanks, solid waste disposal sites, and identified underground storage tank sites).

In addition, other database listings of note are the Federal Engineering Institutional Control Sites and RCRA Sites with Controls, where engineering controls such as legal controls or land caps, barriers, or other device engineering controls have been implemented to prevent access, exposure, or continued migration of contamination.

The Tacoma Smelter Plume database is maintained by Ecology in relation to the former copper mining smelter plant operated by ASARCO in nearby Ruston, Washington. Operational emissions from the ASARCO smokestack deposited lead and arsenic in surface soils over an area covering approximately 1,000 square miles that includes the whole of the study area.

The NPL (otherwise known as the Superfund database) includes Commencement Bay as an area associated with a long history of dredging and industrial activities that have adversely affected sediments in the nearshore and uplands. See Exhibit 3-5 for the location of Superfund sites and also the location of 303-listed Water Bodies. The term "303(d)" list is short for a state's list of impaired and threatened waters. States are required to submit their list for EPA approval every two years as part of the Clean Water Act. Nearly 300 industries have produced a variety of hazardous substances such as solvents, metals, PCBs, pesticides, and polycyclic aromatic hydrocarbons (PAHs) that end up in the air, surface, and groundwater, as well as the sediments and soils of the Commencement Bay area (U.S. Department of the Interior 2020). Concentrations of 100 to 1,000 times those in reference areas were measured for 28 contaminants or contaminant groups. This widespread contamination led the EPA to list the site (Commencement Bay) in 1981 as a Superfund site. Contaminants released from activities such as ship building and repair, timber-related pulp and kraft milling, oil refining, chemical manufacturing and storage, aluminum and specialty ore smelting, and automotive repair and recycling have impacted fish and wildlife of South Puget Sound. These

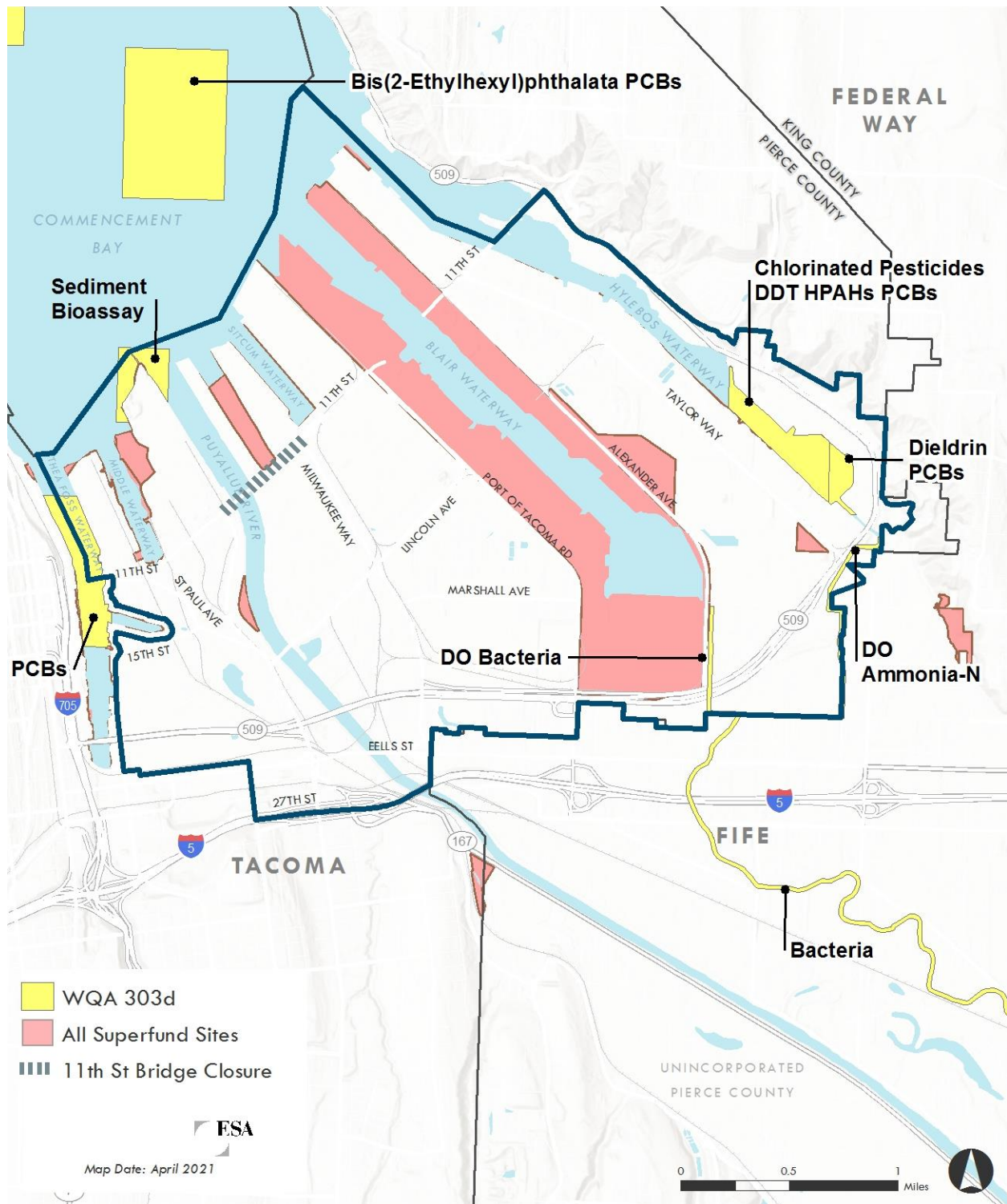
contaminant-related impacts include fishery closures and warnings, exceedances of state water and sediment quality standards, fin erosion, tumors in fish, reproductive and behavioral effects, suppressed disease resistance, and reduced populations (EPA 2020).

Landward areas of Commencement Bay that were created through the placement of dredged sediments have a potential for being built up with contaminated sediments. According to a representative of the Port of Tacoma, there is somewhat of a generalized distinction between the dredged sediments used for fill prior to World War II that are considered relatively clean, and those from after the war through the 1970s, which had a higher potential for being contaminated (Healy 2020).

Other local regulatory programs include the following:

- **Abandoned Commercial Tanks (ACTs):** The Tacoma-Pierce County Health Department identifies ACT sites at former gas station locations that are potentially contaminated from on-site historical activities for which there are no records of storage tank removal or environmental cleanup.
- **Confirmed and Suspected Contaminated Sites:** The Tacoma-Pierce County Health Department has also identified sites where storage tanks have been removed, and sites for which Ecology has recorded a cleanup. These cleanup sites may or may not have been gas stations and could have supported industrial activities, such as laundries and vehicle maintenance shops, that contributed contaminants.
- **Leaking Underground Storage Tanks (LUSTs):** Ecology maintains a database of leaking underground storage tanks (LUSTs). While many of these tanks have been removed, the status indicates that contamination remains. Ecology also tracks various “contaminated sites,” including USTs and other miscellaneous spills.

Sites with known releases of hazardous materials or wastes can be in varying stages of investigation and cleanup, from attempting to determine the lateral and vertical extent of contamination up to nearing completion of remediation. In some cases, institutional engineering controls have been selected as the most effective remediation strategy by leaving contaminated subsurface materials in place but preventing migration and any exposure routes through the construction of impenetrable layers, walls, or land caps. Additional controls such as limitations on land use (e.g., restrictions from any residential uses) and notification requirements prior to any subsurface earthwork are emplaced to protect future workers and inhabitants. For example, a number of Port properties within the study area include an engineered cap or confined disposal facility that would limit any changes to future uses (Healy 2020).

Exhibit 3-5 303d-Listed Waterbodies and Superfund Sites in the Study Area

Source: ESA, 2020.

Overall, the number of environmental database entries that are listed for the entire study area is considerable. While not all of these entries are indications of the presence of high concentrations of contaminants that could adversely affect future workers, visitors, or occupants, their number demonstrates a high potential for encountering either known or unknown contaminants of concern. As a result, any future change in land use or proposed development or redevelopment throughout the study area should be required to conduct a site-specific evaluation of environmental conditions in the subsurface prior to construction.

3.3 Key Findings and Implications for Plan

The following topics related to earth and contamination & remediation should be considered in the development of the Tacoma Tideflats Subarea Plan:

- Future planning should consider the locations of confirmed and suspected contaminated sites that are present throughout the study area. Site-specific evaluation prior to development or redevelopment is recommended.
- Seismic hazards area in the Tideflats area are associated with the major fault zones that traverse the Puget Sound region. Thick deposits of unconsolidated materials and the presence of unknown fill areas, as found in the study area, can amplify earthquakes waves and cause far more damage to structures than the same waves passing through bedrock. The entire study area is also susceptible to liquefaction hazards, which has often been the cause of damage to structures during past earthquakes. This risk should be considered in future land use planning and building code standards.
- Due to potential geohazard risks, critical facilities should be located outside of the Tacoma Tideflats area when possible. Critical facilities include emergency services (such as police stations and fire stations), medical facilities (such as hospitals and nursing homes), schools and daycare centers, or facilities that store toxic materials. Some critical facilities may not be located outside of the Tacoma Tideflats such as port terminals and the fire stations that serve them. If located in the Tideflats, critical facilities may require additional protection from geohazard risks.
- Many of the uses are water-dependent and inherently located in areas that are exposed to geohazards and are subject to environmentally critical areas regulations. The Subarea Plan should take into account the Environmental Policy Elements in the City of Tacoma Comprehensive Plan and the City of Tacoma and City of Fife municipal codes for environmentally critical areas including landslide hazards areas found on the steep hillsides on the east and west sides of the study area and along much of the shoreline area within the study area.
- There may be funding sources available for clean-up work through local, state, and federal agencies. These may include grants or low-interest loans, including funding for Brownfields development through special agency programs. Additional funding for removal of commercial

underground storage tanks and associated contaminated soils is available through the Washington state Pollution Liability Insurance Agency (PLIA).

4 STORMWATER AND WATER QUALITY

This chapter describes the existing conditions for stormwater and water quality within the Tideflats study area. It includes a discussion of existing policies, plans, and regulations; existing stormwater and water quality conditions; and key findings and implications for the Subarea Plan (the Plan). Information contained in this section is based on readily available secondary sources of data; primary research, such as project-specific water quality monitoring or modeling, has not been conducted as part of this analysis.

4.1 Existing Policies and Regulations

Stormwater and water quality in the study area are regulated at the federal, state, tribal, and local levels, as described below. In the discussion below, it is worth noting that some federal environmental regulations and permitting related to stormwater and water quality are administered at the state and local levels.

Federal Regulatory Requirements

The purpose of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The CWA established the National Pollutant Discharge Elimination System (NPDES) in 1972 (33 U.S.C. §1251 et seq.). In Washington State, this program is administered by the Washington State Department of Ecology (Ecology) on non-federal, non-Tribal lands. On federal and Tribal lands, the NPDES program is administered by the U.S. Environmental Protection Agency (EPA). The NPDES program is described in more detail below.

Under Section 401 of the CWA, a federal agency may not issue a license or permit for an activity that may result in a discharge into a water of the United States without a water quality certification or waiver (EPA 2020a). In Washington, Ecology administers Section 401 water quality certification with authority to set conditions for projects, actions, and activities potentially affecting water quality (Ecology 2020c). Projects subject to Section 401 include but are not

limited to channel and waterway dredging, hydropower, wetland protection during site development, and shoreline development such as new piers and structures.

Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the United States, including wetlands. This includes fill placement for development and infrastructure projects. Section 404 requires a permit before dredged or fill material may be discharged, unless an activity is exempt (such as certain farming and forestry practices). The U.S. Army Corps of Engineers (Corps) is the permitting authority for Section 404 (EPA 2020b).

The purpose of the Rivers and Harbors Act is to ensure the free flow of interstate commerce on navigable waters. Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. 403) regulates the construction of wharves, piers, dolphins, jetties, bulkheads, and other structures in ports, harbors, navigable rivers, and other waters of the U.S., and restricts the placement of fill and modifying water courses (EPA 2020c). The Corps is the permitting authority for Section 10.

State Regulatory Requirements

Surface Water Quality Standards

Washington's surface water quality standards are the basis for water quality protection in the state, implementing portions of the CWA. Chapter 173-201A of the Washington Administrative Code (WAC) states *"the purpose of this chapter is to establish water quality standards for surface waters of the State of Washington consistent with public health and public enjoyment of the waters and the propagation and protection of fish, shellfish, and wildlife.... All surface waters are protected by numeric and narrative criteria, designated uses, and an antidegradation policy."* Ecology applies the surface water quality standards to set pollution limits in water quality permits (see the *National Pollutant Discharge Elimination System* section, below).

National Pollutant Discharge Elimination System (NPDES)

Ecology developed and administers provisions of the federal Clean Water Act NPDES Municipal Stormwater Permits for Washington (Ecology 2020a). Under this program, local governments are required to manage and control stormwater runoff so that downstream waters are not polluted by uncontrolled stormwater discharges. The NPDES program uses a phased approach and started with larger systems such as City of Tacoma and Pierce County as part of Phase 1 (those with populations greater than 100,000). The NPDES program also applies to public entities that own Municipal Separate Storm Sewer Systems (MS4s) located in a Phase 1 city or county, as well as other jurisdictions and special taxation districts (such as the Port of Tacoma). Phase 2 of the NPDES program applies to smaller municipalities, including the City of Fife (City of Fife 2019).

Jurisdictions operating under NPDES Municipal Stormwater Permits must implement requirements for new and redevelopment in order to comply with their NPDES permit. To meet this requirement, municipalities develop stormwater management guidance documents (e.g., manuals) that Ecology

judges are equivalent to the Stormwater Management Manual for Western Washington (Ecology 2019). Several stormwater manuals could apply within the Tideflats study area, depending on whether a given project site is located on Port of Tacoma property, Puyallup Tribal land, City of Tacoma land, or adjacent City of Fife land. The City of Tacoma's Stormwater Management Manual is the primary manual used by Tideflats projects. The Port of Tacoma does not have its own manual.

Another component of the NPDES program is that discharge permits are issued when stormwater is discharged to a designated Water of the State from non-municipal systems and construction sites. Municipal Stormwater Permits (as described above) are for agencies that discharge from public stormwater systems, such as underground pipes that discharge to a waterbody. Industrial Stormwater Permits are required for operations with manufacturing, industrial, and certain transportation uses, and are issued by Ecology to the site operator or owner if the owner is also the operator. Construction Stormwater General Permits are required when construction activities disturb 1 acre or more of land and are also issued by Ecology.

The Industrial Stormwater General Permit (ISGP) is a standard form discharge permit required for operations (facilities) that discharge stormwater from industrial activities described by Table 1 of the permit. The permit establishes requirements that include developing a site-specific Stormwater Pollution Prevention Plan (SWPPP) and Spill Control Plan, benchmarks for target pollutants in discharges, monitoring and sampling procedures, quarterly and annual reporting to Ecology, and Corrective Action procedures that apply when discharges exceed target benchmarks or water quality limits. Ecology updates the ISGP on a five-year cycle; the current permit went into effect on January 1, 2020 and expires December 31, 2024 (Ecology 2020b). Facility operators use their North American Industry Classification System (NAICS) codes to determine whether they are required to have ISGP coverage (in a maritime setting, most industrial, manufacturing, repair facilities, and transportation uses will trigger the permit), and which specific pollutants they must sample. Under the ISGP, all facilities must sample turbidity, pH, oil sheen, copper, and zinc in their site discharges. Specific industries must sample additional parameters. For example, the timber products industry must measure chemical oxygen demand (COD) and total suspended solids (TSS) in discharges, and transportation facilities must sample petroleum hydrocarbons (diesel fraction).

Washington Department of Fish and Wildlife

Chapter 77.55 of the Revised Code of Washington (RCW) regulates construction projects in state waters. The Washington Department of Fish and Wildlife (WDFW) administers the Hydraulic Project Approval (HPA) permit that is required for hydraulic projects in or near state waters. The HPA ensures that construction is done in a manner that protects fish and their aquatic habitats. (WDFW 2020).

Washington State Department of Transportation

The Washington State Department of Transportation (WSDOT) is responsible for stormwater within the property and rights-of-way owned by WSDOT, including the SR 509 corridor, which is within the Tideflats study area. Similar to the Port, WSDOT has its own NPDES permit and is responsible for reviewing and permitting projects within its properties. The WSDOT Highway Runoff Manual establishes stormwater regulations and design requirements for WSDOT projects (WSDOT 2019).

WSDOT is currently in the early construction phases of the SR 167 Completion Project. When completed, the project will include a 2-mile connection from I-5 to the Port of Tacoma that will tie into SR 509 in the southeast quadrant of the Tideflats study area.

Tribal Requirements

Puyallup Tribe of Indians

Much of the Tideflats study area lies within the Puyallup Indian Reservation, as established in the 1854 Treaty of Medicine Creek. The Tribe asserts its right to consult on projects near and within the boundaries of the reservation. Tribal lands are categorized as Tribal trust or Tribal fee lands. Federal regulations (such as the NPDES program) apply to all Tribal lands. Some State and local regulations apply to Tribal fee lands on reservation, but not to Tribal trust land. The Tribe has jurisdiction over Tribal fee lands on reservation in Tribal ownership.

On Puyallup Tribal trust lands, non-federal regulations and requirements related to stormwater and water quality are administered by the Tribe. In many cases the Tribe will coordinate with the local jurisdiction adjacent to the property and apply those requirements when practical and feasible. The Tribe is developing interim and long-term standards and requirements as part of a pending Comprehensive Land Use Plan that will apply to Tribal trust lands (Naylor, pers. comm., 2020). On Tribal trust lands, NPDES requirements are administered by the EPA.

Water quality is very important to the Puyallup Tribe and is a focal point of project reviews for projects on-reservation and within the treaty area. The Tribe requires sites to implement stormwater controls for flow control where possible and enhanced water quality treatment¹⁵ through new and redevelopment, and by retrofitting existing facilities.

¹⁵ Enhanced water quality treatment is a term used in Washington State that refers to a standard level of stormwater treatment that targets the removal of metals, such as zinc and copper, in addition to suspended sediment (TSS), and is typically required for industrial/manufacturing sites.

Local Plans, Policies, and Regulatory Requirements

City of Tacoma

Stormwater management in Tacoma is managed by the City Public Works Department's Surface Water and Environmental Compliance Sections of the Environmental Services, Science, and Engineering Division. Responsibilities include the following: The Environmental Services Department is the Utility that manages surface water in Tacoma.

- Inspecting business activities and permitting and inspecting new construction projects.
- Collecting and evaluating stormwater and sediment quality monitoring data.
- Mapping, maintaining, and cleaning a stormwater system that includes approximately 575 miles of storm pipe, 10,000 manholes, 18,300 catch basins, 400 outfalls, 4 pump stations, and 47 stormwater ponds and other treatment and flow control facilities.
- Rehabilitating and replacing aging infrastructure and improving the storm system with capital projects to address identified water quantity and quality issues.
- Providing public education about stormwater and surface water management and sharing information with staff from federal, state, and neighboring municipal governments, environmental groups, businesses, and interested citizens.
- Participating in regional watershed councils and committees.
- Ensuring that City activities and operations are in compliance with NPDES permit requirements.
- In the Tideflats study area, the City of Tacoma has jurisdiction for stormwater for properties that are within the City limits. The City owns and operates much of the stormwater infrastructure, including collection and conveyances for stormwater generated within the streets of the City right-of-way. The City reviews and regulates new development and redevelopment of City-owned right-of-way, and also stormwater systems that discharge to the City-owned facilities.

City of Tacoma Comprehensive Plan Environmental Policy Element

The Environmental Policy Element of Tacoma's Comprehensive Plan (2019) identifies the goals, policies, guidelines, and requirements of the State Growth Management Act (GMA) (RCW 36.70A.170) "*to designate and classify ecologically sensitive and hazardous areas and to protect these areas and their functions and values, while also allowing for reasonable use of private property.*"

The Environmental Policy Element establishes the following policies regarding water quality:

- **E-WQ-1 Water Quality:** Recognize the need for an increase in the level of sewage treatment and potential treatment of stormwater to meet the NPDES Phase I Municipal Stormwater permit requirements.

- **E-WQ-2 Retain Vegetation Near Water:** Encourage the retention of natural vegetation along lakes, ponds, and streams, where appropriate, to help preserve water quality, protect fishery resources, and control erosion and runoff.
- **E-WQ-3 Shoreline:** Encourage cooperation between public and private efforts in the management and development of Tacoma's shorelines.
- **E-SWR-1 On-Site Retention Facilities:** Encourage the use of on-site retention and water quality facilities that are designed in accordance with the City's Surface Water Management Manual (now called the Stormwater Management Manual) where not prohibited by identified critical drainage areas and the South Tacoma Groundwater Protection District.
- **E-SWR-2 Natural Watercourses:** Prohibit any filling of natural watercourses without adequate mitigation, proper environmental processing and permitting, and provisions to accommodate the existing drainage through the modified watercourse in accordance with the City's regulations.
- **E-SWR-3 Natural Land Features and Erosion:** Protect existing natural gulches, watercourses, ravines, and similar land features from the adverse erosional effects of increased stormwater runoff that is generated by new development.

Stormwater Management Manual

Stormwater requirements of the City are identified in the Stormwater Management Manual (SWMM) (City of Tacoma 2016), which will be updated in 2021 as part of the City's municipal NPDES permitting with Ecology. The SWMM establishes the Minimum Requirements for New and Redevelopment. Depending on the size and type of a proposed project, different combinations of these Minimum Requirements (MR) may apply (City of Tacoma 2016):

- MR-1: Preparation of Stormwater Site Plans
- MR-2: Construction stormwater pollution prevention
- MR-3: Source control of pollution
- MR-4: Preservation of natural drainage systems and outfalls
- MR-5: On-site stormwater management
- MR-6: Runoff treatment
- MR-7: Flow control
- MR-8: Wetlands protection
- MR-9: Operation and maintenance
- MR-10: Off-site analysis and mitigation

Per the SWMM, some types of activities are exempted from the minimum requirements. These include pavement maintenance, underground utility projects, minor clearing and grading, and emergency projects. The minimum threshold that triggers requirements for new development is 2,000 square feet of new, replaced, or new plus replaced hard surface area, or 7,000 square feet of land-disturbing activity.

The City defines redevelopment as development on a site that is already substantially developed with 35% or more hard surfaces. For redevelopment (the more common scenario in the Tideflats study area), replaced hard surfaces are not required to be brought up to current code unless specific money or space thresholds are exceeded. All redevelopment must comply with MR-2 by providing construction stormwater controls. The MR-9 Operations and Maintenance requirement applies to any project where a permanent stormwater facility exists or is proposed. The MR-10 Off-site analysis requirement may apply to projects that increase the amount of stormwater runoff to the downstream stormwater system.

Additionally, Minimum Requirements 1-5 are applied to new and replaced hard surfaces and disturbed land if the project results in 2,000 square feet of new plus replaced hard surface area or 7,000 square feet of land disturbing activity. Furthermore, for new hard surfaces and converted vegetation areas Minimum Requirements 6-10 are applied when the project adds 5,000 sf or more of new hard surfaces, or 0.75 acre of natural vegetation converted to lawn or landscape, or 2.5 acres of native vegetation to pasture. When applying these thresholds, the City considers the cumulative impacts of all hard surfaces constructed since January 1, 2003.

In addition to the above requirements that apply for new hard surfaces and converted surfaces (vegetation to hard surfaces), there is a monetary threshold which if exceeded triggers all 10 Minimum Requirements for new, converted, and replaced hard surfaces. This criterion is that the total of new plus replaced hard surfaces is 5,000 square feet or more and the value of the proposed improvements (including interior improvements) exceeds 50% of the assessed value of the existing site improvements.

The SWMM provides guidance for each watershed as to the requirements that are expected to apply to new and redevelopment in those areas. Three of the requirements pertinent for the Tideflats study area (because of site locations, existing infrastructure, and receiving bodies) are described below. The requirement's in the City of Tacoma's SWMM are as stringent or more than with the Department of Ecology's Stormwater Management Manual for Western Washington.

On-site Stormwater Management

On-site Stormwater Management best management practices (BMPs) are practices that infiltrate, disperse, and / or retain stormwater runoff on-site. These BMPs can be selected by applying approved lists to identify specific practices or the stormwater designer can demonstrate compliance with the Low Impact Development (LID) Performance Standard by conducting stormwater modeling of whichever practices are proposed for the site. Pertinent to the Tideflats study area, the SWMM establishes approved BMPs to consider when projects discharge to marine waters and waterbodies that are classified as flow control exempt, a common condition within the Tideflats study area. Roof Downspout Controls BMPs are listed and a separate list is provided for Other Hard Surfaces. Bioretention, rain gardens, permeable pavement, and full dispersion do not have to be considered when developing stormwater plans for these sites (that discharge to marine waters).

Water Quality

Enhanced water quality treatment is required for projects that discharge to sensitive habitat areas. The reader is referred to SWMM Figure 1-4 that shows Natural Resource Damage Assessment (NRDA) areas and other sensitive habitat areas proximate to the Tideflats study area. Because of the wide distribution of these through the study area, some projects under City jurisdiction will likely have to meet the enhanced treatment requirements.

Flow Control

Flow control is intended to reduce project runoff rates in order to protect freshwater resources and City infrastructure. For projects that discharge to freshwater bodies within the Tideflats study area, the Mitigation – Existing Condition standard is applied; hydrologic modeling must demonstrate that discharges match developed discharge durations to existing discharge durations for the range of existing discharge rates from 50% of the 2-year return period flowrate up to the full 50-year return period flowrate.

For projects that discharge to a capacity-limited system, the Infrastructure Protection Requirement applies. This can be met by demonstrating downstream capacity (with hydraulic computations) to convey fully developed design flowrates, discharging to a City-owned and identified trunk main, increasing hard surfaces by less than 5,000 square feet, or increasing hard surfaces less than 10,000 square feet and discharging to a 12-inch minimum diameter pipe system. The SWMM presents additional detailed information on how to determine the specific flow control requirements for a given site.

Port of Tacoma

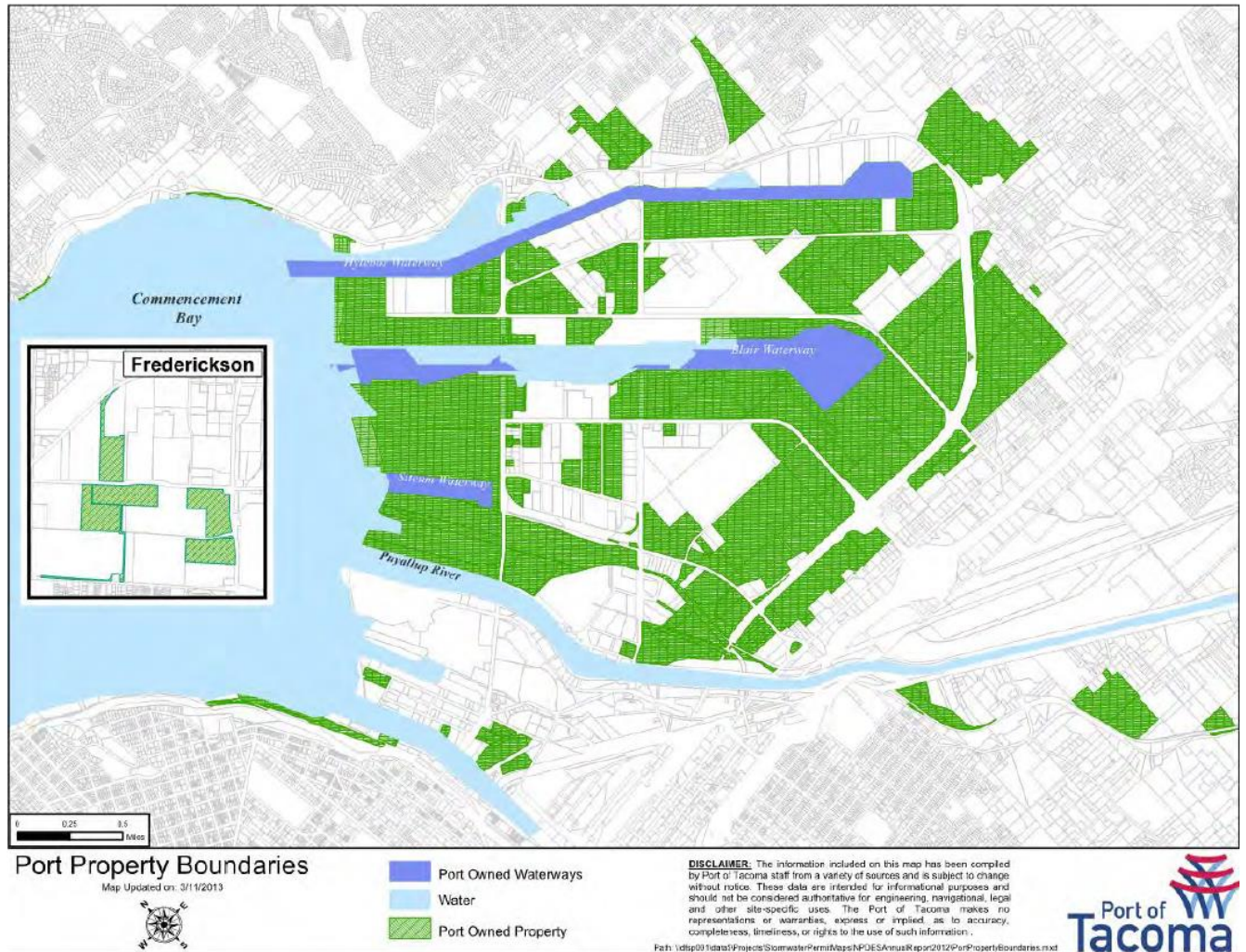
The Port of Tacoma owns many properties throughout the Tideflats study area, and constructs, operates, and maintains stormwater facilities on Port-owned properties in the study area. The Port is a secondary permittee with its own NPDES MS4 permit, which means that the Port has assumed the responsibilities from the City of Tacoma for stormwater plan review on Port-related projects. This arrangement allows the Port to tailor stormwater requirements to the unique industrial activities and physical setting of Port properties (Port of Tacoma 2015). Many Port properties are “self-contained” with respect to stormwater, with no connection to the City system; when these properties undergo new or redevelopment, the Port conducts reviews internally for compliance with the Port’s MS4 permit and stormwater requirements. The City performs a courtesy stormwater review during the site development permit application process; the City’s comments are non-binding. Certain operations on Port properties are also covered under the ISGP (Port of Tacoma 2015). Exhibit 4-1 shows the extent of Port-owned properties in the Tideflats study area. Note that since the map was produced, Frederickson is no longer owned by the Port of Tacoma.

The Port has established an Interlocal Agreement (ILA) with the City of Tacoma to coordinate stormwater compliance across their respective jurisdictions (Port of Tacoma 2020). Under this agreement, the Port’s new and redevelopment must comply with the SWMM and Tacoma

Municipal Code 12.08 requirements for stormwater. The City is provided a courtesy stormwater review for Port projects that discharge to the Port-owned MS4. The ILA also establishes mutual access to stormwater facilities for the purposes of permit compliance such as mapping, spill/emergency response, inspections, and repair.

The Port's stormwater requirements are enumerated in the Port of Tacoma Stormwater Management Guidance Manual (SMGM) (Port of Tacoma 2015). Exhibit 4-2 shows the Port of Tacoma Minimum Requirements for Stormwater. The Port's Minimum Requirements are a compilation of those from the Ecology Stormwater Management Manual for Western Washington, and those from the City's SWMM (Exhibit 4-2 shows for each requirement if it is equivalent to Ecology, the City, both, or is unique to the Port). In addition to requirements that are common with the City's SWMM, the Port requires Activity-based Treatment (MR-12); this provides a means to implement water quality treatment when a change in land use would increase pollutant loadings unless mitigated. The Port's requirements are specifically tailored to the setting and issues of the Port properties. Treatment BMPs listed in the SMGM are those that are most proven to be effective in marine industrial settings. Note that properties draining to City of Tacoma stormwater system are also subject to City of Tacoma Stormwater Requirements.

Over 70% of waterfront operations have stormwater treatment/filtration systems installed and operational to capture pollutants from their properties. There are 123 facilities in the Tidelflats that are subject to and required to be in compliance with the Industrial Stormwater General Permit.

Exhibit 4-1 Properties Subject to Port of Tacoma Requirements for Stormwater

Note: Current map versions can be downloaded from the Port's website. Note that since this map was produced, Frederickson is no longer owned by Port of Tacoma.

Source: Port of Tacoma, 2015.

Exhibit 4-2 Port of Tacoma Minimum Requirements for Stormwater

Requirement	Application to Port Projects
MR-1 Preparation of Stormwater Site Plan (Ecology/City of Tacoma)	Requirements as described in the City of Tacoma manual apply on Port projects. Additional submittal requirements for Port projects are described in Section 2.5.1. The Port of Tacoma Engineering Department will review submitted site plans.
MR-2 Construction Stormwater Pollution Prevention (Ecology/City of Tacoma)	Requirements as described in the City of Tacoma manual apply on Port projects. The Port typically acquires the Construction Stormwater NPDES permit prior to construction and develops the initial construction Stormwater Pollution Prevention Plan (SWPPP). The contractor is given the option of creating their own SWPPP or adopting the Port SWPPP.
MR-3 Source Control of Pollution (Ecology/City of Tacoma)	Requirements as described in the City of Tacoma manual apply on Port projects. The Port also requires avoiding the use of galvanized steel and other pollution-generating products or materials. Properties under ISGPs also have source control requirements.
MR-4 Preservation of Natural Drainage Systems and Outfalls (Ecology/City of Tacoma)	Does not apply. Port properties are drained by storm drains or ditches leading to outfalls. There are no "natural drainage systems." Redirecting runoff between outfalls may be possible on a case by case basis if there is sufficient capacity in the drainage system and the diversion is compatible with environmental regulations.
MR-5 Onsite Stormwater Management (Ecology/City of Tacoma)	Applicable to the extent required by the discharge location and activity. Port properties predominately discharge directly to tidally influenced waters, and on-site stormwater management practices are used primarily for runoff treatment rather than runoff reduction. Guidelines regarding the use of On-site Stormwater Management for Port projects is described below in Section 2.5.2 and is further defined in Chapter 3.
MR-6 Runoff Treatment (Ecology/City of Tacoma)	Water quality treatment is required for Port projects exceeding the thresholds. The Port has identified acceptable structural BMPs that can be considered (identified in Chapter 4). In addition, the Port is in the process of establishing a water quality treatment bank whereby mitigation required for a particular redevelopment project can be applied, in kind, to retrofit another site as designated by the Port. Additional information concerning Water Quality Treatment requirements for Port projects are described below in Section 2.5.3 and Chapter 4.
MR-7 Flow Control (Ecology/City of Tacoma)	Flow control, for streambank erosion protection, generally does not apply to Port projects. Runoff generated within the Tacoma Tideflats is collected by man-made conveyance and directed to outfalls discharging to receiving waters that are flow-control exempt. The Port does own some properties in outlying areas where flow-control could be required. In flow-control areas, the project proponent must follow the requirements of the local jurisdiction.
MR-8 Wetlands Protection (Ecology/City of Tacoma)	There are habitat and wetland mitigation sites that require protection. Port projects in the vicinity of these sites should review the site's mitigation plan to determine what measures could be required to protect these areas.
MR-9 Basin/Watershed Planning	No longer listed as a MR by Tacoma or Ecology. This is a placeholder for future planning efforts and does not apply on Port projects at this time. Port sub-basins draining to individual outfalls are subsets of larger basins that fall outside of Port jurisdiction. A Basin Plan can be used to tailor requirements for the entire area and develop a comprehensive plan for implementing water quality controls.
MR-10 Operation and Maintenance (City of Tacoma/MR9 in Ecology)	Requirements as defined in the Port's MS4 permit or as described in the City of Tacoma manual apply on Port projects. For proprietary systems, operation and maintenance will be based on the manufacturer's recommendations.
MR 11 Offsite Analysis and Mitigation (City of Tacoma)	Not listed as a MR by Ecology. Modified for application to Port projects. Port properties are typically located where groundwater is tidally influenced and discharge directly to tidally influenced waters. The Port requires offsite analyses but does not necessarily require mitigation. Capacity issues are dealt with on a case by case basis. The procedures to follow for offsite analysis and mitigation on Port projects are described below in Section 2.5.4.
MR 12 Activity-based Treatment Requirement (New-added for Port of Tacoma)	The activity-based treatment requirement by the Port of Tacoma provides a means to implement necessary water quality treatment if a change in land use or activity can increase pollutant loadings. This requirement will be initiated through the submission of a Tenant Improvement Request and the Project Request Checklist for Stormwater (Appendix B) as a condition of the lease agreement for the subject property. Negotiation between the tenant and the Port could result in the site being retrofitted for treatment, suitable off-site treatment of an equivalent area or participation in the retrofit banking program being developed by the Port.

Source: Port of Tacoma, 2015.

City of Fife

The City of Fife is located immediately adjacent to the study area. Stormwater runoff generated in Fife reaches the Tideflats waterways through a combination of storm drains, pipes, ditches, and streams. Three natural watercourses flow through Fife before entering the Tideflats: Puyallup River, Wapato Creek, and Hylebos Creek.

The City of Fife requires that stormwater be managed in accordance with the most recent Ecology Stormwater Management Manual for Western Washington (SMMWW). The nine minimum requirements of the SMMWW parallel the City of Tacoma MR 1–9 (Exhibit 4-2).

In addition to applying the SMMWW requirements, the City of Fife consults and coordinates with the Puyallup Tribe regarding stormwater practices and policies. The City of Fife also coordinates with Drainage District 23, a special purpose district that manages the drainage ditches and culverts in north Fife and adjoining Pierce County areas.

Pierce County

Pierce County manages floodplains through the area. Refer to the Floodplains memo for additional information (ESA 2020).

4.2 Current Conditions

Climate

Tacoma is subject to the long duration, low-intensity storms typical of the Pacific Northwest maritime and Mediterranean climate. Short high-intensity storms have also been occurring more frequently. The average annual precipitation is 36.9 inches (Ecology 2019). Based on isopluvial maps published by the National Ocean and Atmospheric Administration (NOAA), Tacoma has type 1A rainfall distribution and the design storms listed in Exhibit 4-3.

Exhibit 4-3 Design Storm Precipitation Values

Return Frequency 24-hour Storm Event (Years)	Precipitation (Inches)
0.5	1.44
2	2.0
5	2.5
10	3.0
25	3.5
50	3.5
100	4.1

Source: City of Tacoma, 2016.

Watersheds and Infrastructure

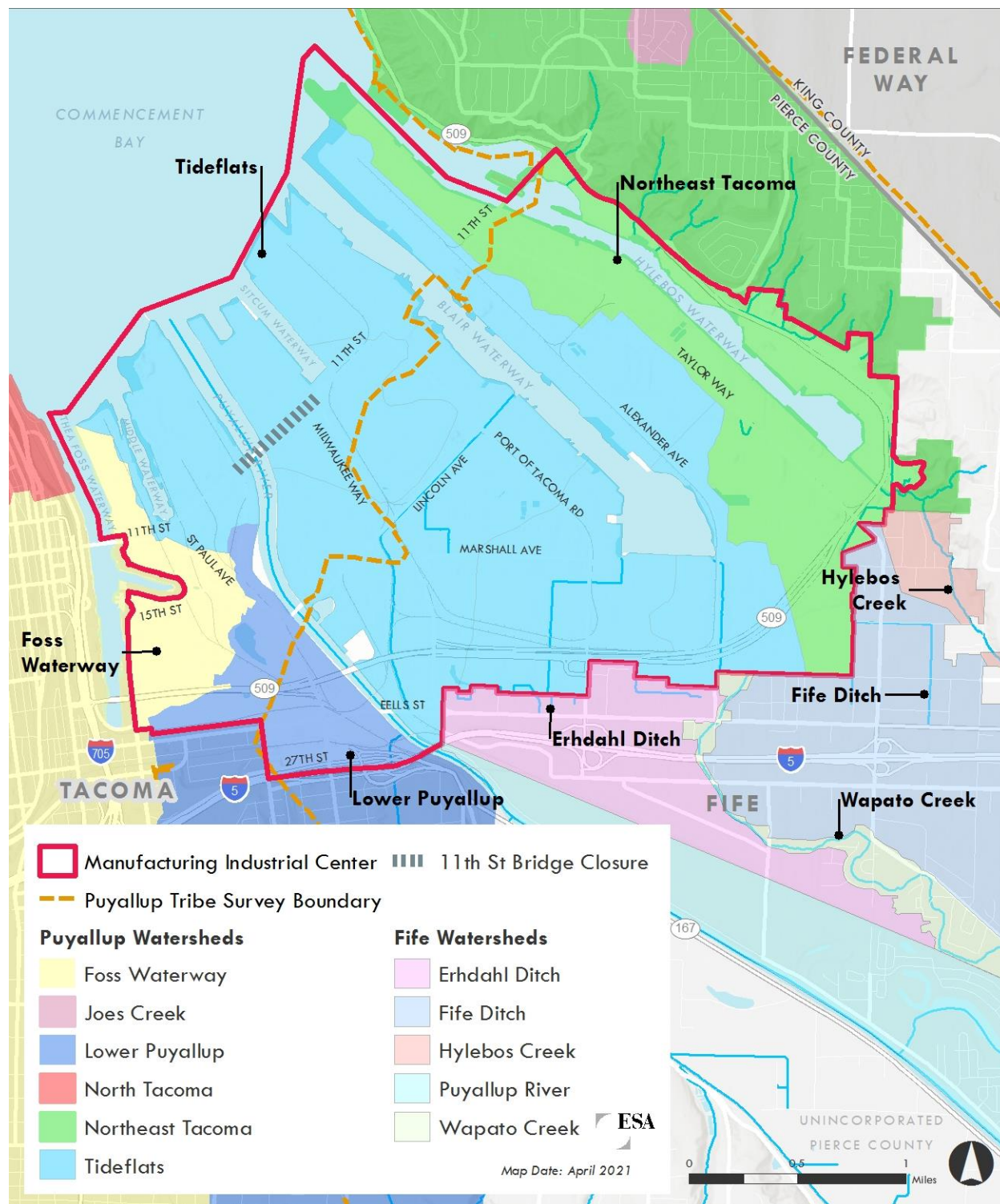
Stormwater is that portion of precipitation, including snowmelt, that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes and other features of a stormwater drainage system into a receiving water or stormwater facility. The stormwater runoff generated from roadways, roofs, parking lots, and other impervious surfaces created by urban development is typically of a higher volume than what occurred in a predeveloped state. Runoff from within a watershed drains to a discharge point (also called an outfall) to a receiving body. Runoff from roadways, driveways, and parking lots can transport pollutants such as gas and oil as well as residues from pesticides, fertilizers, and other chemicals used in lawn care, as well as animal waste in agricultural areas. This “non-point” source pollution accumulates as water runs over impervious surfaces toward a receiving body of water.

There are six receiving waterbodies in the Tideflats study area: Thea Foss Waterway, Middle Waterway, Puyallup River, Sitcum Waterway, Blair Waterway, and the Hylebos Waterway (Exhibit 4-4). Draining to these are four watersheds within the City of Tacoma, as designated by the City: Thea Foss Waterway, Lower Puyallup, Tideflats, and Northeast Tacoma (Exhibit 4-4). Areas within the Tideflats watershed drain to either the Middle Waterway, Puyallup River, Sitcum Waterway, or Blair Waterway – sub-basin boundaries distinguishing which specific properties and parcels drain to each of these waterways are not identified in the City SWMM or shown here. Parts of Federal Way, City of Fife, and City of Milton drain into the Hylebos Waterway via drainage district 23, Wapato and Hylebos Creek.

The waterbodies that are within the study area also receive surface water inputs from watersheds that are outside of City of Tacoma boundaries and outside of the study area. The Puyallup River watershed is approximately 1,053 square miles and extends to the summit of Mount Rainier. Wapato Creek drains approximately 6.5 square miles and discharges into the south end of the Blair Waterway. The Hylebos Creek watershed is approximately 16.8 square miles and discharges at the south end of the Hylebos Waterway. Portions of Fife are drained by a network

of ditches; the Erhadahl Ditch network drains into the Blair Waterway, and the Fife Ditch network drains to the Hylebos Waterway.

Exhibit 4-4 Watersheds in the Tacoma Tideflats Study Area



Source: ESA, 2020; BERK, 2020.

The study area is largely impervious (hard surfaces) comprised of pavement and rooftops, which cover approximately 85% of the study area (City of Tacoma 2020a). Exhibit 4-5 shows the land cover within the study area. Those areas that are not impervious are typically imported fill soils placed over historic tideflats. Vegetation, where present, is typically grass or scrub-shrub. There are no old-growth forests in the Tideflats study area.

Stormwater infrastructure within the study area includes drainage structures, inlets, and catch basins; underground storm drain pipes; and surface ditches. Sites with industrial uses likely have systems to store and treat stormwater runoff from pollutant-generating surfaces. The City of Tacoma operates a number of storm drain trunklines. City trunklines and many Port-owned drainage systems have surface water discharge points (outfalls) to one of the receiving bodies. Because of maritime transportation safety concerns, some of the infrastructure in the area may not be shown on the exhibits herein.

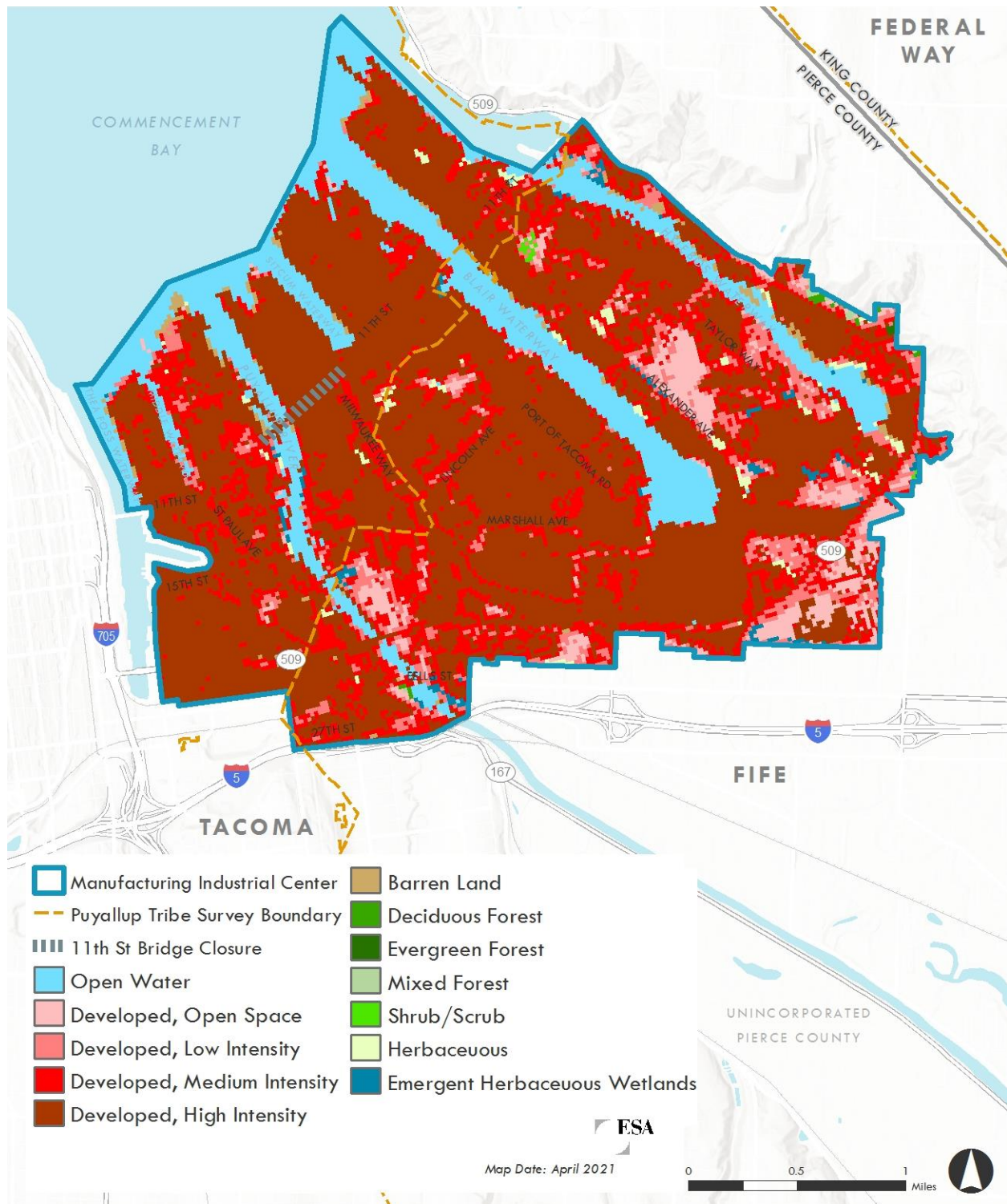
Information presented below for the watersheds and waterways is summarized from documentation provided by the City of Tacoma (City of Tacoma 2020b).

Thea Foss Waterway Watershed

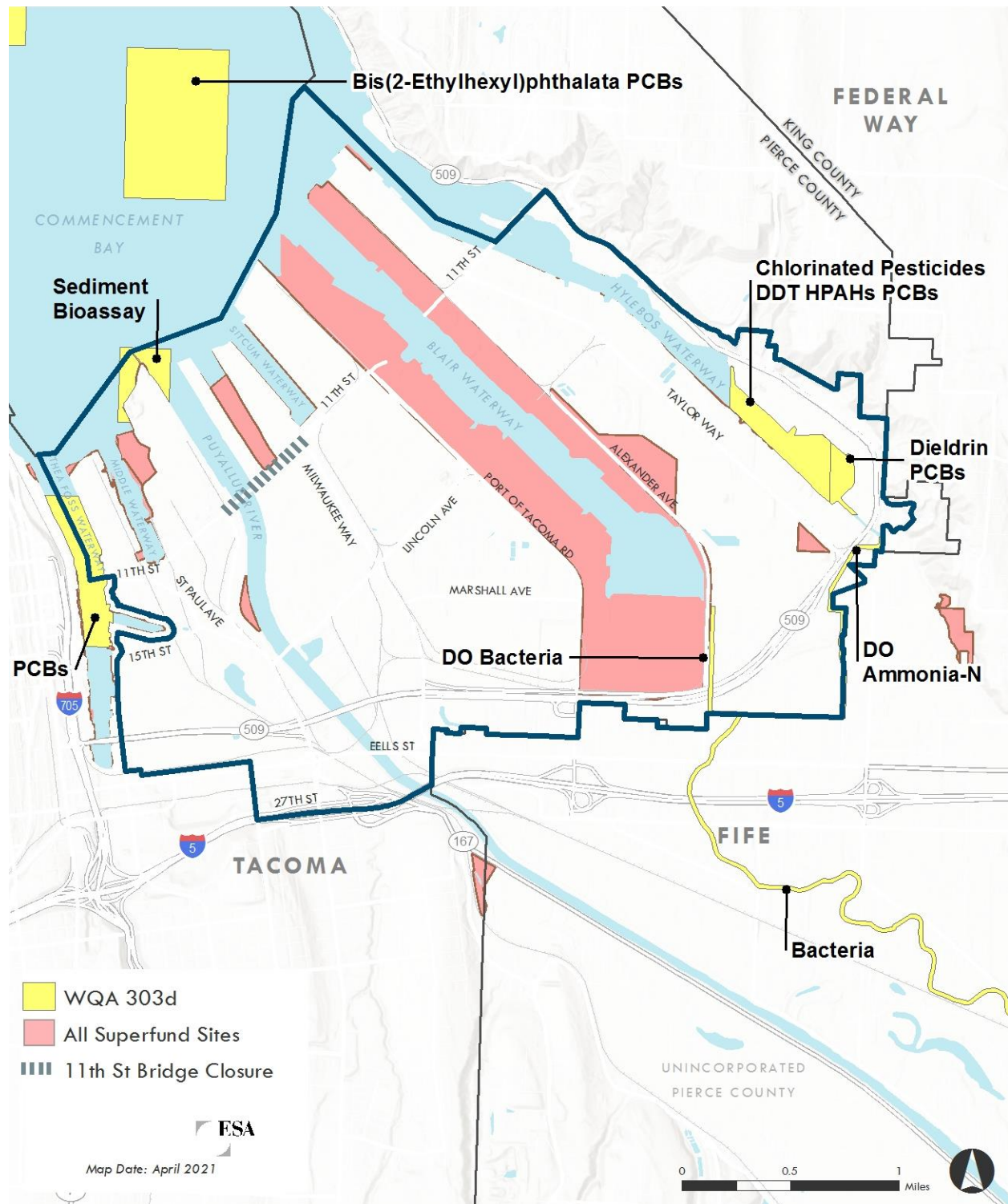
The most western part of the Tideflats study area is within the Thea Foss Waterway Watershed. The Thea Foss Waterway Watershed, also known as the “Foss Watershed,” covers approximately 5,864 acres and drains most of south-central Tacoma. The watershed is bordered by East F to East K Streets on the east side of the Thea Foss Waterway (City of Tacoma 2020b).

Stormwater is conveyed through the watershed primarily in underground pipes. There are currently no streams or creeks remaining in the watershed. The land and collection system on the east side of the waterway, within the study area, are very flat, and the collection system is oversized to account for tidal inundation (City of Tacoma 2020b).

The Ecology Water Quality Assessment for Thea Foss Waterway includes the listing of a number of parameters for the sediments (City of Tacoma 2020c). Exhibit 4- shows the zones that are listed and which parameters are affected.

Exhibit 4-5 Land Cover in the Tacoma Tideflats Study Area

Source: ESA, 2020; BERK, 2020.

Exhibit 4-6 303d-Listed Waterbodies in the Tacoma Tideflats Study Area

Source: ESA, 2020; BERK, 2020.

Northeast Tacoma Watershed

The Northeast (NE) Tacoma watershed covers 3,385 acres. Pierce County and the City of Federal Way border the area to the north and east, the City of Fife borders the south, and the industrial Tideflats watershed borders the west of this watershed. Much of the watershed contains steep slopes and bluffs with several intermittent streams that flow into Commencement Bay. Marine View Drive (SR 509) separates the steep sloped areas of the NE Tacoma Watershed from the Hylebos Waterway (City of Tacoma 2020b).

Hylebos Creek

Hylebos Creek is the major tributary to the Hylebos Waterway and drains approximately 12,000 acres from tributaries in Federal Way, Milton, Edgewood, King County, Pierce County, and Fife to the mouth of the creek at the Hylebos Waterway in Commencement Bay. The lower portion of Hylebos Creek moves through Puyallup Tribal Reservation lands. The Muckleshoot Tribe also maintains fishing rights on Hylebos Creek. The West Fork drains the central and southern portion of Federal Way. The East Fork begins with several small tributaries in eastern Federal Way, near North Lake and Lake Killarney, and drains south into Milton. The East Fork flows through a narrow ravine known as the East Hylebos Ravine, before emerging onto a broader floodplain near its confluence with the West Fork. The lower Hylebos Creek is the mainstem downstream of this confluence. This tributary drains from Surprise Lake in Milton, and flows through Fife and unincorporated Pierce County before emptying into the Hylebos Waterway of Commencement Bay in Tacoma (City of Tacoma 2020b).

Hylebos Waterway

The Hylebos Waterway is one of six waterbodies within the Tideflats study area and Commencement Bay. It is a federal navigation channel and an estuary that receives fresh surface water from Hylebos Creek and direct runoff from the surrounding Tideflats. The Hylebos Waterway is listed impaired by Ecology for the parameters shown on Exhibit 4- (City of Tacoma 2020b). These parameters include English Sole Fish tissue results from 1998, collected before the EPA lead remedial actions in the Hylebos were completed.

Tideflats Watershed

This watershed covers 2,112 acres and is the most highly industrialized area of the city. Most of Tacoma's heavy industrial facilities are located here along the Sitcum, Blair, and Hylebos Waterways. The Tideflats Watershed is bordered by the Lower Puyallup Watershed on the south and west, Thea Foss Waterway Watershed to the west, Northeast Tacoma Watershed to the northeast, and the City of Fife to south. Significant navigable waterways in this watershed include the Middle, Sitcum, and Blair Waterways, which allow deep-water berthing by ocean-going vessels, and the Puyallup River. Wapato Creek discharges into the head of the Blair Waterway (City of Tacoma 2020b).

The Tideflats study area is zoned for Port Maritime and Industrial uses, which are mostly dominated by Port of Tacoma operations, but also include other businesses. The Port of Tacoma supports 24-hour operations to accommodate regional and international shipping and distribution schedules, raw materials processing and manufacturing, transport of raw materials, transport of finished products, and freight mobility infrastructure. The entire area is served by road and rail corridors designed for large, heavy truck and rail loads (City of Tacoma 2020b).

Stormwater is conveyed through the watershed primarily by both public and private underground conveyance systems, as well as through some stormwater ditch systems including Wapato Creek and the Lincoln Avenue Ditch. The Port of Tacoma, the City of Tacoma, and Operations with North American Industry Classification System (NAICS) codes triggering Industrial Stormwater General Permit (ISGP) coverage have State issued National Pollutant Discharge Elimination System (NPDES) Stormwater Permits regulating their stormwater discharges. Because of the interconnected stormwater systems throughout this watershed, the City of Tacoma and Port negotiated an Interlocal Agreement (ILA) to describe the individual and coordinated stormwater management activities that both parties are doing to protect the water quality of Commencement Bay. The collection system throughout this area is generally quite flat and the pipes are often oversized to compensate for tidal inundation. Tidegates and check valves are present on most of the marine outfalls (City of Tacoma 2020b).

Over 70% of waterfront operations have stormwater treatment/filtration systems installed and operational to capture pollutants from their properties. There are 123 facilities in the Tideflats that are subject to and required to be in compliance with the Industrial Stormwater General Permit.

Puyallup River

The Puyallup River is about 45 miles long and is formed by glaciers on the west side of Mount Rainier. It flows generally northwest, emptying into Commencement Bay in Puget Sound. The glaciers that feed the river continually provide silt and gravel to the river, creating sand and gravel bars. During the summer, glacial meltwater dominates the streamflow, turning the Puyallup River turbid. The Puyallup River is listed as impaired (303d list) for fecal coliform and subject to a fecal coliform Total Maximum Daily Load (TMDL). There is one City-owned outfall to the river in the Tideflats Watershed and several Port-owned outfalls (City of Tacoma 2020b).

Blair Waterway

The Blair Waterway is a federally designated channel that supports domestic and international cargo shipping activity and is dredged periodically to maintain depths for shipping. There are four City-owned outfalls and at least 19 private and Port-owned outfalls discharging to the Blair Waterway (City of Tacoma 2020b).

Sitcum Waterway

The Sitcum Waterway, a domestic and international cargo shipping channel, was identified as one of the areas of contamination as part of the Commencement Bay Superfund site. However, remediation was completed in the Sitcum waterway along with the development of the Milwaukee waterway habitat site and the waterway is eligible for delisting. The shorelines of the waterway are urbanized, with heavy industry on former tideflats. There are two City-owned outfalls and several Port of Tacoma outfalls which discharge to the Sitcum Waterway (City of Tacoma 2020b).

Middle Waterway

The Middle Waterway contains one of the last remnant mudflats in the Tideflats study area. The waterway is an industrial and commercial shipping channel and was identified as a remediation site as part of the Commencement Bay Superfund site. The remediation was completed in the waterway in 2004. Significant habitat restoration has occurred in this waterway, including virtually the entire eastern shoreline of the waterway, around the head of the waterway, and along the southern portion of the western shoreline. In the outer portion of the western shoreline, industrial uses remain. There is one City-owned outfall to the head of the Middle Waterway, as well as several small private outfalls (City of Tacoma 2020b).

Wapato Creek

The Ecology Water Quality Assessment for Wapato Creek includes the listing of a number of parameters for the sediments. The habitat in Wapato Creek, and specifically the instream flow, is listed in Category 4C (impaired by a non-pollutant) for inadequate instream flow. In addition, the water in the creek is listed as Category 5 for bacteria and dissolved oxygen based on data received from the Puyallup Tribe. Wapato Creek was also listed as Category 2 for benzene (City of Tacoma 2020b).

4.3 Key Findings and Implications for Plan

The following topics related to stormwater and water quality should be considered in the development of the Tacoma Tideflats Subarea Plan:

- Depending on the land ownership and the point where stormwater is discharged from a site, stormwater reviews and permitting could be the responsibility of the City of Tacoma, the Port of Tacoma, or the Puyallup Tribe.
- The Puyallup Tribe of Indians reviews and comments on projects near and within the Reservation. The Tribe works with the City of Tacoma, the City of Fife, and the Port of Tacoma cooperatively to protect water quality and ensure that appropriate stormwater BMPs are implemented for projects.

- The City of Tacoma applies an Infrastructure Protection Requirement for flow control on many projects in the Tideflats study area.
- Federal review of projects is required when developing or filling along a navigable waterway.
- State review is required for projects placing hydraulic structures or potentially impacting water quality.
- Properties with industrial, manufacturing, and transportation uses typically require a discharge permit for stormwater; the Industrial Stormwater General Permit is issued by Ecology to ensure compliance with water quality standards.

5 PLANTS AND ANIMALS

This section describes existing conditions for plants and animals in the study area, summarizes existing policies and regulations, and identifies key findings and implications for the Subarea Plan. Plants and animals in the study area are supported by patches of natural land cover, open space, and habitat mitigation sites. In general, the study area is extensively altered with high levels of impervious surface coverage associated with the intense industrial and port land uses. Natural drainage features, which historically supported wetlands and streams important for fish and wildlife, either no longer exist or have been heavily modified. Small areas of restoration activity have occurred as mitigation for impacts in the study area, and these areas provide important habitat patches for fish and wildlife traveling through the study area.

5.1 Existing Policies and Regulations

Plants and animals in the study area are protected by a variety of federal and state laws and policies, and local plans and policies. These laws, plans, and policies have slightly different but overlapping requirements, and together protect and maintain species, habitats, and their functions.

Federal and State

Several federal and state regulations, plans, and policies influence planning, land use, and management activities that can impact or benefit plants and animals and their habitats within the study area. **Exhibit 5-5-1** and **Exhibit 5-5-2** summarize the applicable federal and state laws, regulations, and policies.

Exhibit 5-5-1 Federal and State Laws, Regulations, and Policies Related to Plants and Animals

Law/Regulation/Policy	Lead Agency	Description
Federal Endangered Species Act (ESA)	National Marine Fisheries Service (NMFS) U.S. Fish and Wildlife Service (USFWS)	Program for the conservation of federally listed threatened and endangered plants and animals and their habitats. Prohibits importing, exporting, taking, possessing, selling, and transporting listed species (with certain exceptions), and prohibits the destruction of designated critical habitat.

Washington State Endangered Species Act	Washington Department of Fish and Wildlife (WDFW)	Program for the listing and recovery of state-listed threatened and endangered species.
Magnuson-Stevens Fishery Conservation and Management Act (MSA) - Public Law 104-297, October 11, 1996, as amended	NMFS	Requires federal agencies to review activities that may adversely affect Essential Fish Habitat (EFH). The EFH designation for the Pacific salmon fishery (Chinook, coho, and pink salmon) includes all those streams, lakes, ponds, wetlands, and other waterbodies, currently or historically accessible to salmon in Washington, except above identified impassable barriers.
Marine Mammal Protection Act	NMFS, USFWS	Protects all marine mammals and prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas.
Fish and Wildlife Coordination Act	NMFS, USFWS, WDFW	Requires that federal agencies consult with the USFWS, NMFS, and state wildlife agencies for activities that affect, control, or modify waters of any stream or bodies of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and habitat.
State Hydraulic Code (Washington Administrative Code [WAC] 220-660)	WDFW	Regulates hydraulic projects (construction or performance of work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or freshwaters of the state) by requiring a Hydraulic Project Approval (HPA) for all such projects. The purpose of the HPA is to ensure that construction or performance of work is done in a manner that protects fish life.
Bald and Golden Eagle Protection Act	USFWS	Protects bald and golden eagles from the unauthorized capture, purchase, or transportation of the birds, their nets, or their eggs.
Coastal Zone Management Act	Administered by Washington Department of Ecology (Ecology)	Voluntary state–federal partnership that encourages states to adopt management programs to meet the federal goals of protection, restoration, and appropriate development of coastal zone resources. In Washington, primarily implemented through the Shoreline Management Act (described below). Includes the “federal consistency” provision, which gives states a strong voice in federal agency decision-making and guidelines.
Shoreline Management Act (SMA)	Ecology	Requires local jurisdictions to implement Shoreline Master Programs (SMPs) to “prevent the inherent harm in an uncoordinated and piecemeal development of the state’s shorelines.” Shorelines are defined as marine waters, streams, and rivers with greater than 20 cubic feet per second (cfs) mean annual flow; lakes 20 acres or larger; upland areas called shorelands that extend 200 feet landward from the edge of these waters; biological wetlands and river deltas connected to these waterbodies; and some or all of the 100-year floodplain, including all wetlands.
Executive Order 12962 (Recreational Fisheries)	USFWS	Mandates federal agencies, to the extent permitted by law and where practical, to improve the “quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities.”
Migratory Bird Treaty Act	USFWS	Protects migratory birds by prohibiting private parties (and federal agencies in certain judicial circuits) from intentionally taking, selling, or conducting other activities that would harm migratory birds, their eggs, or nests (such as the removal of an active nest or nest tree), unless the Secretary of the Interior authorizes such activities under a special permit.
Growth Management Act (GMA)	Department of Commerce	Frames the land use planning regime for many counties and cities in Washington to prepare local comprehensive plans, development regulations, and requirements for public participation. The purpose

		is to set goals to plan and control growth in order to wisely use and protect the state's resources, including aquatic resources.
Clean Water Act (33 Code of Federal Regulations [CFR] 320-332) Sections 401 and 404	U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (Corps) and Ecology	Regulates discharges of dredged or fill materials into waters of the U.S., including wetlands and streams. Also requires any activity that may result in a discharge of a pollutant into waters of the U.S. to obtain a certification from the state that the discharge complies the applicable water standards.
Water Pollution Control Act (RCW 90.48)	Ecology	Enables the review and approval, condition, or denial of projects proposed in waters of the U.S., including wetlands. Generally administered via Section 401 of the Clean Water Act.

Local and Tribal

The study area includes lands located in the cities of Tacoma and Fife. These municipalities have developed comprehensive plans, zoning, shoreline management plans, and ordinances for environmentally critical areas to direct growth and development within their jurisdictions, and have codified regulations in their respective municipal codes. **Exhibit 5-5-2** presents a summary of applicable local laws, plans, and policies. The primary local program with the most influence over the Tideflats area is the Tacoma Shoreline Master Program (SMP), which includes goals, policies, and development regulations for all shoreline areas including Commencement Bay and its waterways.

The study area also includes lands located within the Puyallup Tribe of Indians Reservation and Tribal-owned parcels. The Puyallup Tribe operates and administers a set of laws and regulations collectively referred to as the Puyallup Tribal Codes (PTC). The PTC includes a Fisheries Management Code (Chapter 12.04) and the Revised Shellfish Code (Chapter 12.12) that contain provisions to protect, manage, and enforce regulations governing Tribal fishing and harvesting activities. In addition, the Tribe is involved in formal and informal consultation with state and federal agencies under many of the laws and regulations listed previously, and also provides review and input on local decisions made under the State Environmental Policy Act (SEPA) or Growth Management Act (GMA).

Exhibit 5-5-2 Local Laws, Regulations, and Policies Related to Plants and Animals

Law/Regulation/Policy	Lead Agency	Description
Tacoma Municipal Code (TMC) Chapter 13.11 Critical Areas Preservation	City of Tacoma	TMC Chapter 13.11 governs areas of Tacoma that provide habitat for plants and animals including critical aquifer recharge areas, fish and wildlife habitat conservation areas, flood hazard areas, geologically hazardous areas, stream corridors, and wetlands.
State Environmental Policy Act (SEPA). Washington Administrative Code (WAC) 197-11	City of Tacoma	WAC 197-11 provides regulations for the State Environmental Policy Act (SEPA) process identifies and analyzes environmental impacts associated with governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies, and plans.
Shoreline Master Program (SMP) (Updated 2019). TMC Chapter 19	City of Tacoma	TMC Chapter 19 provides information on the SMP. The SMP provides goals, policies, and regulations for shoreline use and protection, and establishes a permit system for administering the program.

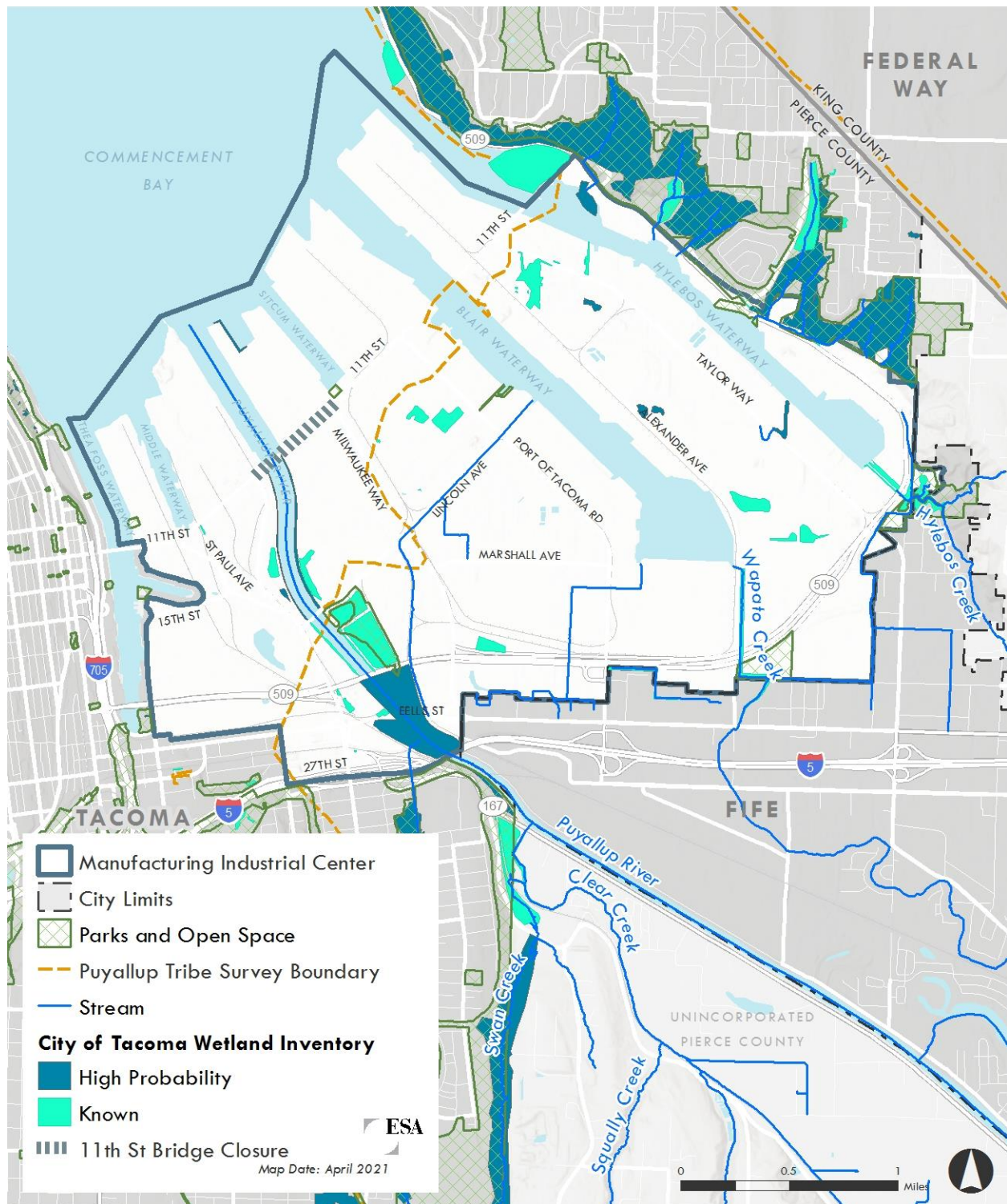
One Tacoma, Comprehensive Plan (Updated 2020)	City of Tacoma	One Tacoma describes the community's long-term vision and goals, and guides decisions on land use, transportation, housing, capital facilities, parks, and the environment. It includes an Urban Forest Policy Element focused on tree canopy cover and retention.
Urban Forest Policy	City of Tacoma	Implemented through Urban Forest Management Plan (UFMP) that aims to achieve tree canopy cover of 30% by the year 2030. The UFMP includes goals, strategies, targets, actions, and an audit system for evaluation.
Fife Municipal Code (FMC) Title 17 Environmental Protection	City of Fife	FMC Title 17 protects areas in the city identified as critical areas from adverse impacts and incompatible land use. Critical areas include wetlands, critical aquifer recharge areas, fish and wildlife habitat conservation area, frequently flooded areas, geologically hazardous areas, and seismic hazard areas.
Shoreline Master Program (SMP) (Adopted 2019)	City of Fife	The SMP provides goals, policies, and regulations for shoreline use and protection, and establishes a permit system for administering the program. Fife shorelines include the Puyallup River and Hylebos Creek.
Puyallup Tribal Code Fisheries Management Code (Chapter 12.04) and Revised Shellfish Code (12.12).	Puyallup Tribe of Indians	Puyallup Tribal Codes Fisheries Management Code (Chapter 12.04) and Revised Shellfish Code (Chapter 12.12) contain provisions to protect, manage, and enforce regulations governing Tribal fishing and harvesting activities.

5.2 Current Conditions

The following sections describe the current conditions for plants and animals, including habitats and species present in the study area.

Streams and Wetlands

The Puyallup River, and Wapato Creek flow through the study area within highly modified channels and armored banks. Hylebos Creek has been restored over the past decades and discharges into the Hylebos Waterway. The Puyallup River is tidally influenced throughout the study area and is the major source of sediment to nearshore marine habitats. Prior to construction of the waterways and dredging of the Puyallup River channel, the Commencement Bay nearshore and Puyallup River delta supported over 2,100 acres of intertidal mudflats (Kerwin 1999, as cited in City of Tacoma 2007). In addition, approximately 3,900 acres of emergent marsh historically existed. Today, estuarine wetlands and mudflats occur in a few isolated areas adjacent to the waterways and associated with Port of Tacoma restoration sites (USFWS 2020a; City of Tacoma 2020a). Freshwater wetlands are present in small, isolated areas within the built environment and comprise a very small percentage of the study area. According to the City of Tacoma's wetland inventory, less than 200 acres, or about 3.5% of the study area supports known wetlands or areas with high probability (City of Tacoma 2020a). The inventory maps cover 40 small (<1 acre) known wetlands that are scattered throughout the study area. The creeks and streams are labeled (Exhibit 5-3). Please refer to Section 4 Stormwater and Water Quality Exhibit 4-4 for the labels for stormwater ditches.

Exhibit 5-3 Mapped Streams, Wetlands, Parks and Open Spaces

Fish and Wildlife Species

The Puyallup River supports several salmonid species including coastal cutthroat trout, bull trout, steelhead/rainbow trout, and Chinook (spring and fall), sockeye, coho, pink, and chum salmon (WDFW 2020a; WDFW and NWIFC 2020). Wapato Creek and Hylebos Creek support a smaller set of salmonid species including steelhead, coho, Chinook (fall), pink, and chum. Three of these fish species are listed as threatened under the federal Endangered Species Act (ESA) (Chinook, bull trout and steelhead), have designed critical habitat in the study area and are also listed in Washington State by WDFW (**Exhibit 5-5-4**). The waterways are characterized by narrow intertidal and shallow subtidal margins around a relatively deep channel. These margins are important migratory routes for salmon, waterfowl, and shorebirds, and serve as rearing areas for juvenile and adult salmonids and their prey.

Adult salmonids are typically found in Commencement Bay August through November, except spring Chinook and steelhead, which are present during the winter and spring (City of Tacoma 2007). The Salmon Habitat Protection and Restoration Strategy for the Puyallup and Chambers Watersheds (Water Resource Inventory Area 10 [WRIA] 10 and WRIA 12, respectively) is designed to provide a scientific framework for identifying priorities and strategies to support protection and restoration of salmon habitat in both watersheds and, ultimately, the Puget Sound region. According to the Salmon Habitat Protection and Restoration Strategy for Puyallup and Chambers Watershed, adult chinook (fall) can show up as early as June (Puyallup and Chambers Watersheds Salmon Recovery Lead Entity 2018). Juvenile Chinook salmon use the Commencement Bay nearshore and the waterways, particularly after the releases of hatchery fish in mid to late May (Kerwin 1999, as cited in City of Tacoma 2007). The Puyallup Watershed is used by the only remaining spring Chinook salmon stock found in South Puget Sound.

Despite substantial modification of the Commencement Bay nearshore, WDFW has documented forage fish (i.e., surf smelt and sand lance) spawning at the west edge of the Middle Waterway, near the mouth of the Puyallup River, and along the upper intertidal zone of the sand-gravel beaches of the former Milwaukee Waterway, which is a 30-acre habitat mitigation site located between the Puyallup River and Sitcum Waterway (WDFW 2020b). The WDFW surveys documented mostly surf smelt spawning at these locations with only a small area of sand lance spawning observed at the spit on the west side of the Puyallup River.

The Puyallup Tribe operates a robust program to maximize and optimize the shellfish harvest by protecting the habitats and populations of shellfish while also providing a safe environment for commercial, ceremonial, and subsistence fishing opportunities for Tribal members. The Tribe manages this fishery per their Revised Puyallup Tribal Shellfish Code (Chapter 12.12), and it includes crab (Dungeness, red rock, graceful), sea cucumber, geoduck, and spot prawn, among other species. Despite productive habitat for crab along edges of the waterways, there is no Tribal harvest within the Tideflats study area due to ship traffic associated with Port activities (Winfrey, pers. comm., 2020). The closest approved commercial harvest for filter feeding shellfish is north of the study area between Browns Point and Dash Point. Recreational harvest of spot

shrimp occurs near the barge rafts on Commencement Bay, and common squid are harvested from areas near Les Davis pier adjacent to Ruston Way as well as crab species throughout the bay, especially near the mouth of the Thea Foss Waterway. (Winfrey, pers. comm., 2020). According to WDFW, documented shellfish resources include Dungeness crab and geoduck clams, although the Washington State Department of Health has closed all of Commencement Bay shoreline to shellfish harvesting due to a combination of marine biotoxins and pollution associated with densely populated urban areas (DOH 2021).

Marine mammals that have been observed in Commencement Bay include Pacific harbor seal, harbor porpoise, California sea lion, and killer whale. Seal and sea lion haul-outs have been documented along Tacoma's marine shoreline on buoys, floats, and logbooms in northeast Commencement Bay (Jeffries et al. 2000, as cited in City of Tacoma 2007). Harbor porpoise distribution in Puget Sound includes central and south Puget Sound. WDFW also has a GIS map that shows abundance estimates for harbor porpoises in central Puget Sound, and Commencement Bay is included in the habitat area (Bockstiegel, personal communication, 2020). In general, there is limited use of marine shoreline due to the shipping traffic.

Commencement Bay is located within the Pacific Flyway, a major north-south migratory corridor which extends from Mexico north into Canada and the state of Alaska. The marine waters along with the restored intertidal wetlands and riparian buffers associated with mitigation sites provide habitat for shorebirds, waterfowl, and upland birds to breed and overwinter.

The WDFW Priority Habitats and Species (PHS) database online mapper also documents big brown bat, purple martin, bald eagle, great blue heron, and western pond turtle in the study area (WDFW 2020c). None of these species are listed under the federal ESA or have specific protections under state regulations. Coyote and beaver are frequently found in the study area with the latter species requiring active management to maintain stream and ditch conveyance and reduce localized flooding issues.

Exhibit 5-5-4 Federal and State-Listed Species in the Study Area

Common Name	Scientific Name	Federal Status	State Status	Critical Habitat in Study Area
Chinook salmon (Puget Sound)	<i>Oncorhynchus tshawytscha</i>	Threatened	Candidate	Yes
Steelhead (Puget Sound)	<i>O. mykiss</i>	Threatened	Candidate	Yes
Bull trout	<i>Salvelinus confluentus</i>	Threatened	Candidate	Yes
Coho salmon (Puget Sound)	<i>O. kisutch</i>	Species of Concern	None	None
Killer whale (orca) (Southern Resident DPS)	<i>Orcinus orca</i>	Endangered	Endangered	Yes
Marbled murrelet	<i>Brachyramphus marmoratus</i>	Threatened	Threatened	None
Streaked horned lark	<i>Eremophila alpestris strigata</i>	Threatened	Endangered	None
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Threatened	Endangered	None

Common Name	Scientific Name	Federal Status	State Status	Critical Habitat in Study Area
Oregon spotted frog	<i>Rana pretiosa</i>	Threatened	Endangered	None
Water howellia	<i>Howellia aquatilis</i>	Endangered	n/a	None
Marsh sandwort	<i>Arenaria paludicola</i>	Endangered	n/a	None

Source: USFWS, 2021 WDFW; 2020d and 2020e. NMFS, 2021

City of Tacoma Natural Resource Damage Assessment and Restoration (NRDA) Habitat Sites

The Commencement Bay Natural Resource Trustees in adherence with state and federal laws, assessed the natural resource damage caused by previous land practices and assigned it to potential responsible parties (PRP). The City of Tacoma was among those PRPs and in 1997, the City entered into a Natural Resource Damage Assessment (NRDA) Consent Decree. The Consent Decree had many parts including: environmental protection efforts, tribal and oversight payments as well as the construction of five restoration sites. These sites were chosen based on their benefit to salmon and proximity to the natural resource damage among other criteria. Restored areas are described below.

Middle Waterway

1701 East F Street

The 1.85-acre piece of land next to Middle Waterway has been cleaned of its contaminated materials and reconstructed into an intertidal salt marsh. Volunteers planted native plants near the water to restore the habitat necessary for juvenile chinook, pink and chum salmon from the Puyallup River.

Final Report: [Middle Waterway Completion Report](#)

Olympic View Resource Area

202 East F Street

This 12.4-acre area includes land that the state Commissioner of Public Lands has withdrawn from leasing. To restore the area, 600 pilings were removed and 11 tons of contaminated sediment was replaced with 22 tons of clean sediment. The work returned the Olympic View upland and aquatic areas to its natural condition and preserved one of the last remaining eel grass beds in Commencement Bay.

Final Report: [OVRA Monitoring Completion Report](#)

Tahoma Salt Marsh

1741 North Schuster Parkway

Nestled along the Ruston Way shoreline, a bowl-shaped salt marsh and upland areas were created in this area to restore riparian habitat. Contractors removed more than 6,000 cubic yards of soil. The clean soil was reused to create the upland areas and nearly 1,000 cubic yards of contaminated soil was properly disposed of off-site. Volunteers planted more than 6,000 native plants near the water.

Final Report: [TSM Monitoring Completion Report](#)

Place of Circling Waters

1621 Marine View Drive

Located along Hylebos Creek at the foot of Northeast Tacoma, off-channel habitat was created and upland areas were preserved benefitting local Coho, Chinook, and Chum salmonid species. Amphibians and bird species also benefit from the wetland enhancement. Under an agreement with the Port of Tacoma, the Port owns the site, constructed the habitat, and monitors and maintains it.

Current Report: [Place of Circling Waters Monitoring Report, Year 1](#)

The Commencement Bay Natural Resource Trustees have also established restoration projects throughout the Puyallup River Watershed. The current sites where the City is acting as interim site steward are listed below.

Yowkwala

Located on the northeast shore of Commencement Bay near the mouth of the Hylebos Waterway, these 15 acres have been set aside for preservation of the shoreline's intertidal habitat areas and native vegetation.

Skookum Wulge

Located on the northeast shore of Commencement Bay near the mouth of the Hylebos Waterway, this narrow strip of 1.19 acres has been set aside for preservation of the shoreline's intertidal habitat areas and native vegetation.

Squally Beach

Located on the northeast shore of Commencement Bay just north of the 11th Street bridge, seeps from the hill above are diffused over the shoreline creating an area of brackish marsh and backwater pools. This 0.66-acre area provides intertidal habitat and native vegetation.

Mowitch

Located at the head of the Hylebos Waterway, this site provides intertidal backwater fingers that enable brackish marsh vegetation to grow and provide foraging and refuge habitat for salmonids. The Port of Tacoma was a partner on this project.

Additional Habitat Sites

Thea Foss Waterway Cleanup Habitat Mitigation Sites

The City removed or capped in place sediments contaminated by more than a century of environmentally insensitive practices, and restored marine habitats around the Foss and other areas of Commencement Bay in partnership with agencies, organizations, property owners and other responsible parties. As part of the cleanup project, habitat restoration sites were constructed at four new locations: Middle Waterway Tideflats Habitat, North Beach Habitat, Puyallup River Side Channel and Hylebos Creek mitigation site. In addition, shorelines were enhanced wherever possible to make them habitat friendly, including four additional areas along the Thea Foss Waterway.

Port of Tacoma Habitat Sites

The areas within the Tideflats study area that do provide natural vegetation cover are typically associated with Port of Tacoma-managed habitat mitigation sites, which provide substantial habitat for fish and wildlife species, particularly salmonids. The Port created its first habitat mitigation site at Slip 1 in 1980 and since then over 21 sites and approximately 213 acres have been developed or preserved by the Port. The habitat sites are a result of either compensatory mitigation requirements due to unavoidable development or remediation impacts, NRDA, or preservation of open space provide as a public benefit (Port of Tacoma 2018).

One of the first sites (and the most well-known) is the Gog-le-hi-te wetland complex, which totals approximately 26 acres of estuarine intertidal wetland habitat. The wetlands provide valuable habitat to numerous species of fish and wildlife, including important Tribal, commercial, and ESA-listed fish species. Gog-le-hi-te provides an important transitional environment for juvenile salmon migrating from fresh to marine waters as well as habitat for migratory and resident birds (**Exhibit 5-5-5**). At the mouth of the former Milwaukee Waterway is another mitigation site of approximately 30 acres that supports marine intertidal and shallow subtidal sandflats and mudflats. The site restored and connected two previously existing sandflats of Commencement Bay and provides spawning habitat for surf smelt and foraging opportunities for juvenile salmon, shorebirds, and waterfowl (**Exhibit 5-5-5**).

Exhibit 5-5-5 Estuarine and Intertidal Habitats at Mitigation Sites



Note: Gog-le-hi-te I view to the east (left); Gog-le-hi-te II view to the west (center); Milwaukee Waterway to the north (right)
Source: Port of Tacoma, 2018.

Existing Port mitigation sites are summarized in **Exhibit 5-5-6**. Some of the listed sites are outside of the Tideflats study area (e.g., Clear Creek, Upper Clear Creek, and Place of Circling Waters). A map showing the location of these sites as well as potential sites is included (Stebbins, 2021).

Exhibit 5-5-6 Existing Port Habitat Sites in Study Area

Name	Size (acres)	Habitat Types and Species Use ¹
Slip 5 (Phase I)	2.50	Estuarine intertidal
Slip 5 (Phase II)	0.20	Estuarine intertidal
Mowitch NRDA	3.17	Estuarine intertidal/riverine tidal

Name	Size (acres)	Habitat Types and Species Use ¹
Milwaukee Waterway	30.00	Estuarine intertidal and subtidal
Outer Hylebos	1.60	Estuarine intertidal
Fairliner	3.35	Estuarine intertidal and subtidal
qʷiqʷəlut (deeded to City of Tacoma)	1.25	Estuarine intertidal
Clear Creek (Phase I)	9.70	Riverine lower perennial
Clear Creek (Phase II)	6.50	Riverine lower perennial
Gog-le-hi-te Habitat Improvement Action	1.13	Estuarine intertidal/riverine tidal
Slip 5 (Phase III)	7.00	Marine intertidal and subtidal
Inner Hylebos Peninsula	1.70	Estuarine intertidal
Orting Habitat Preservation Area	9.64	Riverine lower perennial
Gog-le-hi-te II	8.38	Estuarine intertidal/riverine tidal
APM Seaplane Ramp	0.29	Estuarine intertidal
Dick Gilmur Public Access	2.00	Marine intertidal
Sound Refining Cove	20.66	Estuarine intertidal
Place of Circling Waters	30.00	Estuarine intertidal/riverine tidal
EB-1B Alexander Avenue	1.70	Palustrine scrub shrub
Upper Clear Creek	40.00	Riverine lower perennial

¹ Habitat type based on Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979).
Source: Port of Tacoma, 2018.

Slip 5

The Slip 5 habitat site includes about 7 acres of marine intertidal and subtidal habitat. Slip 5 is located on the west side of the mouth of the Blair Waterway, bordering Commencement Bay. Slip 5 provides a sand and gravel beach habitat ideal for juvenile salmon to find food and is also prime habitat for birds. Located on the west side of the mouth of the Blair Waterway, bordering Commencement Bay, Slip 5 provides a sand and gravel beach habitat ideal for juvenile salmon to find food. The site also provides habitat for birds.

Mowitch NRDA

The Mowitch NRDA habitat site includes 3.17 acres of estuarine intertidal/riverine tidal habitat where the mouth of Hylebos Creek becomes the Hylebos Waterway. In 1993, the Port created a 100-foot buffer with native vegetation and woody debris to give juvenile salmon a place to feed and hide.

Milwaukee Waterway

The area at the mouth of the former Milwaukee Waterway was shaped into 30 acres of high quality intertidal and shallow subtidal habitat. The site connects two existing sand flats and the Puyallup River delta to provide a complex of habitat types vital to juvenile and adult salmon.

This intertidal and shallow subtidal habitat provides food and shelter for animals up and down the food chain. The sand, mud and gravel house invertebrates such as epibenthic and benthic organisms. Clams, worms and other burrowing animals, as well as birds, forage fish, and salmon, feed on plankton and other small organisms.

Outer Hylebos

Outer Hylebos is approximately 1.6 acres of estuarine intertidal and subtidal habitat. Located along Marine View Drive, the Outer Hylebos was originally designed and built by the Puyallup Tribe of Indians on Port property through an agreement in 1995. Ownership of the site was transferred from the Port to the Puyallup Tribe of Indians as part of that agreement. The site includes intertidal, salt marsh and riparian habitats. It provides food and shelter for juvenile salmon migrating out of Hylebos Creek, as well as Puyallup River salmon rearing in the nearshore areas of Commencement Bay.

Fairliner

A former marina has new life as a home for birds and fish. The Fairliner Habitat Area is located in a small cove next to Washington United Terminals, a container terminal on the west side of the Blair Waterway. The quiet beach and tidal mudflat provide a rich feeding environment for fish and birds. The quiet beach and tidal mudflat provide a rich feeding environment for fish and birds. Native trees and plants such as shore pine, kinnikinnick (bearberry), Oregon grape, and wild strawberry provide refuge for nesting birds.

q^wi^qwəlut (deeded to City of Tacoma)

Nestled between Washington United Terminals and U.S. Oil, this site of a former fertilizer plant now features a public overlook with views of salt marsh and mudflat habitat ideal for young salmon. q^wi^qwəlut or "Little Marsh" (formerly Rhone-Poulenc) consists of 1.25 acres of estuarine intertidal habitat. The Port deeded the site to the City of Tacoma after construction.

Clear Creek (Phases I and II)

The Port built an outlet channel, tidally-influenced freshwater mudflat refuge bay, bridge and sluice gate at the mouth of Clear Creek. Clear Creek is the last freshwater tributary to the Puyallup River, about three miles upstream from Commencement Bay. This site provides salmon with food, shelter and access to nearly 10 miles of streams and creeks. It is also home to birds and other wildlife. A variety of trees—big-leaf maple, dogwood, hazelnut, red alder, vine maple and western red cedar—shade and cool the water for fish and offer nesting places for hundreds of birds.

Gog-le-hi-te I

The Gog-le-hi-te wetland complex is a series of existing and planned habitat sites. Currently, three different restoration actions (Gog-le-hi-te I, Gog-le-hi-te Habitat Improvement Action, and Gog-le-hi-te II) have re-created over 13 acres of estuarine intertidal/riverine tidal habitat. The Puyallup River levee was breached in two locations to provide off-channel habitat for migrating salmon.

Inner Hylebos Peninsula

The Inner Hylebos Peninsula habitat site includes approximately 1.7 acres of estuarine intertidal habitat. The site is located on the eastern side of Hylebos Waterway. This project was completed through a partnership between the Puyallup Tribe of Indians and the Port. The site was constructed and is still owned and managed by the Puyallup Tribe of Indians. The habitat site was created by converting upland into intertidal mudflat to provide habitat for epibenthic organisms, thereby creating a food source and rearing habitat for juvenile salmon migrating out of Hylebos Creek and Puyallup River.

Orting Habitat Preservation Area

The Orting Habitat Preservation Area is located adjacent to the upper Puyallup River, and provides approximately 9.6 acres of preserved riparian forest along 466 feet of river frontage. Site topography and geomorphic formations suggest the property is within the historical channel migration zone of the Puyallup River. The Port transferred the property's title to Pierce County and the deed limits the site to public use as open space, passive recreation, flood control, and habitat restoration, preservation and management. The site cannot be used for any other purpose.

Gog-le-hi-te II

A public overlook provides views of wetland habitat along the Puyallup River. The off-channel habitat supports a healthy ecosystem for juvenile salmon, plants and a variety of wildlife.

APM Seaplane Ramp

An old asphalt slab associated with a former seaplane ramp, located at the northern tip of the West Sitcum Terminal, was removed and replaced with new substrate within the slab footprint. This change in substrate provides more opportunity for increased productivity of epibenthic organisms, in turn providing more prey for juvenile salmonids as they migrate out from the Puyallup River. By providing more prey availability to an area highly utilized by juvenile salmon, this small but highly productive site contributes to the overall salmon rearing function of Inner Commencement Bay.

Dick Gilmur Public Access

This site's restored shoreline provides habitat for the hundreds of birds and other wildlife that live along the storm-scoured shore. Native plants help anchor soil and provide shade, food and

refuge. Long-term plans call for restoring more of the beach and tidelands, returning critical Puget Sound habitat to the Commencement Bay shoreline along Marine View Drive.

Sound Refining Cove

The Sound Refining Cove is 20 acres on the eastern side of Hylebos Waterway and is a combination of estuarine intertidal and subtidal habitat. The property is owned by the Port; however, this habitat site was constructed and is maintained by Occidental Chemical through an agreement associated with the Superfund cleanup of Hylebos Waterway.

Place of Circling Waters

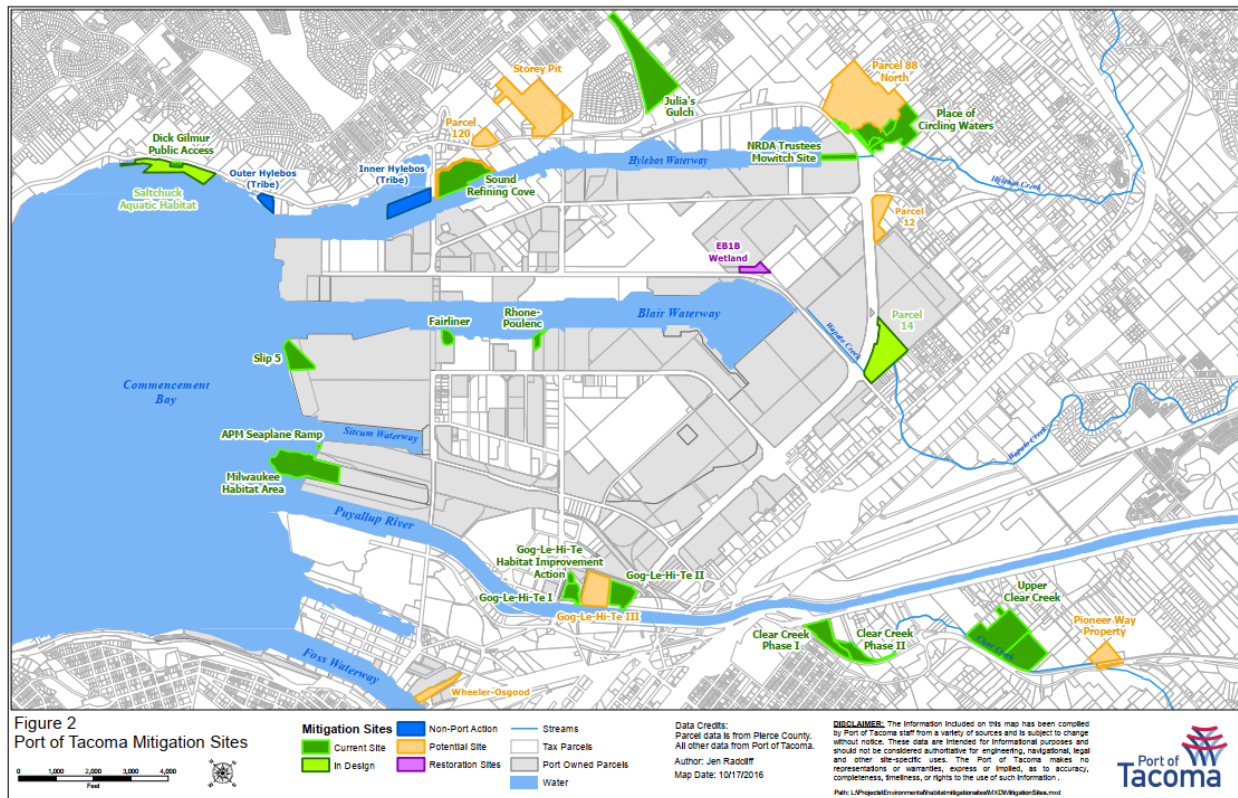
Once a gravel mine and inert waste landfill, this 30-acre consolidated habitat site at the mouth of Hylebos Creek now features valuable intertidal estuarine marsh, tidally-influenced stream channels and forested riparian open space. The site is connected to several other restored areas along the creek. It is part of a larger effort to rejuvenate salmon runs on the tidally-influenced stream.

EB-1B Alexander Avenue

The Alexander Avenue – EB-1B Wetland Restoration (EB-1B) is 1.7 acres of palustrine emergent and scrub-shrub habitat and associated buffer. The restoration includes excavating over 5,000 cubic yards of fill and replanting the area with native shrubs and non-invasive herbaceous species.

Upper Clear Creek

This sizable habitat restoration along Clear Creek, a tributary to the lower Puyallup River, includes rehabilitated floodplain wetlands, more natural meandering and braided creek channels and other habitat features, such as ponds, hummocks, alcoves, standing snags and large woody material. Invasive reed canarygrass was replaced with native grasses and more than 145,000 native plants, shrubs and trees. The site is now home to a variety of wildlife, including salmon, trout, frogs and salamanders, herons, eagles, and several species of songbirds and waterfowl.

Exhibit 5-7 Port of Tacoma Mitigation Sites

5.3 Key Findings and Implications for the Plan

The following topics related to plants and animals should be considered in the development of the Tacoma Tideflats Subarea Plan:

- Habitat for plants and animals is very limited in the Tideflats study area due to existing intense industrial and port land uses, and past conversion of the estuary to a working waterfront.
- The study area continues to be an important location for anadromous fish and shellfish connected to Puyallup Tribal Fisheries restoration and management.
- Documented shellfish resources include Dungeness crab and geoduck clams, although the Washington State Department of Health has closed all of Commencement Bay shoreline to shellfish harvesting due to a combination of marine biotoxins and pollution associated with densely populated urban areas (DOH 2021).
- There is limited potential for improving habitat for plants and animals while maintaining industrial land uses, with the exception of City, Tribe, and Port-managed habitat mitigation sites or other restoration areas. These areas provide substantial habitat for fish and wildlife species, particularly salmonids, and are critical to maintaining or improving conditions for plants and animals.

- The Subarea Plan should not restrict any restoration activities and, if possible, should strive to provide more opportunities for new sites through policies, programs, or funding.

6 FLOODPLAINS

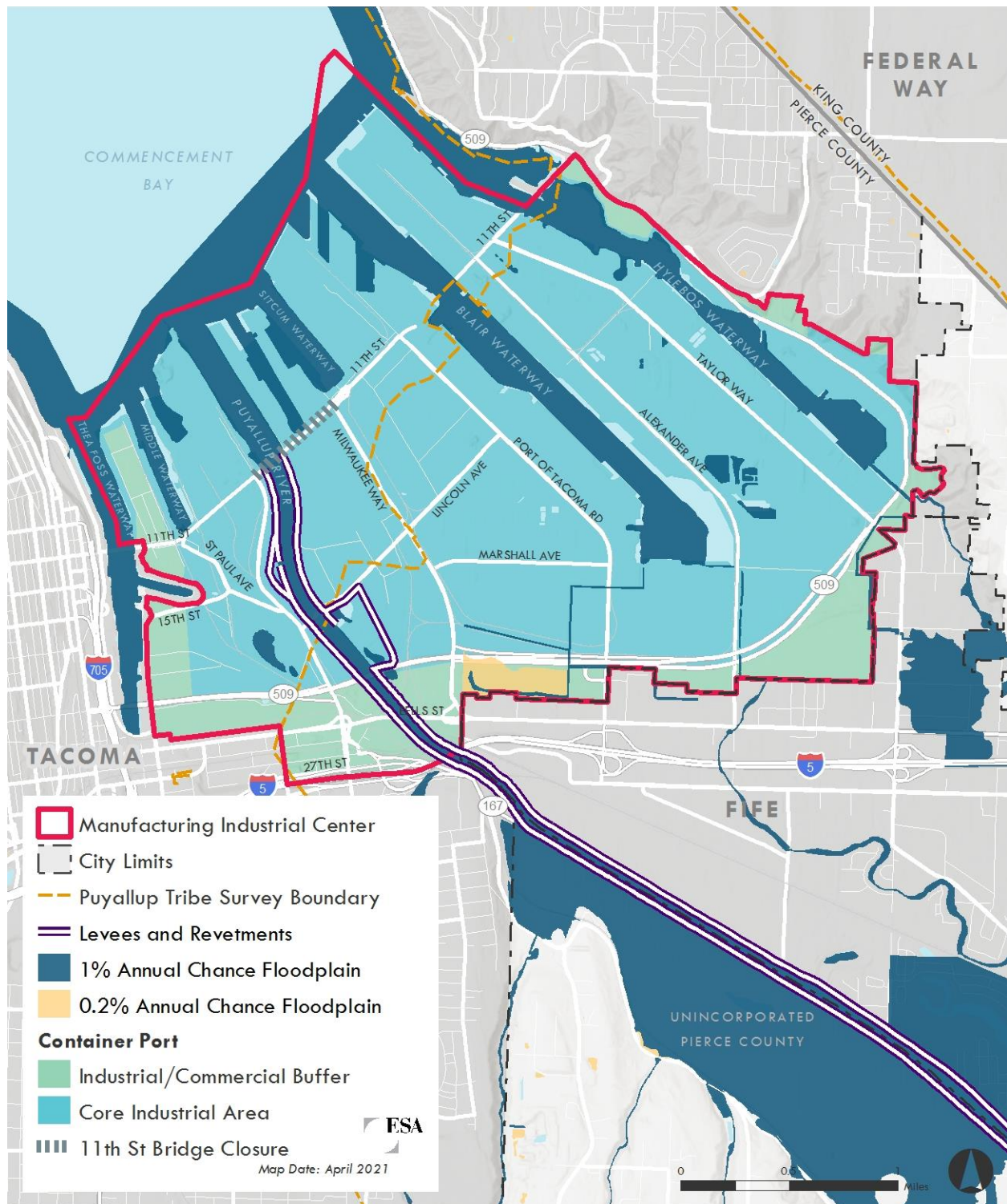
The section describes existing conditions for floodplains within the Tideflats study area (see Exhibit 6-1). The section includes a discussion of floodplain designations; existing policies, plans, and regulations; potential flood hazards; and key findings and implications for the Subarea Plan (the Plan).

6.1 Existing Policies and Regulations

This section describes the existing regulatory environment (at the federal, state, and local levels) for floodplains in the study area. It also describes plans, such as hazard management plans and flood plans, and the floodplain designations for the study area as determined by the Federal Emergency Management Agency (FEMA).

Floodplain Designations

FEMA maps floodplain areas in the United States. The Flood Insurance Rate Map (FIRM) for Pierce County, which includes the Tacoma Tideflats study area, has an effective map date of March 7, 2017 (FEMA 2020). While the map shows several areas of the 1% annual chance floodplain, the majority of the Tacoma Tideflats area is not mapped within the regulatory floodplain. Note that since FEMA maps are based on historic flooding and data, they may indicate flooding on Port properties that have since been raised (Husky Terminal, south end of Milwaukee Waterway, etc.). Exhibit 6-1 shows the regulated floodplain in the Tacoma Tideflats area, which is located within the City of Tacoma. Portions of the area are also within the Puyallup Indian Reservation, and it borders the City of Fife. The Puyallup River and the waterways are mapped as regulated floodplain.

Exhibit 6-1 Regulated Floodplain, Levees, and Revetments in the Study Area

Areas of the 1% annual chance floodplain within the regulatory floodplain are represented in Exhibit 6-1 and include the following:

- Several low-lying areas between E Alexander Avenue and Taylor Way.
- A low-lying area directly adjacent to the Hylebos Waterway.
- An area adjacent to Commencement Bay between the Sitcum Waterway and the Puyallup River.
- Two small areas adjacent to the Blair Waterway near Commencement Bay.
- A small area south of 15th Street and north of Highway 509.
- Two small areas directly east of the Puyallup River, south of Lincoln Avenue.
- An area south of Highway 509, between Milwaukee Way and Port of Tacoma Road E (which is mapped as within the 0.2% annual chance floodplain).

Federal Regulatory Requirements

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is managed by the FEMA and was established with the National Flood Insurance Act of 1968. The two main objectives of the NFIP are to: (1) provide flood insurance to property owners, businesses, and renters, which allows the transfer of some of the financial risk associated with floods from property owners to the federal government; and (2) develop and implement management standards for floodplains to mitigate and reduce flood risk. Currently, the NFIP provides insurance to over 22,000 participating communities in 56 states and jurisdictions. In addition to providing insurance, the NFIP provides other services including mapping and identifying flood hazard areas, establishing building code and community land use standards, and providing grants or other funding sources for investments in flood risk reductions (Congressional Research Service 2020). To maintain membership in the NFIP, local jurisdictions are required to adopt minimum floodplain regulations for new structures. Local floodplain regulations adopted under the NFIP are described below.

NFIP Biological Opinion for Puget Sound

In September 2008, the National Marine Fisheries Service (NMFS) issued the NFIP Biological Opinion (BiOp) after it was found that the operation of the NFIP was resulting in impacts on Endangered Species Act (ESA) protected species within Puget Sound (NMFS 2008). As result of the BiOp, FEMA requires that all proposed developments within a floodplain must demonstrate that their project will not adversely affect species protected by the ESA. Local jurisdictions can either adopt a floodplain management ordinance that complies with the BiOp or can review each proposed development for BiOp compliance (FEMA 2017).

Tribal Plan

Puyallup Tribe of Indians All Hazards Mitigation Plan

The Puyallup Tribe of Indians All Hazards Mitigation Plan (2017–2022 Edition) includes a sub-section on flood hazard and describes a Port of Tacoma Flood Hazard Area (Puyallup Tribe of Indians 2017). It describes flood impacts (across various flood hazard areas) including health and safety, continuity of operations and delivery of services, damage to property, facilities, and infrastructure, damages to the environment, impacts on economic and financial conditions, and impacts on public confidence in a jurisdiction's governance.

State Regulatory Requirements

Chapter 86.16 of the Revised Code of Washington (RCW) Floodplain Management

RCW 86.16 established that Washington State assumes regulatory control over the navigable waters and non-navigable waters within the state to alleviate flood damages and risks to public safety. The RCW establishes that the Washington State Department of Ecology (Ecology) is responsible for coordinating/implementing the floodplain management regulation elements of the NFIP. There are three ways in which floodplains shall be managed within the state:

7. Administration of the NFIP by local governments.
8. Floodplain management requirements that meet the minimum federal requirements for the NFIP.
9. Regulatory orders.

The RCW states that that this regulation is to be applied over any planning, construction, maintenance, or operation effort that could adversely affect the regimen of a body of water or impact health, life, or property protection from flood waters.

Local Plans, Policies, and Regulatory Requirements

Pierce County Rivers Flood Hazard Management Plan

The Pierce County Rivers Flood Hazard Management Plan (Management Plan) was implemented in 2013 to address issues including flooding and channel migration on major rivers and floodplains associated with large tributaries (Pierce County 2013). The purpose of the Management Plan is to “*recommend regional policies, programs, and projects to reduce risks to public health and safety; reduce infrastructure and property damage; reduce maintenance costs; and improve habitat conditions, while protecting and maintaining the regional economy.*” In 2018, the Flood Plan Update and Progress Report was released as a companion document to the 2013 Management Plan (Pierce County 2018). The 2018 Flood Plan Update provides technical updates

to hazards associated with flooding, along with a discussion of accomplishments since the adoption of the 2013 Management Plan.

Pierce County Flood Control Zone District

The Pierce County Flood Control Zone District (FCZD) is a special purpose district charged with addressing flood management needs. The FCZD was formed by the Pierce County Council in 2011 and covers the entirety of Pierce County. The FCZD raises funds through a countywide property levy, which raised \$12.8 million in 2020. The FCZD is governed by a Board of Supervisors, and the Pierce County Department of Planning and Public Works implements the FCZD's programs (Pierce County FCZD 2020).

Pierce County Region 5 All Hazard Mitigation Plan

The Pierce County Hazard Mitigation Plan (Mitigation Plan) identifies flooding as one of the five meteorological hazards within the county (Pierce County 2020). The Mitigation Plan includes data on past flooding events and establishes mitigation measures including:

- Updating the FEMA Flood Insurance Rate Maps.
- Mapping of channel migration zones.
- Completing levee improvement and setback projects.
- Maintenance and construction of flood control infrastructure.
- Offering of relocation services to flood hazard area residents.
- Expanding public education.

Pierce County Floodplain Ordinance, 18E.70.040

Chapter 18E.70.040 of the Pierce County Flood Ordinance identifies construction and development activities that are permitted in flood hazard areas as well as the standards they must adhere to. This chapter also specifies standards for development within coastal flood hazard areas, including requirements for access, clearing and grading, new structures, sewage, and potable water.

Port of Tacoma Region 5 All Hazard Plan

The Port of Tacoma Hazard Plan (2020) is an addendum to the Region 5 Hazard Mitigation Plan (Port of Tacoma 2020). It includes flooding as one of the five meteorological hazards, provides a map of Port of Tacoma-owned properties located in flood hazards areas, and establishes mitigation measures.

Tacoma Floodplain Ordinance

The Tacoma Municipal Code (TMC) classifies how flood hazard areas are determined and provides development standards (TMC 13.11.600). Designated flood hazard areas with the City are consistent with the FIRM and established by the Federal Insurance Administration. When the FIRM does not provide enough information, the City of Tacoma will consult the information provided by other governmental agencies including the U.S. Army Corps of Engineers (Corps), Department of Housing and Urban Development, and the Natural Resources Conservation Service (NRCS). The ordinance also establishes development standards for floodplains. All development proposals located in a flood hazard area must comply with all plans and ordinances as specified in TMC 13.11.620. Projects that would reduce flood water storage ability must mitigate the impact by demonstrating the creation of on- or off-site compensatory water storage.

Tacoma Shoreline Master Program

The Tacoma Shoreline Master Program (SMP) resulted from the Washington State Shoreline Management Act (SMA), which regulates Washington State Shorelines to prevent “*the inherent harm of uncoordinated and piecemeal development of the state’s shorelines*” (Chapter 90.58 RCW). The Tacoma SMP aims to protect the City’s shoreline jurisdictions from flood damage by establishing flood hazard area standards that regulate development and construction activities and protect fish-bearing waters (City of Tacoma 2013).

6.2 Current Conditions

Potential Flood Hazards

Under current conditions, flooding does not appear to be a substantial hazard for the Tacoma Tideflats area. As described above, the area is not mapped within the 1% annual chance floodplain, with the exception of several isolated low-lying areas. As shown on Exhibit 6-1, the study area is protected from flooding by levees on both sides of the Puyallup River. The 2013 Pierce County Rivers Flood Hazard Management Plan does not describe a history of flooding in the study area (Pierce County 2013). The primary threat to the study area from flooding relates to the potential inundation of access routes including roads and rail to the Port of Tacoma, potentially causing substantial supply chain delays (Warfield 2020).

The City of Tacoma’s wastewater treatment plant is located in the floodplain in the study area. In a 2009 flood event, the treatment plant was considered at risk of flooding, and 17,000 sandbags were placed around the plant to protect it from inundation. In that event, the banks did not overtop. However, if the treatment plant had flooded, untreated wastewater could have been released into Puget Sound, and business at the Port of Tacoma could have been disrupted (Glenn 2015). In 2015, a floodwall was constructed with funding from the Pierce County Flood Control

Zone District and the City of Tacoma, increasing the protection of the treatment plant from inundation (Pierce County FCZD 2016).

While flooding does not currently pose a substantial threat to the Tacoma Tideflats area, climate change will likely increase the risk of flooding. A 2018 factsheet (*Climate Change in the Puyallup River: A Quick Reference Guide for Local Decision-Makers*) prepared by Floodplains by Design, The Nature Conservancy, and the University of Washington Climate Impacts Group, states that the sea levels will rise in Commencement Bay, and both rain storms and riverine flooding will become more frequent and severe. The factsheet projects:

- Six to seventeen inches of sea level rise by the 2050s.
- An increase in streamflow volume of 37% or greater during a 100-year flood.
- An increase of 5 or more additional days of heavy rain events (an increase from 2 days to 7 days) by the 2080.
- A 22% increase in the intensity of 24-hour rain events by the 2080s (Floodplains by Design et al. 2018).

These factors suggest that flooding could become a significant threat to the Tacoma Tideflats area in coming decades.

6.3 Key Findings and Implications for Plan

The following topics related to floodplains should be considered in the development of the Tacoma Tideflats Subarea Plan:

- Critical facilities should be located outside of the Tacoma Tideflats area when possible to avoid issues similar to those faced by the City of Tacoma wastewater treatment plant. Critical facilities include emergency services (such as police stations and fire stations), medical facilities (such as hospitals and nursing homes), schools and daycare centers, or facilities that store toxic materials.
- Some critical facilities may not be located outside of the Tacoma Tideflats such as port terminals and the fire stations that serve them. If located in the Tideflats area, critical facilities may require additional protection such as flood infrastructure similar to the wastewater treatment plant.
- The Subarea Plan should take into account increased flood levels in the future with sea level rise and changing hydrology. The Subarea Plan should assume that overtopping of levees and inundation of the Tideflats area is a real possibility in future decades. Climate change projections should be considered in relation to the design lifetime of infrastructure in the area, Plan components, and the Plan itself.
- The resilience of the transportation network providing access to the Tideflats area should be considered in the Subarea Plan. Blocking of access to the Tideflats area is the primary threat

posed by flooding under current conditions. Transportation access is critical to support Port of Tacoma businesses, as well as for emergency response during a flood event.

7 CLIMATE CHANGE VULNERABILITY ASSESSMENT

A critical component in climate resiliency planning is an assessment of the vulnerability of different resources and infrastructure assets within the study area. The vulnerability of a resource or asset is defined within this study as a product of three components: exposure, sensitivity, and adaptive capacity (Snover, et al., 2007), defined below.

- **Exposure** is the degree to which a system or asset is exposed to climate hazards over a planning horizon. The 1 ft and 2 ft RSLR scenarios are the focus of hazard exposure discussion due to the 20-year planning horizon of this study.
- **Sensitivity** is the degree an asset would be impaired by the impacts of climate hazards. Systems that are greatly impaired by small changes in climate hazards have a high sensitivity, while systems that are minimally impaired by the same small change in climate hazards have a low sensitivity.
- **Adaptive capacity** is the ability of an asset to respond to climate hazards, to moderate potential damages, to take advantage of opportunities, and to cope with the consequences. This does not mean that the system must look the same as before the impact, but it must provide comparable services and functions with minimum disruption or additional cost.

The vulnerability of a resource increases as sensitivity and hazard exposure increase. Adaptive capacity is inversely related to vulnerability in that as the adaptive capacity increases, the vulnerability decreases. In the context of SLR adaptation, resources with low vulnerability may utilize lower, less conservative RSLR projections for planning purposes due to their ability to adapt or experience relatively small consequences of RSLR hazard impacts, whereas higher, more conservative RSLR projections may be appropriate for highly vulnerable resources.

7.1 Coastal Development

Hazard Exposure

Coastal flood hazard exposure is limited for coastal development within the 20-year planning horizon of this study. Flood projections under MHHW conditions for the 1 ft and 2 ft RSLR scenarios are largely restricted to low-lying areas bordering drainage canals and do not extend into any terminal areas. No public service facilities are projected to experience flood impacts under MHHW conditions with 1 ft and 2 ft RSLR.

Increased flood hazard exposure is seen under 1% annual chance coastal and riverine flood conditions, where flood projections with 1 ft RSLR extend into select areas between the Thea Foss Waterway and the Puyallup River as well as areas between the Blair Waterway and Hylebos Waterway. Flood hazard exposure under 1% annual chance conditions becomes more widespread with 2 ft RSLR, impacting development within both the MIC and surrounding areas including the Franciscan Occupational Health – Port Clinic, though the majority of projected depths of flooding remain shallow. Flooding is not projected for any other public service facilities under the 1 ft and 2 ft RSLR scenarios.

Hazard Sensitivity

Coastal development has a high overall sensitivity to both storm and non-storm RSLR hazards, particularly those structures with a first floor that sits at ground level. Though temporary, widespread flood impacts during a 1% annual chance event as projected under a 2 ft RSLR scenario are likely to cause substantial damage to any inundated structures, potentially disrupting use of major industrial, commercial, public service, and recreational resources for an extended amount of time as repairs are made. Any coastal flooding from high tides is likely to frequently result in structural damages and disruption of use and services within affected areas.

Adaptive Capacity

Overall adaptive capacity is low for coastal development due to the challenges and costs associated with implementing traditional flood hazard mitigation measures such as elevating structures, flood protection, or floodproofing, especially when considering the potential for widespread flood hazard impacts under severe, long-term RSLR scenarios. Despite overall low adaptive capacity, select development areas that have finished floors on elevated building pads may have improved capacity for adaptation. Options also remain present over the short-to-medium term for low-lying development areas in the form of low-cost flood barriers designed to limit damage from temporary, storm-related flooding. However, reliance on temporary measures may not be adequate to accommodate flood hazard projection under long-term RSLR scenarios.

7.2 Utilities Infrastructure

Hazard Exposure

Coastal flood hazard exposure for utilities infrastructure is greatest along drainage channels that flow into the Blair Waterway and Hylebos Waterway, where high-tide flooding is projected under 1 ft and 2 ft RSLR scenarios. Exposed infrastructure under MHHW conditions primarily consists of outfalls and stormwater infiltration ponds. Flood hazard exposure for potable water, wastewater, and power infrastructure is minimal under MHHW conditions for the 1 ft and 2 ft RSLR scenarios.

Under 1% annual chance conditions, coastal flood projections with 1 ft RSLR extend across additional stormwater outfalls and additional important utilities resources such as the Central Wastewater Treatment Plant. The flood hazard exposure for power utilities infrastructure increases under 1% annual chance flood conditions with 2 ft RSLR as flood projections extend across several substations in areas bordering the Hylebos Waterway, Blair Waterway, and Sitcum Waterway. The flood hazard exposure of water utilities also becomes significant under these conditions due to projected flooding over a large number of outfall locations.

Hazard Sensitivity

Hazard sensitivity for water utilities infrastructure is high overall, as the normal operation of stormwater infrastructure can be affected if water levels rise to the point where backwater effects occur. A backwater effect occurs when a channel restriction or obstruction at the downstream end raises the surface of the water upstream from it, potentially leading to flooding. Though beyond the 20-year planning horizon of this study, high tide flood projections under 4 ft and greater RSLR scenarios are likely to impact stormwater operations if outfall locations become inundated for extended periods of time. Any stormwater infrastructure that relies on gravity flow is also likely to experience some reduction in capacity due to higher downstream water levels. Wastewater treatment plants and pump stations are also likely to experience disruptions in service if inundated during flood events.

Adaptive Capacity

The adaptive capacity of water utilities infrastructure is low overall due the built nature of the infrastructure in fixed locations and the need to maintain function of the network as a whole if any changes are made. Any adaptation measures in highly exposed areas would likely require additional hydraulic studies if significant changes are made to ensure utility functions are not adversely impacted as a result. Though a potential challenge, opportunities exist to coordinate elevation of infrastructure such as outfalls, pumps, and lift stations with any future improvements to or elevation of coastal infrastructure if necessary.

7.3 Transportation Infrastructure

Hazard Exposure

Flood hazard exposure for transportation infrastructure is minimal under MHHW conditions for the 1 ft and 2 ft RSLR scenarios, with only local roadways bordering Hylebos Waterway drainage channels projected to experience flood impacts. Flood hazard exposure increases under the 1% annual chance flood conditions with 1 ft RSLR as flood projections extend across multiple roadways within the MIC such as Taylor Way and St Paul Avenue. Low-lying areas surrounding Route 509 are also projected to experience flooding between the Thea Foss Waterway and Puyallup River under these conditions.

Under the 1% annual chance flood conditions with 2 ft RSLR hazard exposure grows to encompass significant portions of local roadways within the MIC. Segments of Interstate 5 south of the Blair Waterway are also projected to experience flooding. Bridges crossing the Thea Foss Waterway, Puyallup River, and Hylebos Waterway have minimal flood hazard exposure across the 1 ft and 2 ft RSLR scenarios due to their elevation above grade or at Puyallup River levee height.

In addition to flood hazards, segments of Route 509 along the bluff toe in the northeastern portion of the study area are also currently susceptible to shallow and deep landslide hazards. Climate projections such as increased air temperature or increased intensity of extreme precipitation events can potentially exacerbate landslide hazards within the study area. Any increased frequency or severity of landslide hazards in these areas has the potential to further disrupt transportation functions along this corridor.

Hazard Sensitivity

The hazard sensitivity for transportation infrastructure is moderate overall, but is variable based on the type of hazard. Transportation infrastructure typically has a low sensitivity to shallow and short duration flooding, as minor flooding is unlikely to result in significant damage. This sensitivity can be reduced further if roadways subject to coastal flooding are constructed with corrosion resistant materials. As flooding becomes more frequent and severe, transportation infrastructure becomes more sensitive to hazards as longer interruptions in service and more extensive damage become likely along roadways. Transportation infrastructure along the shoreline is also sensitive to erosion and undermining, which can result in prolonged closures, safety concerns, and costly repairs. Widespread flooding, traffic congestion from road closures, or damage to key roads may also impact emergency response times.

Adaptive Capacity

Transportation infrastructure has a moderate adaptive capacity overall. Strategies such as elevating structures are generally more feasible for select portions of roadways as compared to residential or commercial development, but the locations of coastal roadways are often inflexible due to the lack of available area landward and the need to connect multiple high-use industrial services within the study area. Given these factors, adaptation strategies will likely require measures to accommodate extreme storm flood impacts and limit potential for more frequent tidal inundation events along coastal roadways as RSLR increases.

7.4 Environmental Resources

Hazard Exposure

Coastal environmental resources such as wetlands have a high exposure to RSLR hazards as these areas are continuously exposed to changes in tidal water elevations over time. While specific impact thresholds are challenging to quantify due to the number of interdependent ecological process involved, potential thresholds can potentially be estimated based on changes in high tide flood projections within the current wetland areas.

Hazard Sensitivity

Though wetlands are largely resistant to temporary inundation hazards, coastal wetlands can be highly sensitive to consistently elevated non-storm water levels, as these changes can significantly alter the structure and function of wetland ecosystems. This is particularly true if the inland migration of tidal floodwaters exceeds the landward migration rate or sediment accretion rate of wetland areas. If wetlands areas cannot match the gradual increase in tidal elevations due to RSLR these systems will gradually transition to subtidal areas, covered by water at all states of the tide.

Adaptive Capacity

The adaptive capacity of wetland areas is highly dependent on the ability of these natural features to maintain their relative elevation to water levels over time. In natural systems, sediment supply from river discharge or bluff erosion can offset the impacts of RSLR on wetland areas through sediment accretion, which increases land elevation over time. This potential adaptive capacity is highly dependent on a number of dynamic processes including rates of RSLR, coastal sediment accretion, and the ability of wetland species to colonize new areas, and as such may require ongoing monitoring efforts to ensure preservation of ecological functions. Alternative

methods such as thin-layer sediment placement may also be employed to mitigate RSLR impacts by gradually elevating wetland areas as tidal elevations increase.

7.5 Vulnerability and Risk

Results Summary

Exhibit 7-1 provides a summary of the overall vulnerability of coastal resources and infrastructure within the study area. Vulnerability falls into four categories: low (L), medium (M), high (H) and severe (S) based on the potential frequency and severity of climate hazard impacts.

Exhibit 7-1 Vulnerability Rating for Resources and Infrastructure within the Study Area.

Resource	RSLR-Related Hazards	RSLR Scenario				
		1ft	2ft	3ft	4ft	5 ft
Coastal Development						
Industrial Areas within MIC	Coastal/fluvial flooding	L	M	H	S	S
Development Bordering MIC	Coastal/fluvial flooding	M	M	H	S	S
Utilities Infrastructure						
Stormwater	Loss of function due to higher tidal elevations	M	M	M	H	S
Wastewater	Coastal/fluvial flooding	H	H	H	S	S
Water	Coastal/fluvial flooding	L	L	L	M	H
Power	Coastal/fluvial flooding	L	M	M	H	S
Transportation Infrastructure						
Highways	Coastal/fluvial flooding	L	M	M	H	H
Roadways	Coastal/fluvial flooding	M	M	H	H	S
Bikeways	Coastal/fluvial flooding	L	L	M	H	H
Trails	Coastal/fluvial flooding	L	L	M	H	H
Environmental Resources						
Wetlands	Habitat loss due to inundation	M	M	M	H	S

Low (L): Limited areas of vulnerability during extreme conditions

Medium (M): Significant areas of vulnerability during extreme conditions or limited vulnerability during normal conditions

High (H): Area-wide vulnerability under extreme conditions, or significant vulnerability under normal conditions

Severe (S): Area-wide vulnerability under normal conditions

As illustrated in Exhibit 7-1, vulnerability is variable across different resource types within the study area but is generally low to moderate for the 1ft and 2ft RSLR scenarios associated with a 20-year planning horizon. The exception to the overall trend is wastewater infrastructure, rated as highly vulnerable due to projected flooding of the Central Wastewater Treatment Plant under 1% annual chance flood conditions with 1ft RSLR. Extreme flood events have threatened this facility in the past, and ongoing mitigation strategies will likely be necessary given the potential for area-wide impacts if the facility is compromised.

High and severe vulnerability ratings become more common beyond the 20-year planning horizon at 3ft and greater RSLR scenarios. High vulnerability ratings for roadways and coastal development with 3ft RSLR are driven by widespread 1% annual chance flood projections and relatively low adaptive capacity for these types of infrastructure. Vulnerability becomes high to severe across all resource types for the 4ft and 5ft RSLR scenarios except for potable water infrastructure, which maintains moderate vulnerability under the 4ft RSLR scenario due to lack of projected flooding at pump stations.

In addition to vulnerability, resources and infrastructure within the study area are evaluated in terms of risk, a product of potential consequences and timing of hazard impacts. A simple scoring matrix was developed to assess the risk to coastal resources, presented in Exhibit 7-2. The risk scores range from R1 (lowest risk) to R4 (highest risk). Risk can be difficult to define because consequences are subjective, and the precise timing of future impacts are uncertain.

Consequences are determined for each asset qualitatively based on the vulnerability of each asset category. Urgency is determined by distinguishing between long-term and short-term RSLR thresholds. Short-term RSLR thresholds refer to impacts identified for the current sea level or up to 2ft RSLR. Long-term thresholds refer to impacts identified for 3ft and higher RSLR scenarios beyond the 20-year planning horizon of this study. Risk assessment results are presented in Exhibit 7-3.

Exhibit 7-2 Risk Assessment Scoring System

Consequence	Risk Score	
	Short-term RSLR Threshold SLR ≤ 2 ft	Long-term RSLR Threshold SLR ≥ 3 ft
High: Permanently damaged, large impact on system, large loss of value or life	R4	R3
Medium: Temporarily damaged but moderate impact on system, medium loss of value	R3	R2
Low: Temporarily damaged, low impact to system, small loss of value	R2	R1

Exhibit 7-3 Tideflats Resource Risk Assessment Matrix

Resource	RSLR Threshold	Consequence	Justification	Risk Score
Coastal Development				
Industrial Areas within MIC	Long-term (RSLR \geq 3 ft)	High	Highly valuable industrial development critical to region	R3
Development Bordering MIC	Long-term (RSLR \geq 3 ft)	Medium	Variety of uses, less dense than within MIC	R2
Utilities Infrastructure				
Stormwater	Short-term (RSLR \leq 2 ft)	Medium	Temporary impact on infrastructure function	R3
Wastewater	Short-term (RSLR \leq 2 ft)	High	Potential impacts to wastewater treatment plant	R4
Water	Long-term (RSLR \geq 3 ft)	Medium	Potential impacts to pumps in coastal areas	R2
Power	Long-term (RSLR \geq 3 ft)	High	Widespread impacts to substations	R3
Transportation Infrastructure				
Highways	Long-term (RSLR \geq 3 ft)	High	Large impacts possible from temporary disruptions	R3
Roadways	Short-term (RSLR \leq 2 ft)	Medium	Temporary disruptions may have impacts locally	R3
Bikeways	Long-term (RSLR \geq 3 ft)	Low	Relatively minor impacts from temporary loss of service	R1
Trails	Long-term (RSLR \geq 3 ft)	Low	Relatively minor impacts from temporary loss of service	R1
Environmental Resources				
Wetlands	Short-term (RSLR \leq 2 ft)	Medium	Gradual loss of habitat areas	R3

Of the 11 resources categories examined, 4 displayed potential short-term (\leq 2ft) RSLR hazard thresholds: stormwater utilities, wastewater utilities, roadways, and wetlands. Of these resources, wastewater utilities receive the highest R4 risk rating due to projected flooding of the Central Wastewater Treatment Plant, a critical piece of infrastructure within the study area. Stormwater utilities and roadways receive lower R3 risk ratings as short-term impacts are more likely to be temporary disruptions in function or service as opposed to long-term infrastructure damage. Risk

for wetlands over the short-term is driven primarily by potential habitat loss, though these impacts will occur gradually and can be offset by timely mitigation actions.

Of the resource types with long-term (≥ 3 ft) RSLR hazard thresholds, industrial development within the MIC, power utilities infrastructure, and highway infrastructure warranted R3 risk ratings based on the high consequences of hazard impacts. While 3ft and greater RSLR scenarios are outside of the 20-year planning horizon of this study, potential impacts to these resources may warrant consideration in adaptation strategy planning given their critical nature.

Key Takeaways

- Flood projections under 1% annual chance conditions within the MIC largely remain limited to select low-lying areas up to the 3ft RSLR scenario, where projections become widespread. This magnitude of RSLR is beyond a 20-year planning horizon and has approximately a 1% chance of being exceeded by 2070.
- Flooding due to inundation within the MIC during normal tidal cycles is not projected to occur until 4ft and greater RSLR scenarios. RSLR of this magnitude is not projected within a 20-year planning horizon and has only a 5% chance of being exceeded by 2100.
- Climate vulnerability is low to moderate over a 20-year planning horizon for the majority of resources within the study area.
- Wastewater infrastructure has the highest hazard vulnerability and risk due to projected flooding of the Central Wastewater Treatment Plant under short-term RSLR scenarios. The City has taken action to mitigate this risk by constructing a flood wall at the facility. Continued evaluation of flood protection infrastructure and projections at this site is warranted due to the critical nature of the infrastructure.
- Projected impacts over a 20-year planning horizon are primarily driven by increased flood projections during extreme flood events, leading to temporary flooding of roadways and development in low-lying areas. Resources such as stormwater infrastructure or wetlands that are sensitive to tidal elevations may also experience gradual loss of function over the short term.

Next Steps

Despite the potential for significant long-term RSLR hazards and the complexities of adaptation, numerous opportunities are available to mitigate RSLR hazards within the Tacoma Tideflats. Area-wide measures such as increased elevation and improved drainage patterns are key aspects of long-term RSLR adaptation that should be considered throughout the early stages of any redevelopment or infrastructure design. RSLR hazard resilience can then be supplemented by

adaptation measures designed to protect against or accommodate future RSLR hazards. The following objectives have been identified for use in ongoing adaptation efforts at the study area.

Account for up to 2ft RSLR in the short-term design and 5ft RSLR in the long-term planning of high-risk resources

Major, high-risk infrastructure and major utilities that cannot tolerate flooding should consider the potential for severe, low-probability RSLR scenarios at long-term time horizons to avoid potential future loss of key services and minimize the need for costly adaptation measures at a later date. Given these potential consequences, planning for up to 5ft RSLR may be appropriate for resources with 50+ year design lives.

Utilize lower, less conservative RSLR projections in the planning of low-risk resources

Design of lower risk resources such as public spaces and trails that can tolerate infrequent flooding may consider less severe RSLR scenarios initially but should incorporate strategies to increase flood protection levels over time if necessary. Planning for 1ft RSLR over the short term may be appropriate for such resources given the less severe consequences of flooding.

Employ a phased RSLR adaptation approach

A phased approach, where additional measures are implemented as identified RSLR risk thresholds are exceeded, allows project adaptation strategies to adjust over time as needed, reducing the chances of over or underestimating hazard mitigation needs. A critical aspect of phased RSLR adaptation is that initial planning accounts for potential future adaptation measures. Supplementary adaptation measures can then be implemented and adjusted over time, such as increasing the capacity of a floodwall base and tie back to allow for increased elevation once freeboard is reduced below an identified threshold.

Monitor and re-evaluate SLR hazards on a regular basis

RSLR science will continue to evolve over the coming decades. Monitoring observed changes in water elevations at the project site and tracking any changes in RSLR projections will be critical to informing ongoing RSLR adaptation efforts.

Maintain flexibility in SLR adaptation strategies

New or redeveloped infrastructure and short-term RSLR adaptation measures should be designed in a manner that does not preclude implementation of future adaptation strategies geared toward more severe RSLR scenarios. This can be accomplished in a number of ways such as maintaining a buffer area between the shoreline and critical infrastructure.

Coordinate RSLR adaptation efforts with regional initiatives

Where possible, coordination with any regional adaptation strategies will improve hazard resilience both at the study area and throughout the region. This is especially true when

considering the interaction of coastal and fluvial flood hazards that can be impacted by upstream activities.

Seek and attempt to maximize potential hazard mitigation co-benefits

Adaptation efforts such as wetland restoration have the potential to serve both as a public resource and flood hazard mitigation measure. Integrating these RSLR adaptation measures with the potential for co-benefits into overall adaptation strategies has the potential to facilitate RSLR adaptation across the study area.

Recommended Actions

A number of actions to address climate hazard projections and vulnerabilities have been identified as part of this study. The following areas and actions are recommended to be further studied as highest priorities to be addressed over a 20-year planning horizon.

- Implementing flood mitigation measures in low-lying areas surrounding drainage canals within the MIC and surrounding areas.
- Implementing flood mitigation measures for the low-lying area in the southern portion of the Thea Foss Waterway at the Route 509 bridge.
- Mitigating projected flood hazards for low-lying areas of I5 south of the Blair Waterway.
- Improving flood mitigation efforts at the Central Wastewater Treatment Plant as necessary to account for the compounding effects of increased coastal and fluvial flood projections due to RSLR and changes in regional hydrology.
- Implementing or improving landslide hazard protection along Route 509.
- Incorporating climate hazards into existing hazard and ecological monitoring and management efforts.

8 LAND AND SHORELINE USE/PLANS AND POLICIES

This chapter describes existing land use patterns, development types, mix of uses, scale and intensity of development, study area character, and land use compatibility. It also summarizes pertinent plans, policies and regulations, including the City's GMA Comprehensive Plan (including the Container Port Element), land use and shoreline regulations, Puget Sound Regional Council requirements, and other applicable and adopted plans from the Port of Tacoma, Puyallup Tribe, Pierce County, and City of Fife.

8.1 Existing Policies and Regulations

The study area is located within Pierce County in the City of Tacoma and the Puyallup Indian Reservation, and it borders the City of Fife. From a planning policy standpoint, the study area is situated within a regional and local planning framework, with adopted applicable policy and regulatory guidance. These include the City of Tacoma Comprehensive Plan, North and South Downtown Subarea Plans, Shoreline Master Program, Land Use Code, Port of Tacoma Comprehensive Scheme for Harbor Improvements, Land Use and Transportation Plan, the Puyallup Tribe of Indians Land Claims Settlement and Cooperation Agreement, Pierce County Countywide Planning Policies, the Puget Sound Regional Council Vision 2050 and Multicounty Planning Policies, and the Growth Management Act.

Each of these documents is summarized below.

Local Policy Framework

City of Tacoma

City of Tacoma Comprehensive Plan (2015)

The City of Tacoma's Comprehensive Plan is the community's vision for Tacoma in 2040. Tacoma's growth target is for 127,000 new residents and 97,000 new jobs by 2040. The Comprehensive Plan includes goals and policies to accommodate this future growth, and plan for development and improvement. In 2002, the Puget Sound Regional Council designated the study area a regional Manufacturing/Industrial Center (MIC). Consistent with Vision 2050 and this regional designation, the Comprehensive Plan designates the study area as an Manufacturing/Industrial Center (MIC) - a location with unique characteristics that should serve as a long-term and growing employment center. Centers are also intended to be well served by transportation including road, rail and transit systems. See Exhibit 8-1. The study area has a land use designation of Port Manufacturing/Industrial Area. See Exhibit 8-2. With reference to this the Comprehensive Plan states (City of Tacoma, 2019):

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

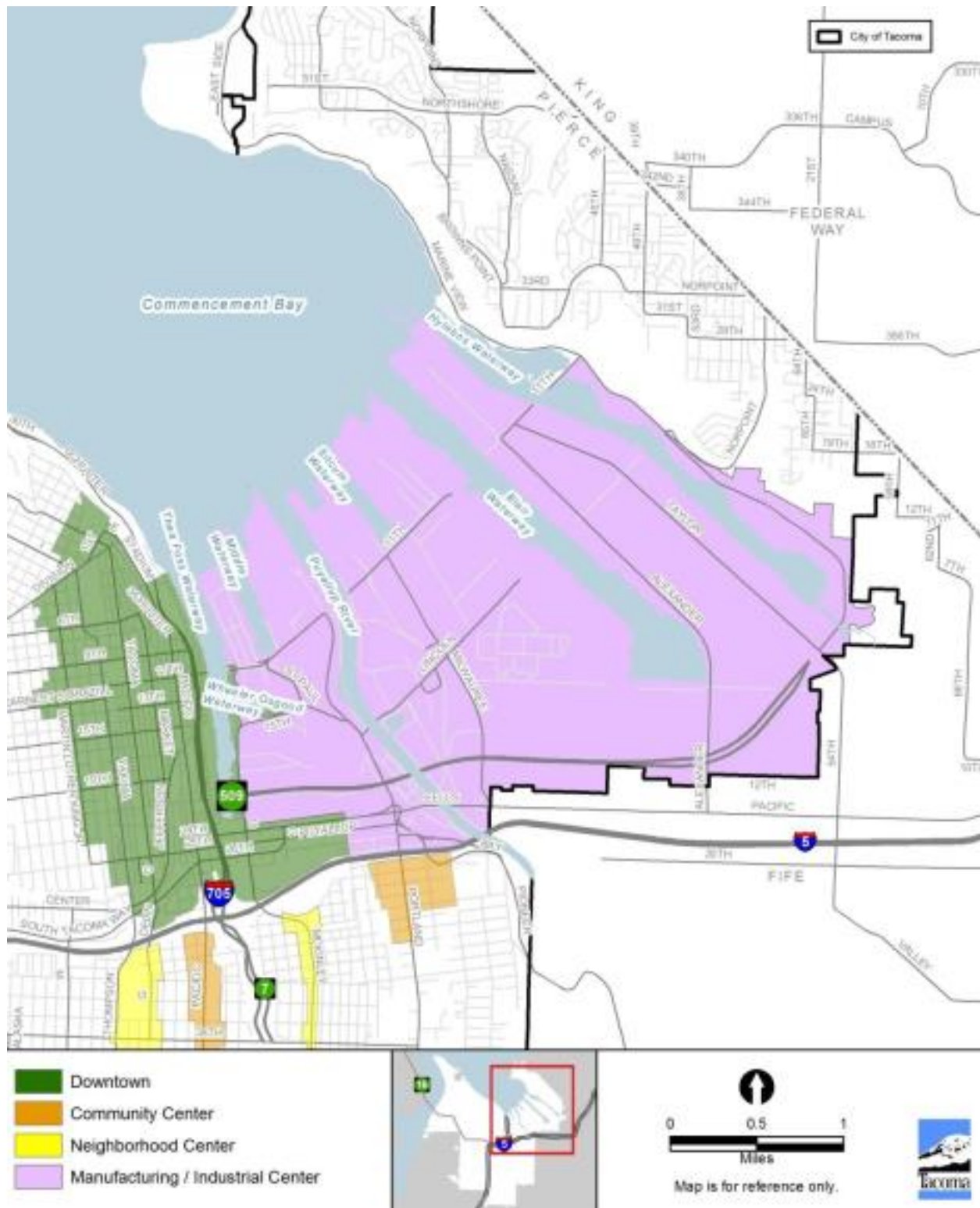
Washington's Planning Framework

The Growth Management Act establishes broad goals to act as the basis for planning at the local, countywide, and regional scales. The law requires consistency between multicounty planning policies (VISION 2050), countywide planning policies, and local comprehensive plans, while recognizing that specific aspects of implementation often occur through local actions.



Source: PSRC, Vision 2050.

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 and odors, noise, smoke, light, glare, traffic congestion, and other undesirable nuisance characteristics in these areas can be fairly high.

Exhibit 8-1 Tacoma Comprehensive Plan Centers

Source: City of Tacoma, 2020; BERK, 2020.

As required by State law (RCW 36.70A.085), the City adopted a Container Port Element (CPE) in its Comprehensive Plan in 2014. Consistent with State requirements, this CPE provides policy guidance to protect of core areas of container port and port-related industrial areas within the City and protect against potential land use conflicts, both within and along the edge of the core area. The Container Port element also includes economic development policies to promote continued economic vitality; natural environment policies to support continued preservation of the environment; capital facilities policies to ensure adequate facilities and services are provided within and beyond the Core Area; and transportation policies to ensure continued efficient freight access and mobility.

Goals and policies are organized into two sections to address (1) the core area and (2) the Industrial/Commercial Buffer area. Goals and policies for the core area identify an area in which cargo activities are the primary use and focus on protecting port-related cargo and industrial uses and rail-related uses within this area. Industrial/Commercial Buffer area goals and policies identify an area immediately adjacent to the core area and provide for a compatible Industrial/Commercial Buffer for the larger surrounding area.

Exhibit 1-1 shows the Core Area, which contains current port, current port-related cargo and industrial uses, and those areas recognized by both the City and the Port as likely to be needed for these uses within the next 20 years. The designated Core Area consists of the following areas:

- Existing Port Maritime Industrial (PMI) zoning designation.
- Those portions of the S-9 and S-10 shoreline districts adjacent to the PMI zoning designation.
- The TEMCO grain terminal, located on a narrow shelf of land between Schuster Parkway and Commencement Bay.

Other than the TEMCO grain terminal site, the Core Area does not include any portions of the S-7 Shoreline District.

The following policies are intended to make sure that Core Area is preserved now and in the future for port maritime and related industrial uses while respecting the rights of all property owners (City of Tacoma, 2019).

Core Area Policies

CP-1.1 Port and Port-Related Cargo and Industrial Uses. *Prioritize, protect and preserve existing and planned port uses, port-related container and industrial uses and rail-related uses. Uses should consist primarily of cargo port terminal, port-related container and industrial activity, compatible manufacturing, industrial-related office, cargo yard, warehousing, transportation facilities, and other similar uses.*

CP-1.2 Port and Port-Related Cargo and Industrial Land. *Prohibit uses that would negatively affect the availability of land for the primary port and port-related cargo and industrial function of the Core Area. Encourage aggregation of industrial land for future development as cargo port terminals and supporting uses.*

CP-1.3 Incompatible Core Area Uses. Clearly identify and prohibit uses that are entirely incompatible with the Core Area uses. Examples may include those that attract people to the area for non-industrial purposes or that would be incompatible with typical industrial area impacts (noise, truck movement, etc.). These may include residential, general retail, temporary lodging or other similar uses.

CP-1.4 Land Use Buffers. Reduce the potential for land use conflicts between industrial development and surrounding nonindustrial uses by providing for adequate Industrial/Commercial Buffer areas, and clear public commitment to continuation of Port and port-related cargo and industrial uses in the designated Core Area.

CP-1.5 Core Area Boundary. Do not allow unrelated uses to gradually encroach on the Core Area through incremental development and modifications of the Core Area boundary. Consider boundary adjustments only in collaboration with the Port of Tacoma and as part of a comprehensive review of long-term port and port-related cargo and industrial land needs.

CP-1.6 Noise, Odor, and Visual Character. In the Core Area, allow for localized impacts associated with industrial activities, including noise, odor and visual character, that are appropriate and expected in heavy industrial areas but would not be allowed in other parts of the city. Noise and odor may be associated with transportation and manufacturing facilities. Visual character may include outdoor storage, relatively large building mass and impervious surface area. While localized impacts are permitted, continue to require Core Area industrial uses to be developed in a manner that protects the environment and preserves public health and safety from a citywide and regional perspective.

CP-1.7 Collaboration. Continue to work in close collaboration with the Port of Tacoma to ensure that port and port related cargo and industrial uses remain viable and that land use development along the edges of the Core Area is thoughtfully planned to avoid land use conflicts and incompatibility. Consider collaborative efforts to develop landscape and street standards that recognize the special working character of the Core Area.

CP-1.8 Public Service Standards. Within the Core Area the Port should assume a greater role in setting level of service and concurrency standards as established in the Public Facilities and Services Element.

CP-1.9 Maritime Industrial Planning. In order to ensure that the Core Area continues to serve future port needs, encourage the Port of Tacoma to develop and periodically update a comprehensive long-range maritime development program that assesses future cargo market demand, developing technologies, geographic constraints and other factors affecting future intermodal cargo opportunities, and land and capital investment necessary to permit Tacoma to continue to serve port and port-related cargo and industrial needs.

Industrial/Commercial Buffer Area

Goal CP-2. *Establish an Industrial/Commercial Buffer Area around the Core Area that will protect the continued viability of the Core Area while providing for a compatible Industrial/Commercial Buffer to development in the larger surrounding area.*

CP-2.1 Industrial/Commercial Buffer Area Collaboration. *Work in collaboration with adjacent jurisdictions, including Pierce County and the City of Fife, to ensure a good Industrial/Commercial Buffer from the Core Area to larger surrounding areas.*

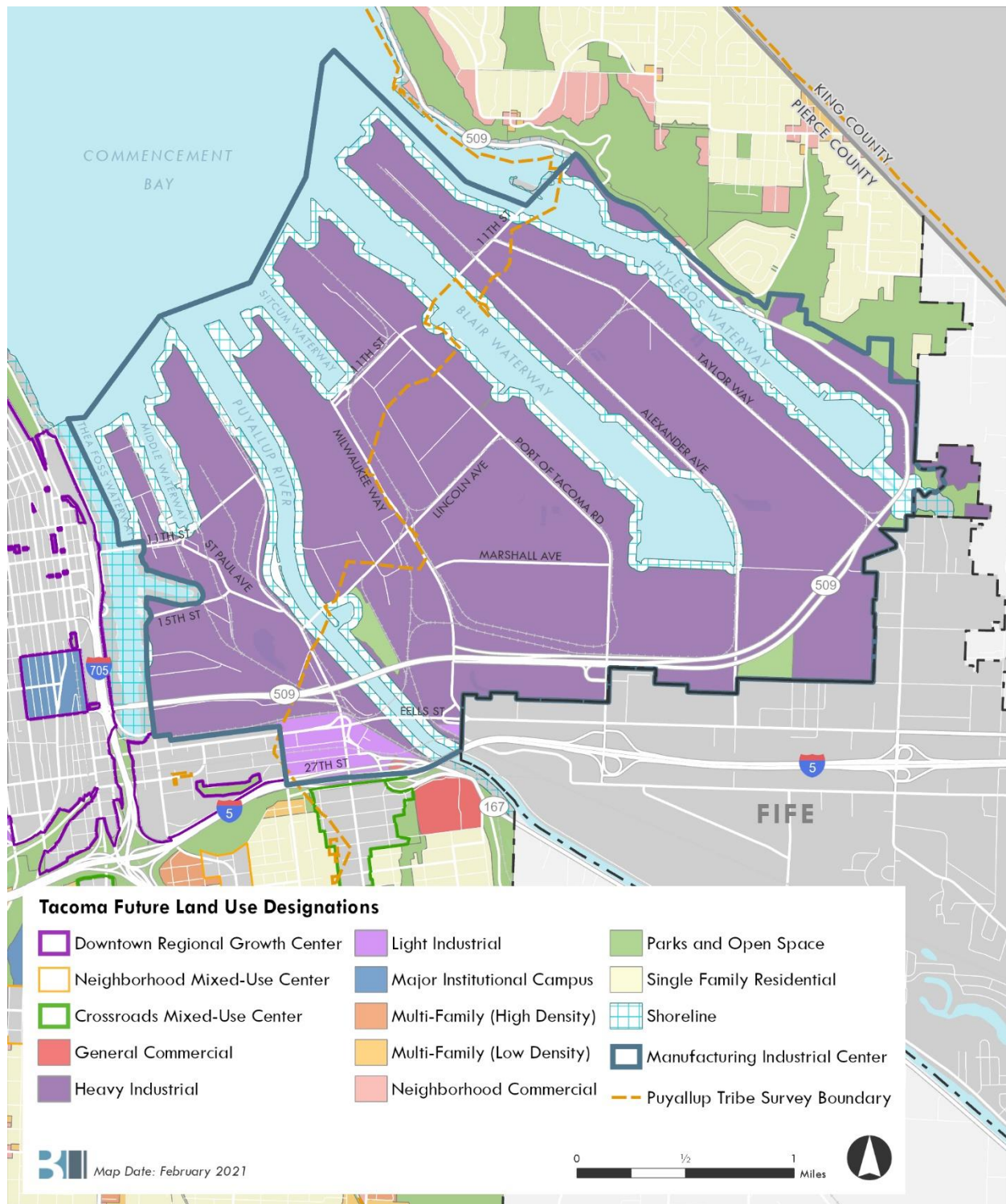
CP-2.2 Industrial/Commercial Buffer Area Function. *In general, natural buffers, such as change in topography, vegetated areas and water bodies are preferred as a means to buffer and separate incompatible uses. The Industrial/Commercial Buffer Area designation is needed only where the existing geography does not provide an effective buffer. Ensure that unrelated uses in the Industrial/ Commercial Buffer Area are not allowed to gradually encroach on the Core Area boundary. The industrial/Commercial Buffer Area should remain of sufficient size to provide a long-term buffer for the Core Area.*

CP-2.3 Industrial/Commercial Buffer Area Uses. *Development standards for industrial and commercial activities in the Industrial/Commercial Buffer Area should ensure compatibility with the activity levels and physical character of adjacent less intensive community character.*

CP-2.4 Retention of Industrial Uses. *Recognizing the importance of industrial activity to the local and regional economy, industrial uses in the Industrial/Commercial Buffer area should be preserved and promoted. Industrial uses, including non-water related industry, is compatible with and can support maritime industrial uses in the Core Area, as well as contributing to the region's economy as a whole.*

CP-2.5 Incompatible Industrial/Commercial Buffer Area Uses. *While the Industrial/Commercial Buffer Area provides for a wider range of uses than the Core Area, incompatible uses that would be impacted by the potential noise, odor and visual character of industrial areas should continue to be prohibited. This may include residential or other sensitive uses.*

CP-2.6 Industrial/Commercial Buffer Area Character. *Establish development or performance standards to allow for continued viability of the Industrial/Commercial Buffer Area, while protecting the livability of adjacent areas.*

Exhibit 8-2 Comprehensive Plan Land Use Designations – Study Area, 2020

Source: City of Tacoma, 2020; BERK, 2020.

City of Tacoma Subarea Plans

North Downtown Subarea Plan (2014)

The *North Downtown Subarea Plan* covers northern Downtown, northern Thea Foss Waterway, and land to the east of Foss Waterway, as well as the Murray Morgan (11th Street) Bridge (City of Tacoma, 2014). Redevelopment in North Downtown is intended to include infill projects in the commercial core, open spaces and streetscapes that increase livability and walkability, and strengthened physical and visual connections to the Foss Waterway and Commencement Bay.

Land use actions in the plan focused on remediation of brownfield sites that are identified as high priority redevelopment sites in North Downtown, the expansion of the Reduced Parking Area, and to pilot a Transfer of Development Rights (TDR) program and live work opportunities. The plan recognizes the industrial character of the east bank of the Thea Foss Waterway with the presence of warehouses, docks and marine-related businesses. No land use changes are contemplated for this area.

South Downtown Subarea Plan (2013)

The *South Downtown Subarea Plan* includes portions of the Tideflats area including the southern stretch of Thea Foss Waterway, land to the east of Foss Waterway, and the vicinity of Puyallup Avenue and E 26th Avenue west of E G Street as well as the SR 509 bridge (City of Tacoma, 2013). Similar to the North Downtown Subarea Plan, the South Downtown Subarea Plan envisions the expansion of the Reduced Parking Area, a pilot Transfer of Development Rights (TDR) program, live work opportunities and street improvements to improve walkability. The plan's policy framework includes five strategies, including developing a closer relationship to transit such as the LINK light rail, and advancing the vision for the Foss Waterway. The plan envisions a range of policies nested under the strategy to advance the vision for the Foss Waterway including a public access system with a continuous esplanade along the shoreline, opportunities for mixed use development along the shoreline, completion of a park at southeast end of the waterway, creating a pedestrian and bicycle trail loop along both sides of the Foss, and ways to activate public space such as public boat launches. However, the plan also supports the retention and enhancement of all characteristics of the waterway that support marine and boating activities.

City of Tacoma Shoreline Master Program (2019) and Public Access Alternatives Plan (2010)

The City of Tacoma Shoreline Master Program (SMP) is a result of Washington State legislation requiring all jurisdictions to adequately manage and protect shorelines of the state. The SMP establishes goals and guidelines for uses within 200 feet of the Ordinary High Water Mark (OHWM); this 200-foot wide area is termed the "shoreline jurisdiction." The SMP goals relate to the use, restoration, conservation, economic development, public access, history/culture/education, recreation, and water quality within the shoreline jurisdiction. The Tacoma Shoreline Master Program includes goals, policies and development regulations for all shoreline areas including Commencement Bay and its waterways, the Narrows, and Wapato Lake.

The SMP establishes a goal related to land use within shorelines areas in the city (City of Tacoma, 2019, pp. 41-42):

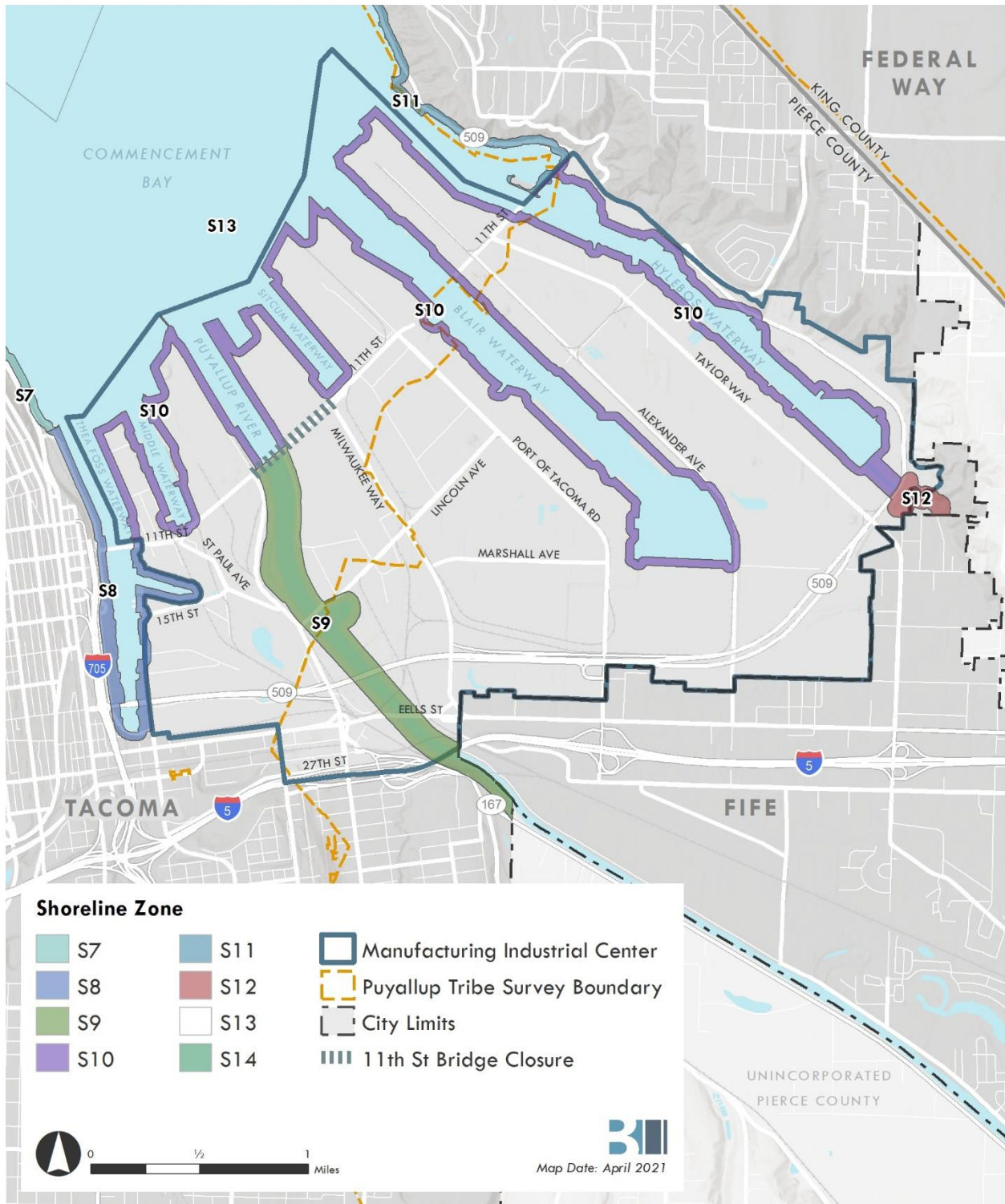
Land use Goal: To preserve and develop shorelines in a manner that allows for an orderly balance of uses.

Specific objectives include:

1. Encourage new water-dependent, water-related, and water-enjoyment uses in priority order.
1. Support the City Comprehensive Plan policies as they relate to the shoreline.
2. Implement regulations and standards in a manner consistent with all relevant constitutional and other legal limitations on the regulation of private property.
3. Encourage mixed use developments that include and support water-oriented uses and provide a substantial public benefit consistent with the public access and ecological restoration goals and policies of the Act.
4. Balance the location, design, and management of shoreline uses throughout the city to prevent a net loss of shoreline ecological functions and processes over time.
5. Encourage shoreline uses and development that enhance shoreline ecological functions and/or processes or employ innovative features that further the purposes of this Program.
6. Discourage new non-water-oriented industrial uses from locating inside shoreline jurisdiction, in order to reserve adequate land supply to serve future water-dependent and water-related industrial uses.
7. Promote and encourage uses and facilities that require and take advantage of the deep water of Commencement Bay and the associated Waterways.
8. Support the long-term and widespread economic contribution of our international container ports and related industrial lands and transportation systems and ensure that container ports continue to function effectively alongside vibrant city waterfronts.
9. Encourage shoreline uses and development that enhance and/or increase public access to the shoreline.

The City's SMP establishes distinct shoreline designations and districts. Each shoreline designation corresponds to a specific shoreline zoning district and operates as a policy designation. The shoreline designations determine which uses are allowed, which are conditional, and which are prohibited in shoreline areas. The study area includes five of these designations: Aquatic, Natural, Urban Conservancy, High Intensity, and Downtown Waterfront. See Exhibit 8-3.

Exhibit 8-3 Shoreline Districts Map – City of Tacoma, 2020



Source: City of Tacoma, 2020; BERK, 2020.

Properties along Commencement Bay are included within the S-7, S-8, S-9, S-10 and S-11 Shoreline Districts. Future permitted use activities within each district, as stated in the SMP, are described below.

- **S-7 – Schuster Parkway:** The intent of this district “is to allow development of deep water terminal and light industrial facilities, support and retain water dependent commodity export business(es), 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 allow new water-oriented industrial uses where appropriate.”
- **S-9 – Puyallup River:** The intent of this district “to encourage recreational development of the riverfront, ecological restoration activities that restore historic floodplain processes and functions, while allowing industrial development of adjacent upland areas, and to encourage continued preservation of Clear Creek, its associated wetlands, and related ecosystems. Permitted industrial uses will develop and operate in a manner that is compatible with shoreline ecological functions.” The Puyallup Tribe of Indians has jurisdiction over these trust lands at the mean high-water mark upstream from the Survey Boundary (Lincoln Street Bridge).
- **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-12 Hylebos Creek –** The purpose is “to protect and restore the historic functions of Hylebos Creek and achieve a net gain of shoreline function over time.”
- **S-13 – Marine Waters of the State:** The intent 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.”

These designations are adopted by ordinance and codified as Chapter 13.10 of the Tacoma Municipal Code, which is discussed in the next section of this chapter.

The City’s Public Access Alternatives Plan (PAAL) is a stand-alone implementation plan associated with the SMP that articulates the vision for public access to the shoreline and recreation. Several existing public access areas are within the study area (City of Tacoma, 2010, pp. 17-21):

- Existing viewpoint at the Port of Tacoma Observation Tower.
- Existing public marinas, private marinas, and hand boat launches on the northern shore of the Hylebos Waterway and eastern shore of the Thea Foss Waterway (including at Waterway Park).

- Existing habitat observation points on the southern shore of the Blair Waterway (the Lincoln Ave public street end) and northern shore of the Puyallup River (near the wetlands by the Lincoln Ave bridge).

The PAAL identifies other potential projects on the Thea Foss Waterway, on Marine View Drive, and on Port Industrial shorelines in areas that will not interfere with port operations or cause public safety concerns. These projects include a pedestrian walkway on the Thea Foss Waterway, motorized and non-motorized boat launches, additional habitat observation points, improved public access/viewing signage, and new view points (City of Tacoma, 2010, pp. 25-29).

City of Tacoma Land Use Designations and Zoning Districts

The Land Use Regulatory Code, Title 13 of the Tacoma Municipal Code (TMC), is the key regulatory mechanism that implements the Comprehensive Plan. The study area is predominantly zoned Port Maritime and Industrial (PMI) and Heavy Industrial (M-2) zoning districts. Roughly 57% or 2,898 acres in the study area are zoned PMI. A smaller proportion (roughly 11% or 575 acres) are zoned M2. Smaller areas (103 acres) to the periphery are zoned Light Industrial (M-1). The Shoreline Master Program (SMP) shoreline designations and associated zoning applies to land within 200' of the High Water Mark. Roughly 30% or 1,493 acres within the study area are subject to the SMP. More detailed information on the SMP is provided in the next section. See Exhibit 8-4.

Exhibit 8-4 Zoning Districts and Shoreline Designation by Acreage – Study Area, 2020

Zoning Description	Zoning District	Shoreline Designation	Acres
Port Maritime and Industrial	PMI		2,897.6
Heavy Industrial	M2		575.9
Light Industrial	M1		103.0
Shoreline Zoning	S		1,492.5
Thea Foss Waterway	S8	Downtown Waterfront	3.0
Puyallup River	S9	Urban Conservancy	171.8
Port Industrial	S10	High Intensity	446.4
Hylebos Creek	S12	Natural	12.1
Waters of the State	S13	Aquatic	859.1
TOTAL			5,069.6

Sources: City of Tacoma, 2020; BERK, 2020.

Port Maritime and Industrial District. This district is intended to allow all industrial uses and uses that are not permitted in other zoning districts; barring uses that are prohibited by City Charter. The Port of Tacoma facilities, facilities that support the Port's operations, and other public and private maritime and industrial activities make up a majority of the uses in this district. This 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.

The PMI District is further characterized by heavy truck traffic and higher levels of noise and odors than found in other districts. Expansion beyond current PMI District boundaries should be considered carefully, as such expansion may decrease the distance between incompatible uses. Expansion should only be considered contiguous to the existing PMI District.

M2 – Heavy Industry District. The M2-Heavy Industrial District designation 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. This classification is only appropriate inside Comprehensive Plan areas designated for medium and high intensity uses.

M1 – Light Industrial District. This district is intended as a buffer between heavy industrial uses and less intensive commercial and/or residential uses. This classification is only appropriate inside Comprehensive Plan areas designated for medium and high intensity uses.

The Municipal Code includes development standards for each of the zoning districts described above, including allowed and prohibited uses, building envelope standards (building height limits, lot area, width and coverage, and setbacks), building design standards, landscaping and/or buffering standards, as well as lighting, parking, loading, and signage standards and requirements. See Exhibit 8-5 for a summary of key standards and Exhibit 8-6 for use regulations by zone.

Exhibit 8-5 District Development Standards – Study Area, 2020

Zoning Description	Min. Lot Area (sf)	Min. Lot Width (ft)	Max Lot Coverage (%)	Max. Height (ft)	Min. Setback Front (ft)	Min. Setback Side (ft)	Min. Setback Rear (ft)
Port Maritime and Industrial (PMI)	N/A	N/A	None	*100'	0	0	0
Heavy Industrial (M2)	N/A	N/A	None	*100'	0	0	0
Light Industrial (M1)	N/A	N/A	None	75'	0	0	0

*100 feet, unless such building or structure is set back on all sides one foot for each four feet such building or structure exceeds 100 feet in height. Certain specified uses and structures are allowed to extend above height limits, per Sections 13.06.010.E and 13.06.080.

Sources: City of Tacoma, 2020; BERK, 2020.

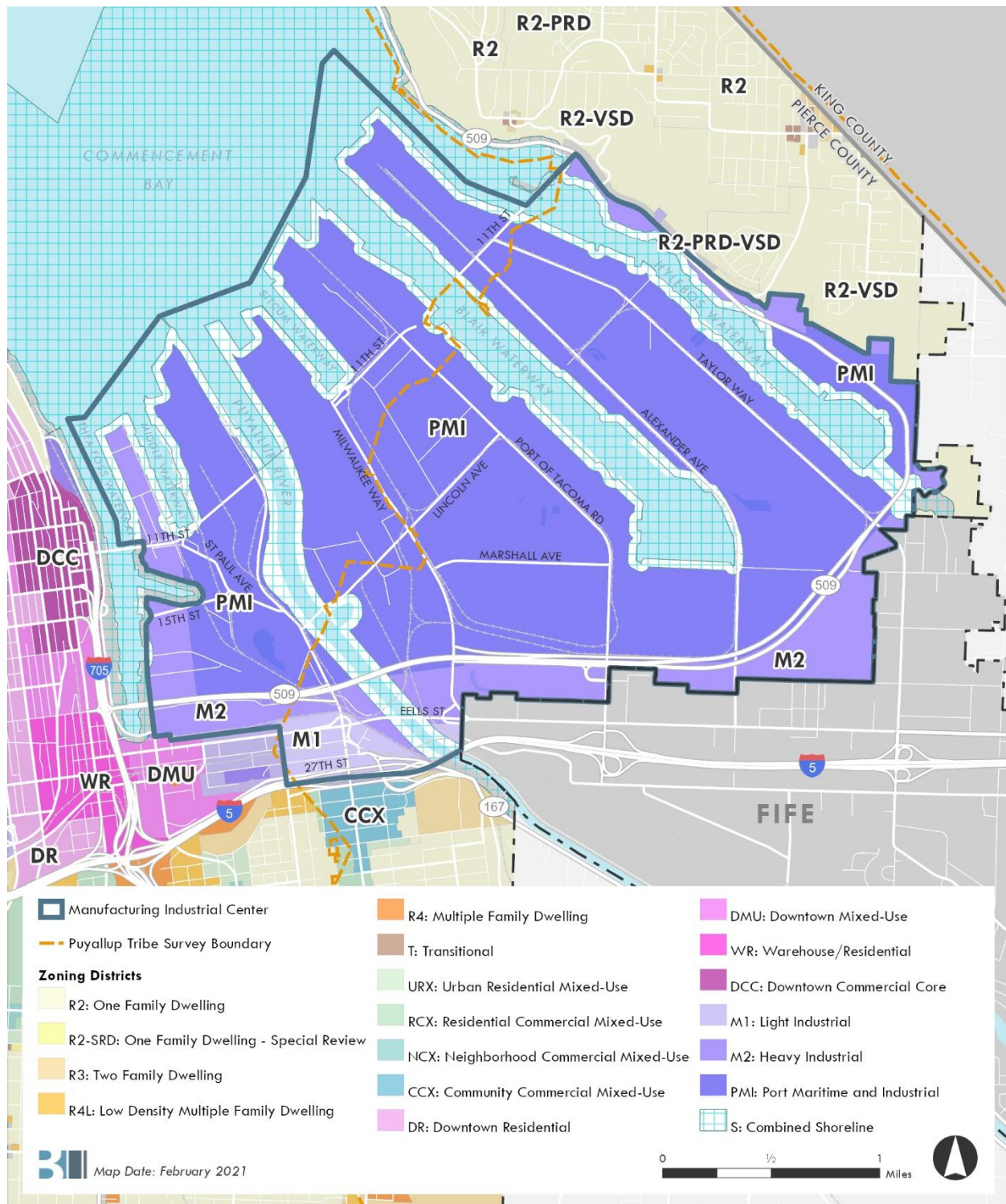
Exhibit 8-6 Use Regulations by Zone – Study Area, 2020

Zone	Permitted Uses	Prohibited Uses
PMI	<ul style="list-style-type: none"> ■ Adult retail and entertainment ■ Agricultural uses (with Conditional Use Permit) ■ Airport (with Conditional Use Permit) ■ Ambulance services ■ Brewpub ■ Building material and services ■ Business support services ■ Commercial parking facility ■ Communication facility ■ Craft Production ■ Drive-through with any permitted use ■ Eating and drinking ■ Fueling station ■ Heliport (with Conditional Use Permit) ■ Home occupation ■ Industry, heavy ■ Industry, light ■ Marijuana processor, producer, and researcher ■ Microbrewery/winery ■ Office ■ Parks, recreation and open space ■ Passenger terminal ■ Personal services ■ Port, terminal, and industrial; water-dependent or water-related (as defined in Chapter 13.10) ■ Public safety and public service facilities ■ Religious assembly ■ Repair services ■ Retail (limited to 7K sf) ■ Self-storage (specific requirements apply) ■ Seasonal sales (Temporary Use) ■ Surface mining (with Conditional Use Permit) ■ Temporary uses ■ Transportation/freight terminal ■ Urban Horticulture ■ Utilities ■ Vehicle rental and sales ■ Vehicle service and repair ■ Vehicle service and repair, industrial ■ Vehicle storage ■ Warehouse/storage ■ Wholesale or distribution ■ Wireless communication facility ■ Uses not prohibited by City Charter and not prohibited herein 	<ul style="list-style-type: none"> ■ Adult family home ■ Animal sales and service ■ Assembly facility ■ Carnival ■ Cemetery/internment services ■ Commercial recreation and entertainment ■ Confidential shelter ■ Continuing care retirement community ■ Correctional facility ■ Cultural institution ■ Day care, family ■ Day care center ■ Detention facility ■ Detoxification center ■ Dwelling, accessory (ADU) ■ Dwelling, single-family detached ■ Dwelling, two-family ■ Dwelling, three-family ■ Dwelling, multiple family ■ Dwelling, townhouse ■ Emergency and transitional housing ■ Extended care facility ■ Foster home ■ Funeral home ■ Golf course ■ Group housing ■ Hospital ■ Hotel/motel ■ Intermediate care facility ■ Juvenile community facility ■ Live/Work ■ Lodging house ■ Mobile home/trailer court ■ Nursery ■ Research and development industry ■ Residential care facility for youth ■ Residential chemical dependency treatment facility ■ Retirement home ■ School, public or private ■ Short-term rental ■ Staffed residential home ■ Student housing ■ Theater ■ Work/Live ■ Work release center
M2	<ul style="list-style-type: none"> ■ Adult retail and entertainment ■ Agricultural uses (with Conditional Use Permit) ■ Ambulance services ■ Animal sales and service ■ Assembly facility ■ Brewpub ■ Building material and services ■ Business support services ■ Commercial parking facility ■ Commercial recreation and entertainment (Conditional) ■ Communication facility ■ Craft Production 	<ul style="list-style-type: none"> ■ Airport (not allowed in Port of Tacoma MIC) ■ Adult family home ■ Carnival ■ Cemetery/internment services ■ Confidential shelter ■ Continuing care retirement community ■ Correctional facility ■ Cultural institution ■ Day care, family ■ Detention facility ■ Dwelling, accessory (ADU) ■ Dwelling, single-family detached

Zone	Permitted Uses	Prohibited Uses
	<ul style="list-style-type: none"> Day care center Day care center Detoxification center (Conditional) Drive-through with any permitted use Eating and drinking Fueling station Helipoint (with Conditional Use Permit) Home occupation Industry, heavy Industry, light Marijuana processor, producer, and researcher Microbrewery/winery Nursery Office Marijuana retailer Parks, recreation and open space Passenger terminal Personal services Public safety and public service facilities Religious assembly Repair services Research and development industry Retail Self-storage Seasonal sales (Temporary Use) Surface mining (with Conditional Use Permit) Temporary uses Transportation/freight terminal Urban Horticulture Utilities Vehicle rental and sales Vehicle service and repair Vehicle service and repair, industrial Vehicle storage Warehouse/storage Wholesale or distribution Wireless communication facility Uses not prohibited by City Charter and not prohibited herein 	<ul style="list-style-type: none"> Dwelling, two-family Dwelling, three-family Dwelling, multiple family Dwelling, townhouse Dwelling, accessory (ADU) Emergency and transitional housing Extended care facility Foster home Funeral home Golf course Group housing Hospital Hotel/motel Intermediate care facility Juvenile community facility Live/Work Lodging house Mobile home/trailer court Nursery Port, terminal, and industrial; water-dependent or water-related (as defined in Chapter 13.10) Residential care facility for youth Residential chemical dependency treatment facility Retirement home School, public or private Short-term rental Staffed residential home Student housing Theater Work/Live Work release center
M1	<ul style="list-style-type: none"> Adult family home (prohibited in certain bldgs.) Adult retail and entertainment Agricultural uses (with Conditional Use Permit) Ambulance services Animal sales and service Assembly facility Brewpub Building material and services Business support services Carnival Commercial parking facility Commercial recreation and entertainment (Conditional) Communication facility Confidential shelter Continuing care retirement community (Conditional) Correctional facility (Conditional) Craft Production Day care, family Day care center Detention facility (Conditional) 	<ul style="list-style-type: none"> Airport (not allowed in Port of Tacoma MIC) Cemetery/internment services Cultural institution Dwelling, accessory (ADU) Dwelling, single-family detached Dwelling, two-family Dwelling, three-family Dwelling, multiple family Dwelling, townhouse Foster home Funeral home Golf course Hospital Juvenile community facility Lodging house Mobile home/trailer court Port, terminal, and industrial; water-dependent or water-related (as defined in Chapter 13.10) Residential care facility for youth Residential chemical dependency treatment facility School, public or private

Zone	Permitted Uses	Prohibited Uses
	<ul style="list-style-type: none"> ■ Detoxification center (Conditional) ■ Drive-through with any permitted use ■ Dwelling, accessory (ADU) Subject to addl. requirements contained in 13.06.080 A ■ Eating and drinking ■ Emergency and transitional housing Subject to addl. requirements contained in 13.06.080 A ■ Extended care facility (only in certain types of bldgs.) ■ Foster home (only in certain types of bldgs.) ■ Fueling station ■ Group housing(only in certain types of bldgs.) ■ Heliport (with Conditional Use Permit) ■ Home occupation ■ Hotel/motel ■ Industry, heavy ■ Industry, light ■ Intermediate care facility ((only in certain types of bldgs.)) ■ Live/Work ■ Marijuana processor, producer, and researcher ■ Microbrewery/winery ■ Nursery ■ Office ■ Marijuana retailer ■ Parks, recreation and open space ■ Passenger terminal ■ Personal services ■ Public safety and public service facilities ■ Religious assembly ■ Repair services ■ Research and development industry ■ Retail ■ Retirement home (only allowed in certain types of bldgs..) ■ Self-storage ■ Seasonal sales (Temporary Use) ■ Surface mining (with Conditional Use Permit) ■ Temporary uses ■ Transportation/freight terminal ■ Theater ■ Urban Horticulture ■ Utilities ■ Vehicle rental and sales ■ Vehicle service and repair ■ Uses not prohibited by City Charter and not prohibited herein ■ Vehicle service and repair, industrial ■ Vehicle storage ■ Warehouse/storage ■ Wholesale or distribution ■ Work/Live ■ Wireless communication facility 	<ul style="list-style-type: none"> ■ Short-term rental ■ Staffed residential home ■ Student housing ■ Work release center

Note: In M-1 districts, adult family homes are permitted only within residential or institutional buildings in existence on December 31, 2008, the effective date of adoption of this provision, or when located within a mixed-use building where a minimum of 1/3 of the building is devoted to industrial or commercial use. Source: City of Tacoma, 2020.

Exhibit 8-7 Zoning Districts – Study Area, 2020

Sources: City of Tacoma, 2020; BERK, 2020.

Non-Interim Industrial Land Use Regulations (Ongoing)

In November 2017, the Tacoma City Council adopted the Tideflats Interim Regulations, Amended Ordinance No. 28470, which includes the following elements:

- Category 1: Expanded public notification of heavy industrial use permits;
- Category 2: Temporary prohibition of new non-industrial uses in the Port of Tacoma Manufacturing and Industrial Center;
- Category 3: Temporary prohibition of new residential development along Marine View Drive and NE Tacoma slopes; and
- Category 4: Temporary prohibition on certain types of new heavy industrial uses.

On October 20, 2020, the City Council approved a six-month extension of the Tideflats Interim Regulations. The Ordinance was amended to direct the Planning Commission to begin a process to review and recommend a new "non-interim" ordinance by April 2021. This process is ongoing. It is planned that on December 2, 2020 at 5:30 PM the Planning Commission will conduct a public scoping hearing on the draft Scope of Work for the Non-interim Industrial Land Use Regulations.

Port of Tacoma

Port of Tacoma Comprehensive Scheme of Harbor Improvements (2017)

Port districts in Washington are required to prepare and update a Comprehensive Scheme of Harbor Improvements (CSHI) which describes the development goals of for the Port (RCW 53.20). CSHI documents are conceptual or programmatic and do not provide specific design details about individuals projects. The CSHI also defines the geographic boundaries within the Port District where facilities development and industrial improvements will occur. The CSHI can 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 2017 and states the following:

Port of Tacoma's planning boundary includes 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 Program 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 53.02.010.

Fossil Fuels. The Port of Tacoma chooses not to develop new facilities for the international export of bulk fossil fuels on port owned property.

Port of Tacoma's 2012-2022 Strategic Plan (2014)

The Port of Tacoma's 2012-2022 Strategic Plan, adopted in 2012 and updated in 2014, aims to improve the port's competitive and financial position and reduce environmental impacts (Port of Tacoma, 2014). The plan includes ten targets such as doubling container volume to 3 million TEUs,¹⁶ doubling dry bulk throughput to 12 million metric tons, increasing breakbulk volume by 30% to 200,000 tons and cleaning up an additional 200 acres of port-owned, contaminated property to industrial standards over the 10 years of the plan. One highlighted strategy is to invest \$500 million to improve existing property, buildings and infrastructure with actions such as redeveloping the General Central Peninsula (GCP) and other terminal complexes to increase container throughput and improve efficiency of the Tideflats rail system. The plan also outlines the long-term development of Port properties. Another strategy considered is collaborating with neighboring jurisdictions to enhance public infrastructure, specifically, providing leadership in securing funds to complete SR 167 and improve operations of Port of Tacoma Road.

The Port of Tacoma is now in the process of updating the Strategic Plan to help the Port review, re-evaluate, and refine the vision for the future. Updates to the Strategic Plan should be considered when evaluating land use needs.

City of Fife Comprehensive Plan

Parcels along the southern boundary of the study area are adjacent to the City of Fife's primary business district, which runs east and west along Pacific Highway East. This area contains several commercial establishments, scattered industrial uses, small residences, and vacant land. The City of Fife Comprehensive Plan designates these parcels as a Phase 2 Downtown District Center and Phase 3 Downtown District Center. This area is zoned Regional Commercial, along with some pockets of Industrial zoning.

County Policy Framework

Pierce County Countywide Policies

Both the Puget Sound Regional Council's Multi-County Planning Policies (MCPs) and the Pierce County Countywide Planning Policies (CWPPs) direct cities toward a centers strategy, in which urban growth is concentrated in designated regional and local centers, consistent with Tacoma's land use strategy.

¹⁶ "TEU" means "twenty-foot equivalent unit," which is a unit of measure for containerized cargo. A 20-foot container is equivalent to one TEU; a standard 40-foot container is equivalent to two TEUs.

In the CWPPs, policies support prioritizing centers for population growth and public investment. CWPPs also reference the following Manufacturing/Industrial Centers that have been adopted into the Regional Growth Strategy for Pierce County: Frederickson, Port of Tacoma, Sumner/Pacific and South Tacoma – Candidate Manufacturing/Industrial Center.

The following policies specifically reference Manufacturing/Industrial Centers:

C-2. *The purpose of Manufacturing/Industrial Centers is to:*

- *Recognize strategically located concentrations of industrial activity as essential resources for the local economy;*
- *Protect and leverage critical and difficult-to-replace freight infrastructure;*
- *Preserve the industrial land base in the long term;*
- *Support family/living wage jobs;*
- *Emphasize the importance of freight movement; and*
- *Preserve the county's supply of industrial land.*

C-4. *Manufacturing Industrial Centers (MICs) preserve lands for family-wage jobs in basic industries and trade and provide areas where that employment may grow in the future. MICs form a critical regional resource that provides economic diversity, supports national and international trade, generates substantial revenue for local governments, and offers higher than average wages.*

C-5. *Transportation and economic development funds should be prioritized for transportation and infrastructure supporting Centers in Pierce County. Projects that support Regional Growth and/or Manufacturing Industrial Centers (and Candidates), support more than one center, and benefit a variety of user groups will be given higher consideration.*

C-15. *Jurisdictions should consider incentives for development within Centers, such as:*
1. Streamlined permitting; 2. Financial incentives; 3. Density bonuses or transfer of development rights; 4. Using SEPA provisions to streamline environmental review; and 5. Shared mitigation, such as stormwater detention and joint parking.

C-20. *Provisions to achieve targeted employment growth should include:*

1. *Preservation and encouragement of the aggregation of vacant land parcels sized for manufacturing/industrial uses;*
2. *Prohibition of land uses which are not compatible with manufacturing/industrial, manufacturing/industrial supportive, and advanced technology uses;*
3. *Limiting the size and number of offices and retail uses as accessory use and only to serve the needs of employees within a Center; and*
4. *Reuse and/or intensification of the land use consistent with the mix of uses envisioned for the MIC.*

C-21. *The transportation network within Manufacturing/Industrial Centers should provide for the needs of freight movement and employees by ensuring a variety of transportation modes, such as roads, rail, and various trucking facilities. Nonmotorized facilities and transit services should be creatively provided when it makes sense and is safe, providing the MIC with alternative transportation to single occupancy vehicles (SOVs) and transportation demand management strategies if transit is unavailable or is not feasible.*

C-22. *The transportation system, including, but not limited to, road, rail, dock, and port terminal, within Manufacturing/Industrial Centers shall be built, protected, and maintained to accommodate existing and future industrial uses.*

C-23. *All jurisdictions should support transportation capital improvement projects which improve access and movement of goods to, in, and from Manufacturing/Industrial Centers.*

C-24. *To be designated as a Regional Manufacturing/Industrial Center (MICs), the following criteria shall be met.*

1. *Consistency with specific criteria for Manufacturing/Industrial Centers adopted within the Countywide Planning Policies and the Multicounty Planning Policies;*
2. *Consideration of the Center's location in the County and region, especially relative to existing and proposed transportation facilities;*
3. *Consideration of the total number of Manufacturing/Industrial Centers in the County that are needed over the next twenty years based on projected need for manufacturing/industrial land to satisfy regional projections of demand for manufacturing/industrial land uses;*
4. *Environmental analysis, which shall include demonstration that the jurisdiction is capable of concurrent service to new development; and*
5. *Adoption within the jurisdiction's Comprehensive Plan of the Center's designation and provisions to ensure that job growth targeted to the Manufacturing/Industrial Center is achieved.*
6. *Manufacturing/Industrial Centers shall be characterized by the following:*
 - a. *Clearly defined geographic boundaries;*
 - b. *Intensity of land uses sufficient to support alternatives to single-occupancy vehicle use;*
 - c. *Direct access to regional highway, rail, air, and/or waterway systems for the movement of goods;*
 - d. *Provisions to prohibit housing; and*
 - e. *Identified transportation linkages to high-density housing areas.*
7. *Jurisdictions having a designated Manufacturing/Industrial Center shall:*
 - a. *Plan for and fund capital facility improvement projects which support the movement of goods;*

- b. Coordinate with utility providers to ensure that utility facilities are available to serve such Centers;
- c. Provide buffers around the Center to reduce conflicts with adjacent land uses;
- d. Facilitate land assembly;
- e. Assist in recruiting appropriate businesses; and
- f. Encourage employers to participate in Commute Trip Reduction program.

Regional Policy Framework

PSRC Vision 2050

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) central Puget Sound region. PSRC's duties include prioritizing and distributing federal transportation funds.

PSRC's Vision 2050 Plan established a long-term land use and transportation framework for the region and designated the Tideflats as one of 10 Manufacturing/Industrial Centers (MIC) in the region. Vision 2050 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.

As part of the Regional Growth Strategy included in VISION 2050, the region has been divided into nine different geographies: *Metropolitan Cities, Core Cities, High Capacity Transit Communities, Cities and Towns, Urban Unincorporated Areas, Rural Areas, Natural Resource Lands, Major Military Installations, and Tribal Lands*. These geographies are used to allocate forecasted population and employment growth by county according to the general type of community.

Under VISION 2050, Tacoma is designated as a "Metropolitan City," and a greater share of growth is allocated to the city and surrounding area as locations with high-capacity transit. The following policies support the prioritization of centers and specify the roles of MICs in the region.

MPP-RC-7. Give funding priority – both for transportation infrastructure and for economic development – to support designated regional growth centers and manufacturing/industrial centers, consistent with the regional vision. Regional funds are prioritized to regional centers.

MPP-RGS-4. Accommodate the region's growth first and foremost in the urban growth area. Ensure that development in rural areas is consistent with the regional vision and the goals of the Regional Open Space Conservation Plan.

MPP-RGS-10. Focus a significant share of employment growth in designated regional manufacturing/industrial centers.

MPP-EC-3. Support efforts to retain and expand industry clusters that manufacture goods and provide services for export, increasing capital in the region.

MPP-EC-4. Leverage the region's position as an international gateway by supporting businesses, airports, seaports, and agencies involved in trade-related activities.

MPP-EC-6. Ensure the efficient flow of people, goods, services, and information in and through the region with infrastructure investments, particularly in and connecting designated centers, to meet the needs of the regional economy.

MPP-EC-21. Concentrate a significant amount of economic growth in designated centers and connect them to each other in order to strengthen the region's economy and communities and to promote economic opportunity.

MPP-EC-22. Maximize the use of existing designated manufacturing/industrial centers by focusing appropriate types and amounts of employment growth in these areas and by protecting them from incompatible adjacent uses.

Additionally, VISION 2050 prioritizes compatibility with tribal reservation lands which interface with the study area.

MPP-RC-4 Coordinate with tribes in regional and local planning, recognizing the mutual benefits and potential for impacts between growth occurring within and outside tribal boundaries.

MPP-DP-7 Consider the potential impacts of development to culturally significant sites and tribal treaty fishing, hunting, and gathering grounds.

MPP-DP-51 Protect tribal reservation lands from encroachment by incompatible land uses and development both within reservation boundaries and on adjacent land.

Regional Center Plans Checklist (2014)

PSRC's *Regional Center Plans Checklist* guides jurisdictions in updating their center plans, including for Regional Manufacturing Industrial Center Plans (PSRC, 2014). The study area is designated by the PSRC as the Port of Tacoma Manufacturing/Industrial Center (MIC). The checklist includes the following requirements for Regional Manufacturing Industrial Center Plans with respect to land use. These requirements are incorporated into the work plan for this project:

- Demonstrate and explain the defined boundaries and shape for the center. Planning area boundaries should fully encompass the designated regional manufacturing/industrial center.)
- Establish employment growth targets that accommodate a significant share of the jurisdiction's manufacturing/industrial employment growth, and demonstrate capacity to accommodate these levels of growth (Note: growth targets are the amount of growth a jurisdiction has agreed, through the countywide process, to plan for throughout its comprehensive plan elements over the 20-year horizon of the comprehensive plan. The targets include both the

baseline density (current) plus the 20-year growth. Distinct from growth targets, zoned development capacity is not time-bound and, therefore, can allow higher levels of development.)

- Describe the percentage of planned land use and zoning in the center for industrial and manufacturing uses.
- Describe strategies to avoid land uses that are incompatible with manufacturing, industrial uses, such as large retail uses, high concentrations of housing, or non-related office uses (other than as an accessory use).
- Establish design standards that help mitigate aesthetic and other impacts of manufacturing and industrial activities both within the center and on adjacent areas.

Regional Centers Framework Update (2018)

In March 2018, after extensive work with members, partners, and the public, PSRC adopted a revised centers framework. The revisions focused on how to support and recognize the region's diverse centers and result in more consistent criteria throughout the region. New eligibility criteria were defined for centers. Minimum eligibility requirements ensure consistency in centers designation and ensure that new regional growth centers meet the intent of VISION 2040 while allowing for flexibility. The Designation Procedures for New Centers will be updated to identify additional supporting documentation around local commitment, planning, and existing conditions.

The Regional Centers Framework Update identifies two distinct pathways to designate new manufacturing/industrial centers. Minimum eligibility for regional designation is described below. The criteria are expanded to include discussion of appropriate employment type, core industrial zoning, industrial preservation strategies, and regional role. The center pathways may be used to inform future growth planning.

Industrial Employment Center	Industrial Growth Center
<p>These centers are highly active industrial areas with significant existing jobs, core industrial activity, evidence of long-term demand, and regional role. They have a legacy of industrial employment and represent important long-term industrial areas, such as deep-water ports and major manufacturing. The intent of this designation is to, at a minimum, preserve existing industrial jobs and land use and to continue to grow industrial employment in these centers where possible. Jurisdictions and transit agencies should aim to serve all MICs with transit.</p>	<p>These regional clusters of industrial lands have significant value to the region and potential for future job growth. These large areas of industrial land serve the region with international employers, industrial infrastructure, concentrations of industrial jobs, and evidence of long-term potential. The intent of this designation is to continue growth of industrial employment and preserve the region's industrial land base for long-term growth and retention. Jurisdictions and transit agencies should aim to serve all MICs with transit.</p>
<p>Center must meet each the following criteria:</p> <ul style="list-style-type: none"> ■ Existing jobs: 10,000 minimum ■ Planned jobs: 20,000 minimum 	<p>Center must meet each the following criteria:</p> <ul style="list-style-type: none"> ■ Minimum size of 2,000 acres ■ Existing jobs: 4,000 minimum

- Minimum 50% industrial employment
- If MIC is within a transit service district, availability of existing or planned frequent, local, express, or flexible transit service. If MIC is outside a transit service district, documented strategies to reduce commute impacts through transportation demand management strategies consistent with the Regional Transportation Plan Appendix F (Regional TDM Action Plan)
- Presence of irreplaceable industrial infrastructure 2
- At least 75% of land area zoned for core industrial uses 3
- Industrial retention strategies in place
- Regional role
- Planned jobs: 10,000 minimum
- Minimum 50% industrial employment
- If MIC is within a transit service district, availability of existing or planned frequent, local, express, or flexible transit service. If MIC is outside a transit service district, documented strategies to reduce commute impacts through transportation demand management strategies consistent with the Regional Transportation Plan Appendix F (Regional TDM Action Plan)
- At least 75% of land area zoned for core industrial uses • Industrial retention strategies in place
- Regional role

2 Industrial-related infrastructure that would be irreplaceable elsewhere, such as working maritime port facilities, air and rail freight facilities. 3 Zoning designations dominated by traditional industrial land uses such as manufacturing, transportation, warehousing and freight terminals. Commercial uses within core industrial zones shall be strictly limited.

State and Federal Policy Framework

Growth Management Act

The Washington State Growth Management Act (GMA) was adopted in 1990 in response to concerns over uncoordinated growth and its impacts on communities and the environment. The GMA includes 13 planning goals to help guide its implementation. These goals address the following: 1) encouraging growth in urban areas, 2) reducing sprawl, 3) encouraging multimodal transportation systems, 4) encouraging a variety of housing types, including affordable housing, 5) encouraging economic development, 6) recognizing property rights, 7) ensuring timely and fair permitting processes, 8) protecting agricultural, forest and mineral lands, 9) retaining and enhancing open space and supporting recreation opportunities, 10) protecting the environment, 11) encouraging citizen involvement in planning processes, 12) ensuring adequate public facilities and services, and 13) encouraging historic preservation. A fourteenth goal was added to the GMA to reference the use preferences of the Shoreline Management Act.

Comprehensive plans are mandated by the GMA to include specific chapters, referred to as elements. Required elements include land use, housing, capital facilities, utilities, transportation, economic development, and parks and recreation. The GMA and other state and regional policies provide specific guidance for the contents of these elements. Cities are also allowed to include optional elements in their comprehensive plans such as subarea plans like the proposed Tideflats Subarea Plan.

The entire comprehensive plan, including the required and optional elements, must be internally and externally consistent. Internal consistency means that all elements of a plan are consistent with the future land use map contained in the land use element, and that the different elements are mutually supportive. For instance, the transportation projects outlined in the transportation element must

support the land use patterns called for in the land use element. The requirement for external consistency means that the comprehensive plan must be coordinated with adjacent jurisdictions.

The GMA also requires that comprehensive plans address provision of sufficient land capacity to meet growth targets, establishment of level of service (LOS) standards, and public participation. A city must designate adequate land to accommodate twenty-year growth forecasts from the Office of Financial Management and Pierce County, based on the requirement to provide sufficient capacity to meet growth targets. The current planning period for the Comprehensive Plan extends through 2035, but soon Tacoma and other central Puget Sound communities will be planning for 2044. A comprehensive plan must include LOS standards for transportation facilities and may include LOS standards for other types of public facilities as well. The comprehensive planning process must include a public participation program providing for early and continuous opportunities to share input and ideas for the plan and its implementation.

Implementation of comprehensive plans is accomplished largely through development regulations and capital budget decisions. The GMA states that jurisdictions' development regulations and budget decisions must conform to comprehensive plans.

Tacoma's strategy for growth in the One Tacoma Comprehensive Plan is consistent with GMA goals which restricts urban growth to urban areas to prevent sprawl and supports economic development.

Treaty of Medicine Creek: Puyallup Tribe of Indians Reservation (1854, 1857, 1873)

The Puyallup Tribe of Indians Reservation was established in 1854 by the Treaty of Medicine Creek which is the supreme governing law over the study area. The reservation was enlarged two subsequent times through presidential executive orders in 1857 and 1873. The treaty federally designated several proto-land use types including reserving the lands for hunting, gathering, fishing, and homesteading. The following articles of the Treaty of Medicine Creek outline these uses:

Article 3: The right of taking fish, at all usual accustomed grounds and stations, is further secured to said Indians in common with all citizens of the Territory, and of erecting temporary houses for the purpose of curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses on open and unclaimed lands[...]

Article 5: To enable the said Indians to remove to and settle upon their aforesaid reservations, and to clear, fence, and break up a sufficient quantity of land for cultivation[...]

Puyallup Tribe of Indians Land Claims Settlement (1990)

A federal appeals court ruled in 1983 in the tribe's favor, awarding 12.5 acres of the Port of Tacoma to the Tribe. 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 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. The agreement outlines the federal requirement for notification and consultation on all development and planning within the Tacoma Tideflats.

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

Puyallup Tribal Codes

As noted above, the study area includes lands located within the Puyallup Tribe of Indians reservation and Tribal-owned parcels. The Puyallup Tribe operates and administers a set of laws and regulations collectively referred to as the Puyallup Tribal Codes (PTC). Title 15 of the PTC addresses land use with a Zoning Ordinance (Chapter 15.12) that contains district classifications for all lands which exist within the boundaries of the Puyallup Reservation as defined by the Plat Map of the 1873 Survey conducted by the United States General Land Office and filed in 1874 and the Puyallup Land Claims Settlement Act of 1989, PL 101-41. In addition, Chapter 15.08 Land Use Consultation Process Ordinance sets out the process for tribal land use decisions and land use decisions by local governments.

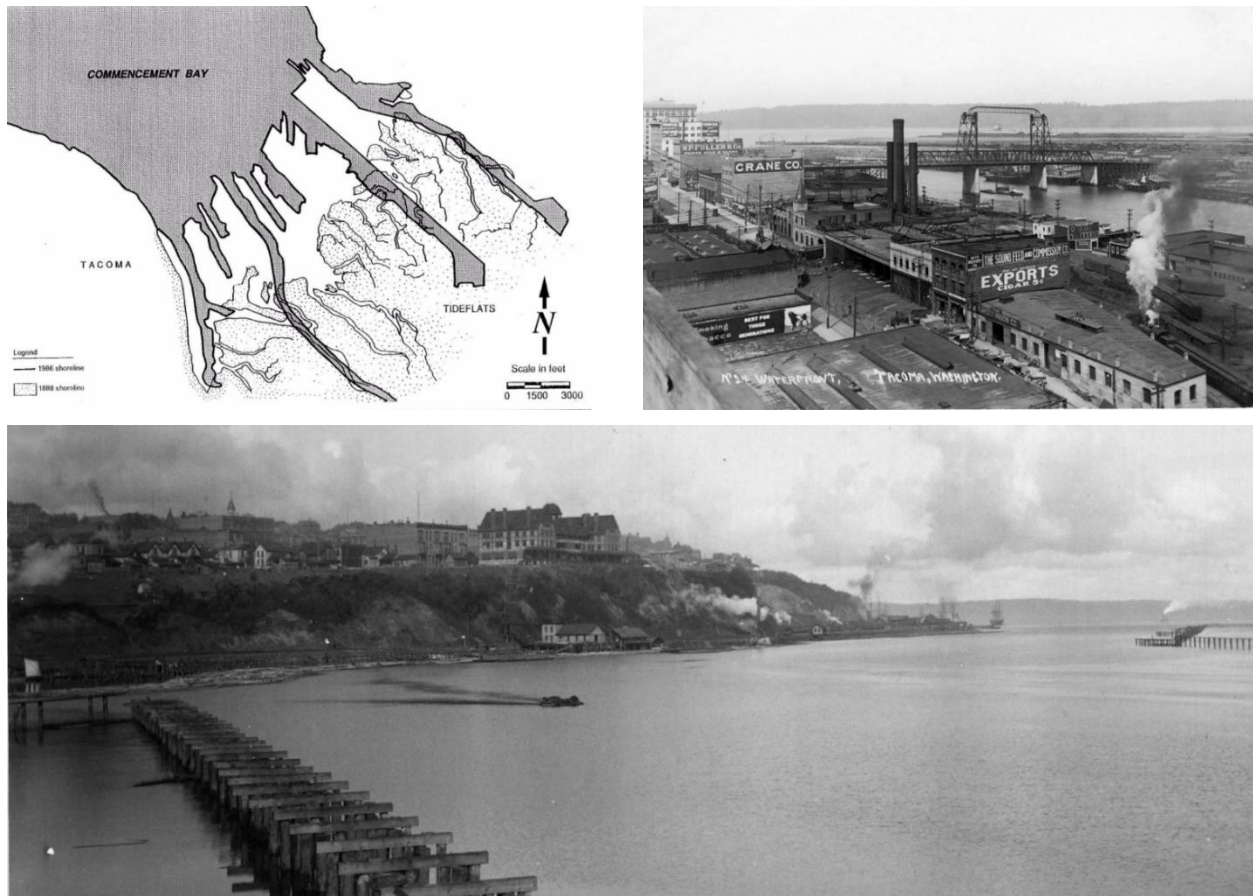
8.2 History of Development

The nature of activities in the study area has shifted greatly over the years. The study area is part of the ancestral lands of the Puyallup Tribe of Indians. For centuries, the Puyallup Tribe, with other Native American communities, fished the rivers, hunted in the forest, and lived in the lands along the shores of Puget Sound and the Puyallup-White River watershed, including the study area. In the 1800s European settlers came to the region with a different view of land use and ownership. In 1854, Territorial Governor Issac Stevens executed the Treaty of Medicine Creek. Various Tribes ceded their claims to land in Washington in return for relatively much smaller land within reservations, hunting and fishing rights, and promises of cash payments. By 1857, the Puyallup reservation was created and expanded to 18,060 acres. The reservation lay along the Puyallup River and Commencement Bay and included parts of the cities of Tacoma, Fife, and Puyallup, including the study area. The arrival of the transcontinental railroad in the 1880s spurred development in Tacoma and much of the tribal lands were alienated or sold to non-Indian

ownership.¹⁷ The railroad brought thousands of new settlers and new trade, business and port activities to Tacoma.

Starting from this time in the 1880s, the study area has a history of maritime industrial activity. Early uses included lumber and shingle mills, as well as shipyards, flour mills, electrometallurgy, and electrochemical uses. In 1918, the Port of Tacoma was established. Starting in 1919, the Port of Tacoma started to build industrial facilities to support local and regional trade. For example, in the 1930s, the Port built a cold storage facility, designed to help farmers in the region safely store and ship their produce. Maritime facilities and activities also took root in the study area in these early years. During World War II (1941), Todd Pacific Shipyards (formerly named Seattle-Tacoma Shipbuilding Company) in the study area became for military shipbuilding activity (Hoyle, 1989).

¹⁷ See Puyallup Land Claims Settlement: In 1990, the Puyallup Tribe of Indians in Tacoma accepted a settlement of \$162 million in cash, real estate, and economic development programs in exchange for claims to some 18,000 acres of land on its historic reservation on Commencement Bay. In exchange for abandoning claims to the original reservation, the tribe received 900 acres of waterfront property, a per-capita payment of \$20,000, a trust fund, employment opportunities, and a subsidy to improve the Blair Waterway, including a new bridge.

Exhibit 8-8 Tideflats Activities in the 1890 - 1900s

Note: Left image, 1888 shoreline and shoreline modifications in 1986. Right Image, waterfront and 11th Street bridge looking east. Bottom image, A look from Commencement Bay in 1890, with the old Northern Pacific Railroad trestle bridge that crossed the Tideflats with the Tacoma Hotel in the background.

Source: City of Tacoma, Marv Coleman: Department of Ecology Toxics Cleanup Program, and Tacoma Public Library, 2020; Washington Department of Historic Preservation, 2020.

In 1966, the Port dredged and extended the Blair and Hylebos waterways creating more than 1,400 acres of new land. The waterway extension and dredging set the stage for increased activity with new terminals, industrial development sites and jobs. By 1981, shipping and transportation innovations transformed the location, land and operational needs of port activities. The study area saw the addition of facilities such as the North Intermodal Yard, shifting the Port's activities, and land uses in the area, into the logistics of moving goods from one place to another. Land use in the study area shifted to include docks, yards, and similar spaces needed for proper cargo handling, and the infrastructure required to carry out their distributive function (Hoyle, 1989).

8.3 Current Conditions

Current Land Uses

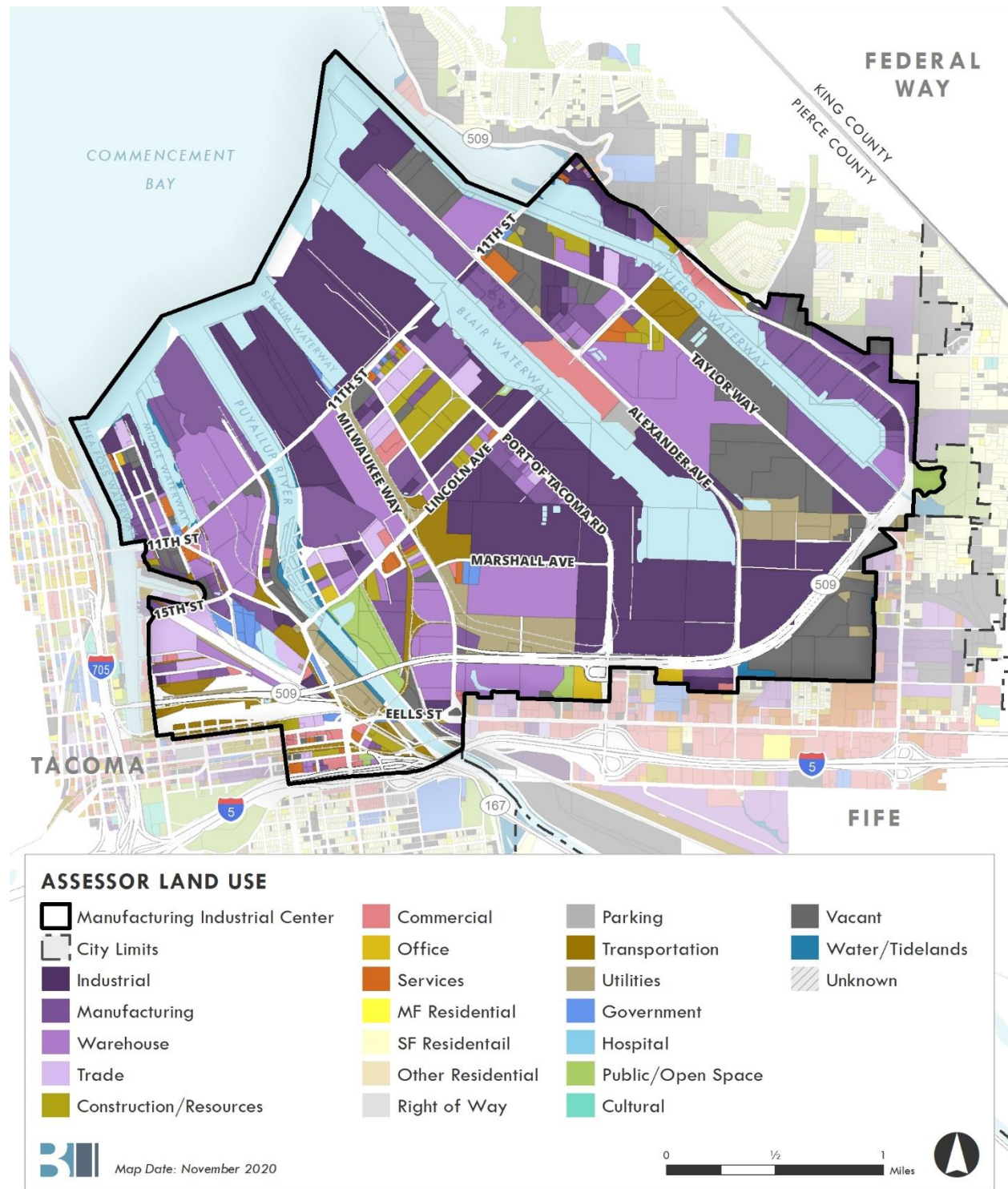
The study area includes 3,963 acres (parcel acres) spread across 752 parcels with a diverse range of uses. The majority (34%) of uses are industrial activities. Manufacturing (16%), warehousing (15%) and transportation (4%) are also significant proportions of the overall land use acreage in the study area (parcel acres). These activities together account for roughly 70% of the land use in the study area.

These acreages reflect the presence of the Port of Tacoma, container and intermodal facilities, and a range of maritime, transportation, manufacturing, fisheries, construction, utilities, and industrial services uses. Specific uses include container marshalling and intermodal yards, chemical manufacturing and distribution, forest product operations (including shipping and wood and paper products manufacturing), warehousing and/or storage of cargo, and boat and/or ship building/repair.

Similar to other industrial areas in the region, however, a number of non-industrial activities that have similar needs around outdoor storage, and distance from residential areas, are also located in the study area. These include uses related to services (6%), construction (6%), utilities (5%) and commercial (2%) activities. Services, retail and commercial uses include food services, auto and other repair services, and other similar uses that serve employees in the area as well as residents in the city. Utilities uses include three substations owned by Tacoma Public Utilities, a substation owned by Bonneville Power Administration, a wastewater treatment plant operated by the City of Tacoma, and property operated by the Tacoma Fire Department. These existing utilities facilities are part of the infrastructure serving the Port of Tacoma. See [Exhibit 8-9](#).

Roughly 14% or 458 acres of land in the study area is vacant. Not all of this land may be vacant in the traditional sense - industrial areas have a larger presence of vacant land since some of this land may be used for staging, storage and to support industrial activities. A significant proportion of the vacant land in the study area is vacant due to legacy contamination that can be expensive to remedy.

Land use patterns are described in greater detail in the northeast, central and southwest portions of the study area in the following section.

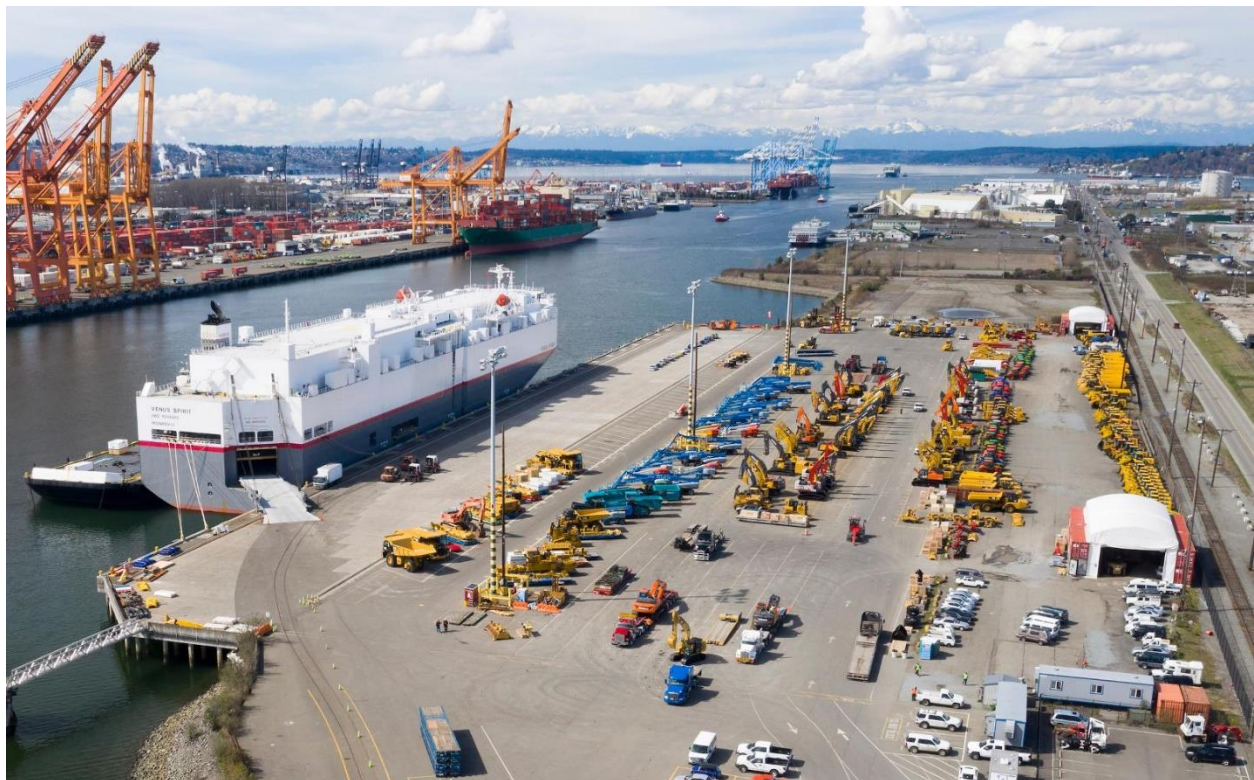
Exhibit 8-9 Land Use – Study Area, 2020

Source: City of Tacoma, 2020; BERK, 2020.

Land Use in the Northeast Portion of the Study Area

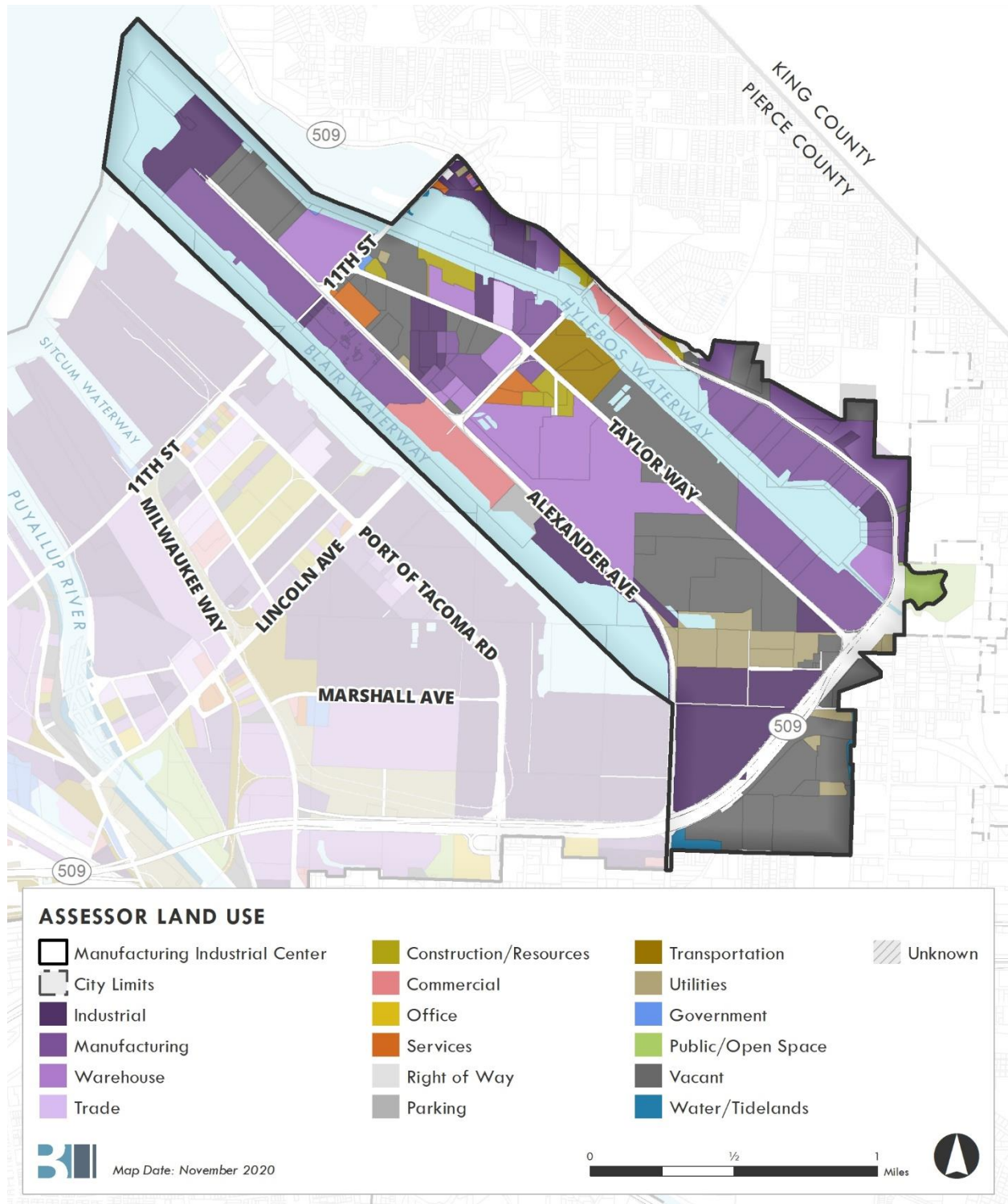
This 1,561-acre area includes parcels east of the Blair Waterway and at the end of the waterway, east of Alexander Avenue. Industrial uses, including terminals, intermodal yards, and other related uses (22 %, 339 acres), manufacturing (20%, 333 acres), warehouse (13%, 207 acres) and utilities (4%, 63 acres) uses account for close to 60% of land use in the area. Nearly a quarter or 383 acres of land in this area is vacant. Some of this land may appear as vacant but may be in use for staging or other needs and not available for redevelopment. Commercial (4%), services (1%) and other sectors are smaller uses in this area. Firms and businesses in the area include a range of transload, transportation, and industrial uses such as Trident Seafoods, TOTE Maritime, the Prologis warehousing facility, Taylor Way Auto Processing Facility, MacMillan Piper, Calbag Metals Company, and Nordlund Boats. See Exhibit 8-10 and Exhibit 8-11.

Exhibit 8-10 East Blair Terminal, 2020



Note: East Blair One Terminal (EB1) is a cargo dock for items which cannot be shipped in a container. This type of cargo is called “breakbulk.” The Port of Tacoma handles heavy equipment such as John Deere and Caterpillar through this facility, including yachts, motorhomes, exotic cars, crates with Boeing parts, medical equipment, or helicopters.

Source: Port of Tacoma, 2020.

Exhibit 8-11 Land Use – Northeast Portion of Study Area, 2020

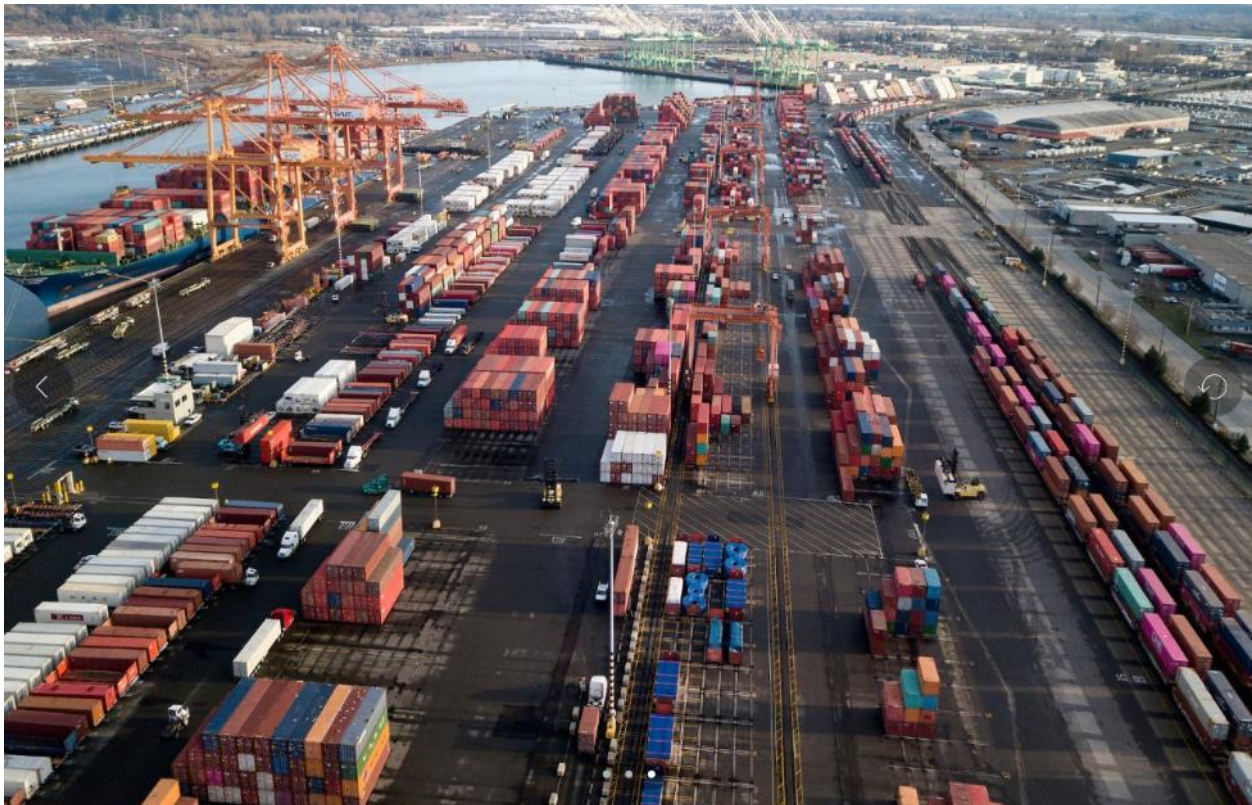
Source: City of Tacoma, 2020; BERK, 2020.

Land Use in the Central Portion of the Study Area

These 1,761-acre area includes parcels between the Puyallup River and Blair Waterway/Alexander Avenue. Industrial (55% %, 968 acres), and warehouse (14%, 251 acres) account for close to 70% of land use in the area. Manufacturing (9%, 159 acres) and utilities (5%, 80 acres) are smaller proportions of the land use here. Very little land in this portion of the study area is vacant. Nearly a quarter or 383 acres of land in this area is vacant. Commercial (4%), services (1%) and other sectors are smaller uses in this area.

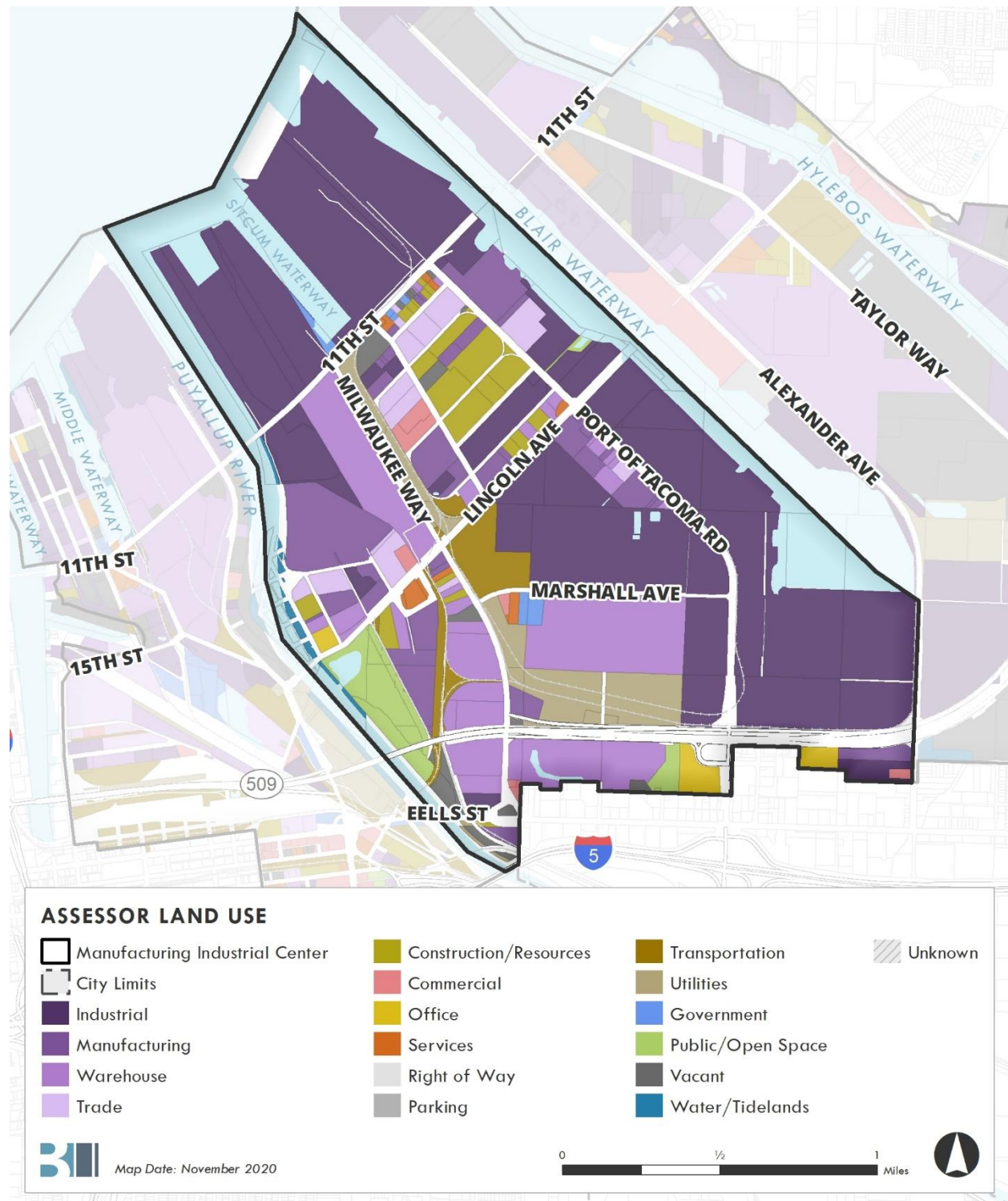
Activities in the area include terminals (both port-owned and private), intermodal yards, and a range of industrial, transportation, marina, auto-related, small office and similar uses. Examples of firms and businesses in the area include the Auto Warehousing Company, Concrete Technology Corporation, US Oil refinery, Tacoma Metals, and others. The Port of Tacoma-owned multi-use office building known as the Fabulich Center is located here off Port of Tacoma Road between SR 509 and I-5. See Exhibit 8-12 and Exhibit 8-13.

Exhibit 8-12 Washington United Terminals, 2020



Note: In 1981, the Port of Tacoma was the first port in the Western Hemisphere to create a facility called an “on-dock intermodal yard.” This enabled the shipping line to move containers between ship and rail without putting the container on a truck and driving it on city streets. Today, the Port has eight intermodal yards which help shipping lines, terminal operators and shippers save time and money.

Source: Port of Tacoma, 2020.

Exhibit 8-13 Land Use – Central Portion of Study Area, 2020

Source: City of Tacoma, 2020; BERK, 2020.

Land Use in the Southwest Portion of the Study Area

This 642-acre area includes parcels west of the Puyallup River. Warehouse (24%, 153), manufacturing (20%, 129 acres), transportation (12%, 75 acres) account for close to 56% of land use in the area. Industrial (6%, 36 acres), utilities (6%, 40 acres) are smaller proportions of the land use here. Nearly 11% or 51 acres of land in this area is vacant. Commercial (9%), services (6%) and other sectors relatively larger uses here compared to the northeast and central portions of the study area.

Activities in the area include distribution services, marine repair services, and warehouses. Examples of firms and businesses in the area include Stellar Industrial Supply, Atlas Columbia Warehouse, PCC Logistics, the Philips 66 Terminal and the Conoco Phillips facility. The Tacoma Northwest Detention Center is also located in this area. See Exhibit 8-14.

Exhibit 8-14 Land Use – Southwest Portion of Study Area, 2020

Source: City of Tacoma, 2020; BERK, 2020.

Land Ownership

Tribal Ownership

The Puyallup Tribe owns various parcels within the area. The most significant of these properties is located along the Hylebos and Blair Waterways. The Tribe utilizes these properties for economic, cultural and administrative uses. The Tribe operates a marina, automobile import facility, and processing facilities. The Tribe also has non-industrial uses within the area including a cultural site, dxw̓lilali “a place to come ashore” and the Tribal Ceremonial Grounds are places where various ceremonies and cultural activities take place. Additionally, the Tribe’s operates several administrative departments within the area. In addition to these properties, parts of the Puyallup River within the study area are also owned by the Puyallup Tribe. See Exhibit 8-15.

Port Ownership

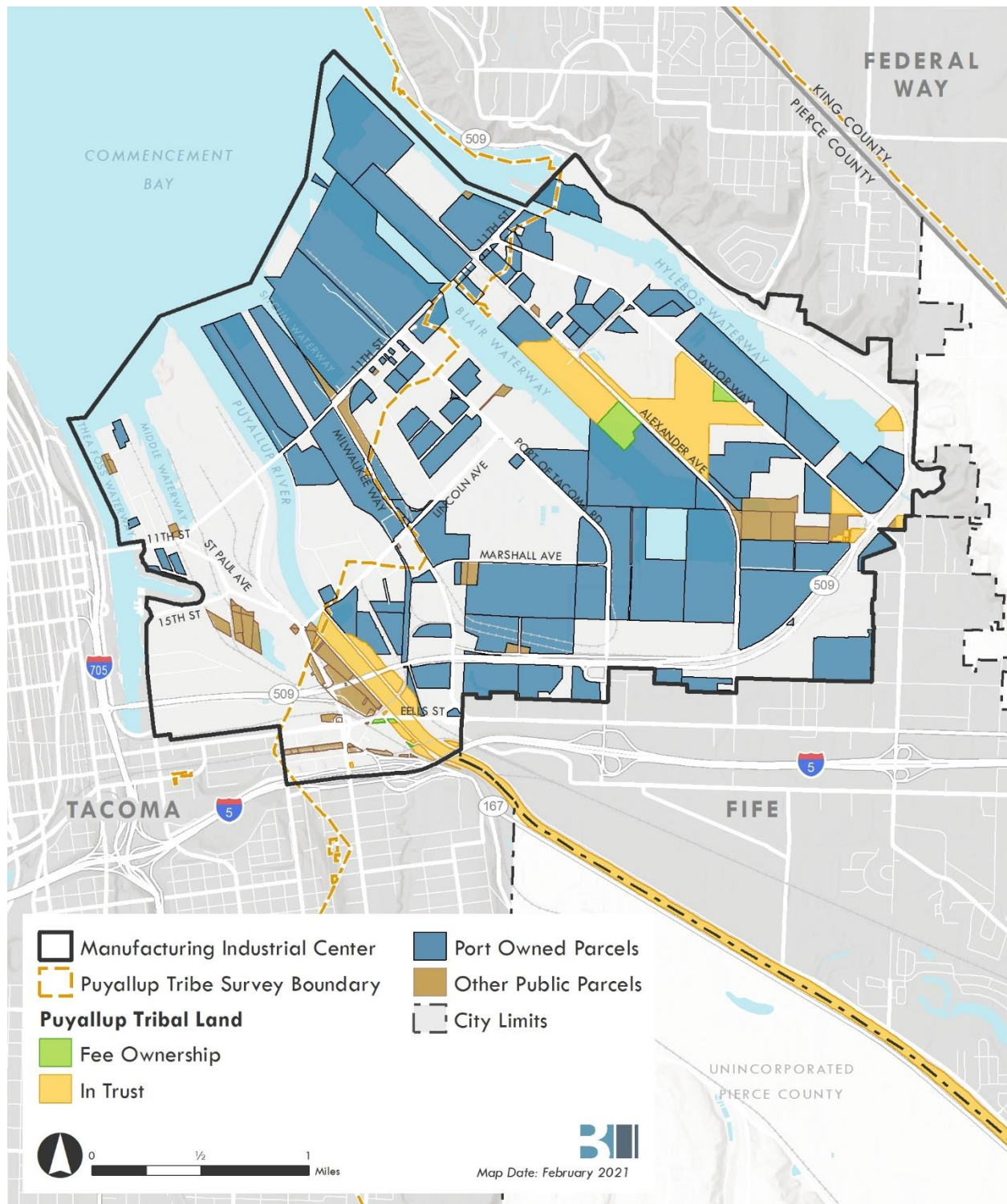
The Port of Tacoma is a major landowner in the area. It operates and leases piers, docks, wharves, cargo handling equipment, and related upland facilities.

Major container and intermodal facilities that are located in the study area include deep water terminals for containerized, breakbulk, and bulk cargo and intermodal rail facilities. Some of the largest cargo terminals, especially the container terminals, are owned and leased by the Port of Tacoma, but there are also many private facilities that transfer cargo to and from ships and barges. See Exhibit 8-15.

City-owned Land

A significant proportion of the land in the study area is publicly owned. For example, Fire Stations 6 and 18, future Fire Station No. 5 (under construction), and a training center are located within the study area. Changes to publicly owned facilities offer opportunities. Proposed changes include:

- **Fire Station #5 (Tideflats):** The City of Tacoma is currently construction a new fire station (Station No. 5) at 3510 E 11th Street to provide fire response, EMS, and hazardous materials capabilities in the Port area. In the 2021-2022 biennium, the City will continue construction on Station 5 and plans to begin service provision to the Port of Tacoma and other industries in the Tideflats by the end of 2021. The project is fully funded.

Exhibit 8-15 Non-Private Ownership – Study Area, 2020

Note: Port and public ownership based on land use designation, taxpayer address, and business name fields in the assessor data.
 Source: City of Tacoma, 2020; Puyallup Tribe of Indians, 2020; BERK, 2020.

Edges and Adjacent Neighborhoods

The study area is bound by I-705 and Dock Street on the west, I-5 on the south, 70th Avenue E and SR 99 on the east, and Marine View Drive and East 11th Street on the north. In addition to these transportation features, the study area is situated in a valley with steep slopes that separate it from uses in the east and west. The combination of transportation corridors and topography create strong edges that physically separate the study area adjacent neighborhoods.

Western Edge

The Thea Foss Waterway forms a physical separation between the study area and Downtown Tacoma on the west. A mix of uses including attractions such as the Museum of Glass, waterfront apartment and condominium buildings, and interspersed commercial uses, occupy the narrow strip of land between Dock Street and the shoreline on this western edge. North of the study area on Schuster Parkway is the Tacoma Export Marketing Company (TEMCO) Grain Terminal. The terminal is the nation's largest exporter of grain and second-largest exporter of flour.

Exhibit 8-16 Western Edge, Study Area



Source: Google Maps, 2020.

The 11th Street bridge at the intersection of Dock Street and S 11th Street is a gateway feature to the study area. A boat ramp facility for the Puyallup Tribe is also located here.

To the southwest edge of the study area, beyond Puyallup Avenue and E 25th Street, are the parking areas and low-density development around the Tacoma Dome Station. The Tacoma Dome Station is a regional transportation facility where multiple transit routes and services converge, including Tacoma Link streetcar, Sounder commuter rail, and local and regional bus service. Just outside the study area on the southwest is the Emerald Queen Casino and Tribal government uses. Within the study area, along the southern edge east of E 27th Street are ceremonial grounds for the Puyallup Tribe.

Southern Edge

On the southeastern edge the area between the study area and Interstate 5 (located within the city limits of Fife) is dominated by commercial uses oriented to the highway. Interspersed with these highway oriented commercial uses is a tribal community informally known as “Youngsville.”

Exhibit 8-17 Southern Edge – Study Area



Source: Google Maps, 2020.

Eastern Edge

Marine View Dr. and SR 509 form the eastern edge of the study area. Julia's Gulch, a 60-acre site owned by the Port of Tacoma and managed by Metro Parks, borders the eastern edge of the study area. The site remains green through a stewardship agreement with the City of Tacoma, Schnitzer Steel Industries, and Forterra. View Point park, housing and forested areas are just

outside the study area. Steep topography separates the study area from the development along this side of the study area.

Exhibit 8-18 Eastern Edge – Study Area



Aerial image: Aerial photo of the study area and the eastern edges. Inset image: steep hillsides separating the study area from development on the eastern edge.

Source: Google Maps, 2020 (aerial image).

Existing Development Types

A large proportion of the development in the study area consists of port-related uses including dock and yard spaces needed for proper cargo handling. These areas have limited buildings and instead comprise a specific type of development characteristic of an area with a working seaport. This includes wharfs, cranes and related infrastructure, power, refrigerated container storage and power, rail, top picks and other heavy equipment, gate and security infrastructure.

Character of Area

A significant proportion of the study area is devoted to yards, outdoor spaces, and other open areas typical in industrial districts. Buildings in the study area are large format buildings oriented

to internal circulation rather than streets. Buildings are typically surrounded by large areas to accommodate truck staging, employee parking and outdoor storage needs.

Exhibit 8-19 Existing Development

Note: Top left image: warehouse building. Top right image: industrial flex buildings. Middle image: interior of concrete factory. Bottom image of purpose-built manufacturing buildings for Graymont and Georgia Gypsum. Source: Google Earth, 2020; Port of Tacoma, 2020.

Building Types and Area

Major building types include industrial flex buildings that can accommodate a range of activities along with ancillary office spaces, warehouses built for storage, and purpose-built manufacturing buildings that are unique to their functions. Industrial/flex properties account for almost 10.9 million square feet of space, followed by manufacturing buildings with 2.6 million square feet. Another 1.3 million square feet of built space is distributed across uses such as oil and chemical refining, resource uses, including cement and gravel plants, marinas and shipyards, lumberyards, railroad yards and the federal Northwest Detention Center.

There are minimal amounts of other uses in this area, including retail and office uses. No multifamily residential development is located within the study area, although some non-residential uses do include live-work / caretaker units. These smaller retail and service buildings occupy interstitial spaces between larger industrial structures.

Age of Buildings

The study area includes both older and newer buildings. About 10%, or approximately 1.6 million SF, of building space was built pre-war, and 57% or roughly 5.8 million SF of total rentable building area is 50 years old or older. There has been a significant amount of new construction in the study area concentrated in warehousing and distribution buildings with about 3.8 million SF of said buildings constructed since 2011.

Anticipated Growth and Development Capacity

Exhibit 8-20 Buildable Lands Analysis – Study Area, 2020

Sources: Pierce County, 2016; City of Tacoma, 2020.

Exhibit 8-21 Land Capacity – Study Area, 2020

Sources: City of Tacoma, 2020; BERK, 2020.

In 2013, the City of Tacoma developed allocations for population and employment for the 2030 and 2040 planning horizons. For 2030, the allocations used for the City as a whole are those established by Pierce County in compliance with the Growth Management Act (GMA). For 2040, the allocations used were taken from the PSRC's VISION 2040 report and are based on data generated by the State of Washington's Office of Financial Management. These total allocations are shown below.

Exhibit 8-22 Growth Allocations – City of Tacoma, 2013

	population allocations			employment allocations		
	percent	2030	2040	percent	2030	2040
Tacoma	100%	78,600	127,000	100%	64,200	97,000
Downtown Regional Growth Center	60%	47,160	76,200	70%	44,940	67,900
North Downtown	26%	20,080	32,445	30%	19,470	29,417
South Downtown	26%	20,080	32,445	30%	19,470	29,417
Martin Luther King	9%	7,000	11,310	9%	6,000	9,065
Tacoma Mall Regional Growth Center	6%	5,000	8,079	0	5,000	7,555
Tideflats Manufacturing/Industrial Center	0%	0	0	8%	5,000	7,555
South Tacoma Manufacturing/Industrial Center	0%	0	0	8%	5,000	7,555
remaining allocation	34%	26,440	42,721	7%	4,260	6,436
% of remaining allocation to MUCs	50%			80%		
MUCs	17%	13,220	21,361	5%	3,408	5,149
Outside all centers	17%	13,220	21,361	1%	852	1,287

Source: City of Tacoma, 2013

8.4 Key Findings and Implications for Plan

- The study area includes a large and diverse set of land uses. These uses span a range of activities and sectors. This assorted mix uses reflect the presence of a working port, a large and diverse industrial support sector, and a range of uses that share a need for distance from residential uses, transportation access, and outdoor storage.
- Industrial uses along with manufacturing, warehousing, and transportation uses account for about 70% of the land use study area.
- Existing state, regional, and local policies and regulations support the area as a location of concentrated industrial activity and its role as a manufacturing industrial center (MIC).
- Existing zoning within the study area continues to allow some uses that may be considered incompatible with industrial activity. The intent of the Comprehensive Plan Container Port Element is that a core of PMI (Port-Maritime Industrial) zoning is protected from encroachment by incompatible land uses by a buffer of general industrial zoning (M-1 and M2). However, PMI zoning allows for a large variety of uses, including high impact heavy industrial uses, light industrial uses and non-industrial uses. For example, PMI zoning allows for smelters, hazardous chemical manufacturing and shipping terminals of all kinds as well as light industry and warehousing.

- Allowed and prohibited uses will need to be evaluated to ensure that they tie into a shared vision for the future of the area and reduce land use conflicts.
- The Current Tacoma Comprehensive Plan and PSRC regional framework policy intent is for the study area to be a viable industrial center. This should be balanced with the fact that the study area is located within the ancestral lands of the Spuyaləpabš̓ (Puyallup Tribe of Indians) and include several places that are locations of important events, village sites, and geographical features with historical and cultural significance.
- In addition, four topics will need further evaluation:
 - **Buffers and transition areas.** The Comprehensive Plan supports the provision of adequate buffers to avoid land use conflicts between industrial development and surrounding non-industrial uses. Currently, however, the Comprehensive Plan assumes that existing geography is a very effective buffer and no additional transition area is needed. Industrial uses produce several impacts, around air quality, noise, and odor, that topography alone might not adequately buffer. Current uses and buffer/transition areas will need to be evaluated to confirm they meet the policy intent.
 - **Community interests and public investments.** Recent planning, including the South Downtown Subarea Plan, and planning for transit around the Tacoma Dome Station area, envision changes to areas adjacent to the study area. These considerations will influence buffers and transition areas and connections to the study area.
 - **Public access.** The public can currently access the shoreline at points along Thea Foss Waterway including at Waterway Park and at the City of Tacoma Fire Department facility. The City of Tacoma Shoreline Public Access Plan describes other possible opportunities to provide public access to waterways in the area while meeting the goals outlined in the Shoreline Master Plan. These opportunities will need to be evaluated.
 - **Public land ownership.** A large proportion of the land in the study area is publicly owned and presents unique opportunities and challenges. For example, the area adjacent to the Puyallup riverfront includes local and federal properties. Future development here could take advantage of the recreation opportunities offered by a generally undeveloped riverfront in an urban setting. On the other hand, the Puyallup River is likely to be vulnerable to flooding due to climate change and have potentially limited adaptation options due to its history of alteration. The appropriate use of these types of land will need to be evaluated.

9 POPULATION, EMPLOYMENT, AND HOUSING

This chapter describes existing demographic conditions and adopted Comprehensive Plan targets for the Tideflats study area, based on available city, regional, state and federal data, and on adopted plans.

9.1 Existing Policies and Regulations

The City of Tacoma plans in coordination with Pierce County and other jurisdictions. The City's 2015 Comprehensive Plan looks forward to Tacoma's long-term future, ensuring that growth happens in a beneficial, healthy, and sustainable way. This Comprehensive Plan builds on the City's 2004 periodic review, responds to community needs, and fulfills the Washington Growth Management (GMA) requirements for periodic review. It also conforms to Pierce County's Countywide Planning Policies and guidance from the Puget Sound Regional Council VISION 2040.

Tacoma's adopted growth target is for 127,000 new residents and 97,000 new jobs by 2040. See Exhibit 9-1

Exhibit 9-1 City of Tacoma Growth Targets and Assumptions – City of Tacoma, 2020

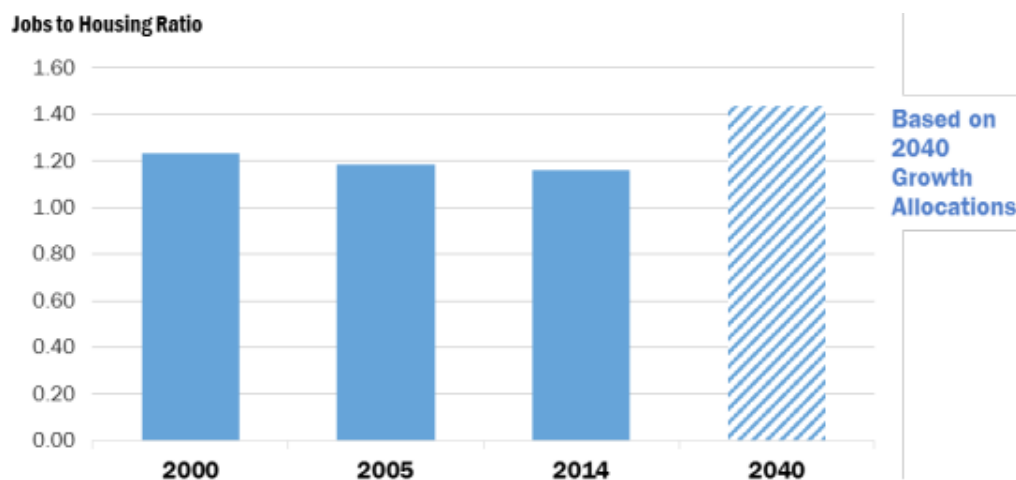
	Current	Comprehensive Plan 2040 Growth Target
Population	213,300 (2020)	127,000 (net increase from 2015)
Employment	110,902 (2019)	97,000 (net increase from 2015)

Note: Total covered employment in Tacoma was slightly over 100,000 in 2014.
Sources: OFM, 2020; PSRC, 2020; City of Tacoma, 2020.

Adopted 2040 employment targets for the city show a large increase in Tacoma's jobs to housing ratio from 1.2 to slightly higher than 1.4. Tacoma's ratio has trended downward over time since 2000, with housing unit increases outpacing job growth. The city's adopted employment targets

and the resulting shift in jobs to housing ratio illustrate the importance of job growth to fulfilling the envisioned role of Tacoma as a regional employment center. See Exhibit 9-2.

Exhibit 9-2 Jobs to Housing Ratio – City of Tacoma, 2000-2040 Growth Allocations



Source: City of Tacoma, 2020.

Economic Development

Goals and policies in the Comprehensive Plan that support a growing vital city with economic development choices are listed below (City of Tacoma, 2019).

Goal EC-1. Diversify and expand Tacoma's economic base to create a robust economy that offers Tacomans a wide range of employment opportunities, goods and services.

Policy EC-1.5. Encourage commercial and industrial development by ensuring the availability of suitable sites for development and providing appropriate zoning and infrastructure.

Policy EC-1.6. Develop relationships, partnerships and programs to promote international business and trade opportunities in Tacoma.

Policy EC-1.10. Leverage Tacoma's industry sector strengths and assets to position Tacoma as a leader and innovator in the local, regional and state economy.

Policy EC-1.11. Identify and regularly update Tacoma's target industries to better leverage the city's economic position within the region and to respond to strategic opportunities as they arise.

Policy EC-1.12. Actively seek investments to grow Tacoma's presence in the following target industries:

- a) Bio-medical and medical
- b) Information technology and cyber security

- c) Professional services
- d) Industrial and manufacturing
- e) Tourism and hospitality
- f) Creative economy
- g) International trade
- h) Finance and Insurance.

Goal EC–2. Increase access to employment opportunities in Tacoma and equip Tacomans with the education and skills needed to attain high quality, living wage jobs.

Policy EC–2.1. Maintain adequate employment land and public facilities that support living wage jobs that do not require a 4-year college degree and facilitate career advancement for low income people.

Goal EC–3. Cultivate a business culture that allows existing establishments to grow in place, draws new firms to Tacoma and encourages more homegrown enterprises.

Policy EC–3.10. Promote key retail, office and manufacturing opportunity sites, as identified in the City’s Economic Development Strategic Plan, Subarea Plans and other planning documents.

Goal EC–6. Create robust, thriving employment centers and strengthen and protect Tacoma’s role as a regional center for industry and commerce.

Manufacturing/Industrial Centers

Policy EC–6.19. Provide industrial land and encourage investment in necessary services that support industrial business retention, growth and traded sector competitiveness as a West Coast trade and freight hub, a regional center of diverse manufacturing and a widely accessible base of living wage jobs, particularly for underserved and underrepresented people.

Policy EC–6.20. Strictly limit Comprehensive Plan Map amendments that convert industrial land and consider the potential for amendments to otherwise diminish the economic competitiveness or viability of prime industrial land.

Policy EC–6.21. Protect and preserve sufficient land use capacity for water-dependent and related industrial uses within the city’s industrial shorelines.

Policy EC–6.22. Maintain properties currently developed with industrial users and strive to offset the reduction of development capacity with the addition of prime industrial capacity that includes consideration of comparable site characteristics.

Policy EC–6.23. Pursue regional capital improvement opportunities to provide a competitive advantage for Tacoma’s industrial districts and ensure that industrial districts

have the necessary infrastructure and capacity to support businesses engaged in activities such as transportation, logistics and international trade.

Policy EC–6.24. *Coordinate with the Port to market and recruit businesses to vacant and undeveloped Port-owned properties.*

Policy EC–6.25. *Take advantage of trade relationships established by the Port of Tacoma to promote business attraction and expansion.*

Policy EC–6.26. *Promote and administer a sister cities program that encourages international partnerships and exchanges focused on education, culture, trade, foreign direct investment and business attraction.*

Policy EC–6.27. *Explore expansion of the Urban Clean Water Technology Innovation Partnership Zone and continue to support marketing of available properties.*

Housing

Goals and policies in the Comprehensive Plan that support a growing vital city with housing choices are listed below (City of Tacoma, 2019).

Goal H–3. *Promote safe, healthy housing that provides convenient access to jobs and to goods and services that meet daily needs. This housing is connected to the rest of the city and region by safe, convenient, affordable multimodal transportation.*

Policy H–3.2. *Locate higher density housing, including units that are affordable and accessible, in and around designated centers to take advantage of the access to transportation, jobs, open spaces, schools, and various services and amenities.*

Policy H–3.3. *Promote transit supportive densities along designated corridors that connect centers, including duplex, triplex, cottage housing, and townhouses.*

Policy H–3.4. *Strive to accommodate 80% of the City's housing targets within and around designated centers.*

Policy H–3.6. *Locate new affordable housing in areas that are opportunity rich in terms of access to active transportation, jobs, open spaces, high-quality schools, and supportive services and amenities.*

Goal H–4. *Support adequate supply of affordable housing units to meet the needs of residents vulnerable to increasing housing costs.*

Policy H–4.4. *Facilitate the expansion of a variety of types and sizes of affordable housing units, and do so in locations that provide low-income households with greater access to convenient transit and transportation, education and training opportunities, Downtown Tacoma, manufacturing/ industrial centers, and other employment areas.*

Goal H-5. Support access to resource efficient and high performance housing that is well integrated with its surroundings, for people of all abilities and income levels.

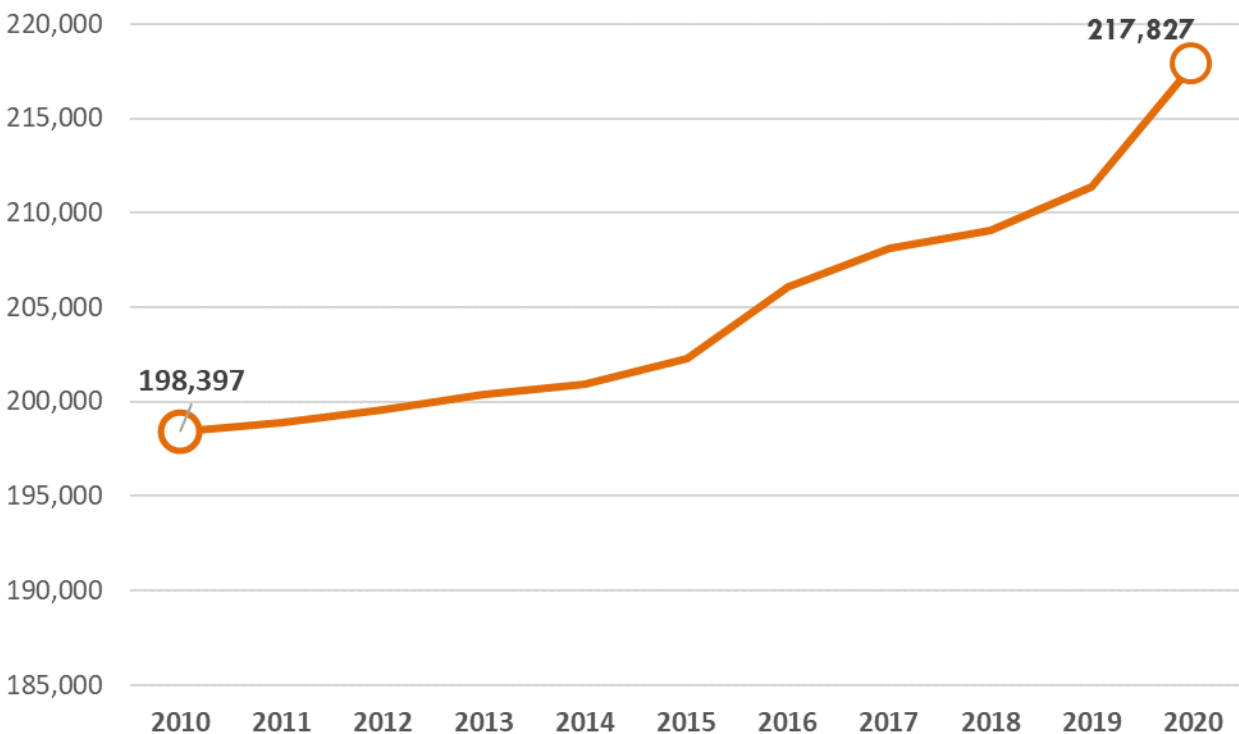
Policy H-5.2. Promote housing that is protected from noise, pests, hazardous environmental conditions and materials.

9.2 Current Conditions

Population

The City of Tacoma has a 2020 population of 217,827 people (Exhibit 9-3), representing roughly a quarter of the population of Pierce County. Given its role as a manufacturing/industrial center, the study area has a very small population overall and a very small proportion of the city's residents. Estimates indicate that the study area has a population of 353.

Exhibit 9-3 Historic and Current Population – City of Tacoma, 2020

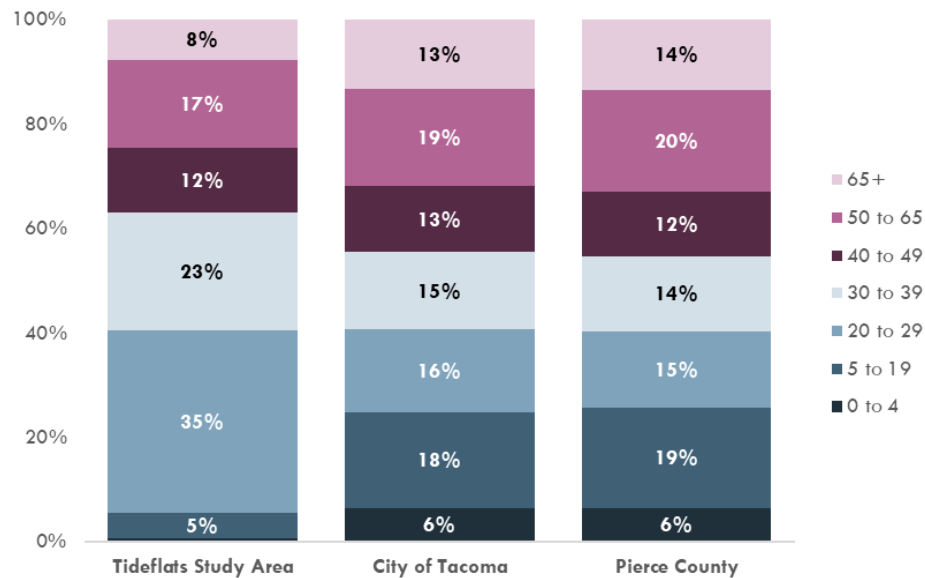


Source: City of Tacoma, 2020.

Demographics

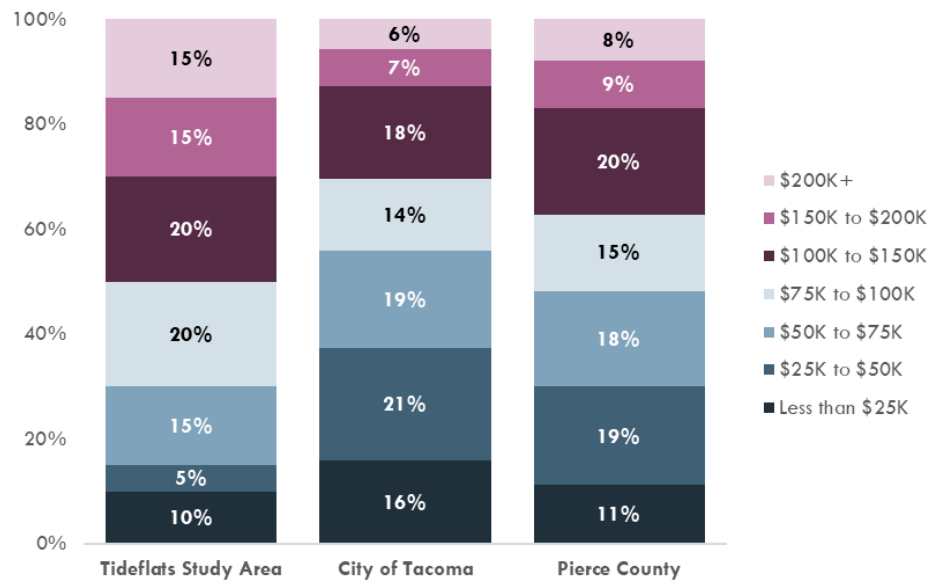
The study area has a larger proportion of residents who are between the ages of 20-39 (58%) relative to the city (34%) or county (29%). See Exhibit 9-4.

Exhibit 9-4 Age – Study Area, City of Tacoma, and Pierce County, 2020



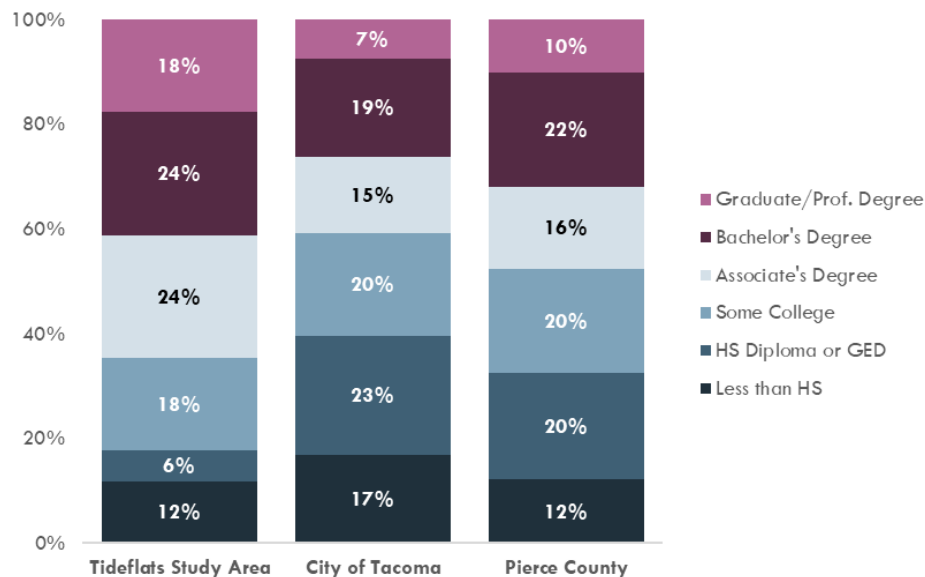
Sources: ESRI, 2020; BERK, 2020.

Smaller proportions of study area residents earn less than \$50K (15%) compared to the city (37%) and county (30%). Roughly half of study area residents earn more \$100K or more, compared to 31% in the city and 37% in the county. See Exhibit 9-5

Exhibit 9-5 Household Income – Study Area, City of Tacoma, and Pierce County, 2020

Sources: ESRI, 2020; BERK, 2020.

A larger proportion of study area residents have Bachelor's Degrees or more (42%) compared to the city (26%) and the county (32%). See Exhibit 9-6.

Exhibit 9-6 Educational Attainment – Study Area, City of Tacoma, and Pierce County, 2020

Sources: ESRI, 2020; BERK, 2020.

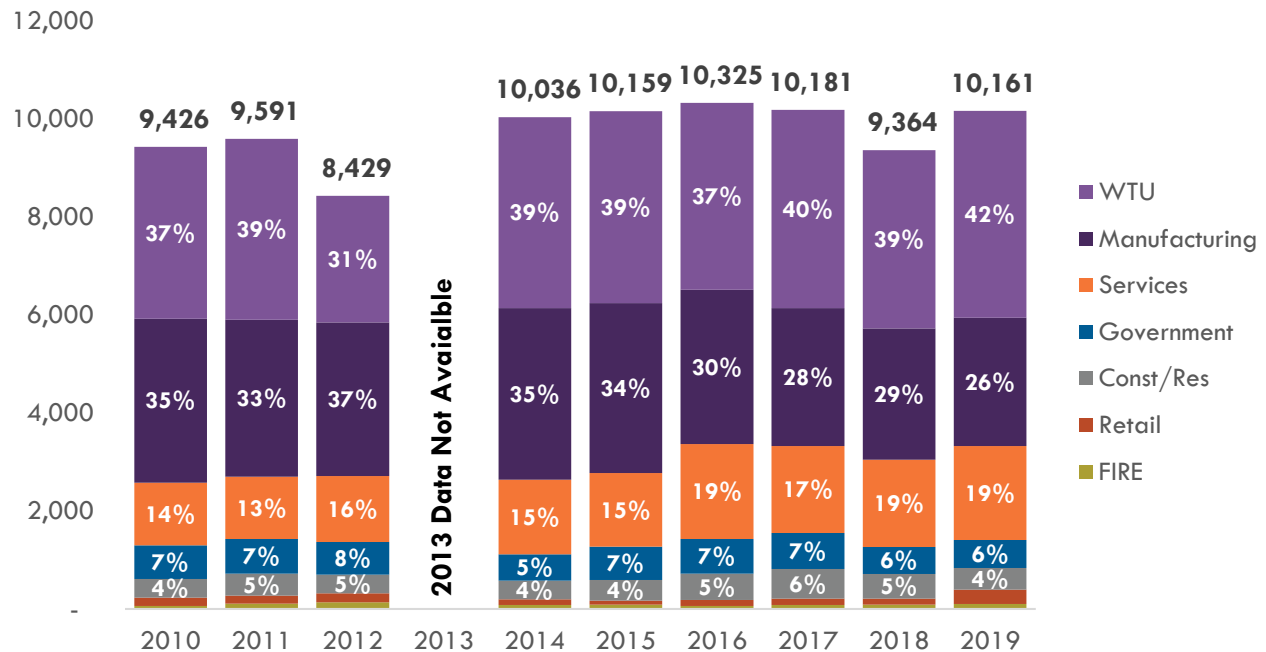
Housing Profile

As an industrial and manufacturing center, the study area has limited housing. No multifamily residential development is located within the study area, although some non-residential uses do include accessory caretaker units. Based on available data from the Environmental Systems Research Institute (ESRI) and the Census, there are an estimated 353 residents within the study area. Using the city's average household size of 2.47, this translates to roughly 143 housing units. This number does not include detainees at the Northwest Detention Center (NWDC), an immigration prison located in the study area. The NWDC was opened in 2004 and is a privately owned and operated facility on behalf of U.S. immigration and Customs Enforcement. The NWDC's current capacity is 1,575, making it one of the largest immigration prisons in the United States (Northwest Immigration Rights Project, 2020).

Employment Profile

As of 2019, total employment within the Port of Tacoma MIC was 10,161, an increase of 735 jobs over the past 10 years. About 68% of employment in the MIC is within the Wholesale Trade, Transportation, and Utilities (WTU) sector (42%) as well as the Manufacturing sector (26%). Much of the growth over the past ten years has been driven by the WTU sector while the Manufacturing sector has shrunk from 2010 levels. Other significant industry sectors include Services (19%), Government (6%), and Construction & Resources (4%). See Exhibit 9-7.

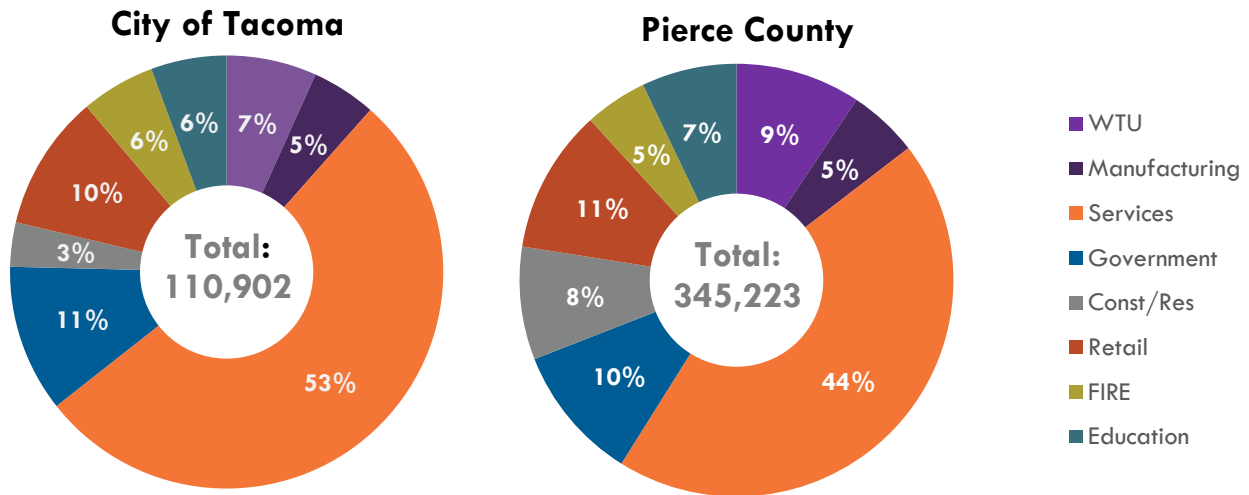
Exhibit 9-7 Tacoma MIC Employment by Sector, 2010-2019



Year	Const/Res	FIRE	Manufacturing	Retail	Services	WTU	Government	Total
2010	378	60	3,342	172	1,284	3,504	686	9,426
2011	455	112	3,198	157	1,273	3,693	703	9,591
2012	381	137	3,135	183	1,341	2,583	669	8,429
2013	2013 Data Not Available							
2014	382	84	3,501	112	1,528	3,894	535	10,036
2015	420	89	3,469	81	1,506	3,915	679	10,159
2016	543	64	3,145	117	1,939	3,813	703	10,325
2017	607	82	2,810	130	1,778	4,044	730	10,181
2018	504	90	2,679	119	1,784	3,639	549	9,364
2019	437	103	2,619	294	1,912	4,220	576	10,161

Notes: Total employment estimates for 2013 are currently unavailable.
Sources: PSRC, 2020; BERK, 2020.

Exhibit 9-8 outlines Tacoma's and Pierce County's employment by sector for 2019, respectively. Manufacturing and WTU jobs make up about 12% and 14% of Tacoma's and Pierce County's total employment, respectively. Services are by far the most significant employment sector in both Tacoma and Pierce County at 53% and 44% of Tacoma's and Pierce County's total employment, respectively.

Exhibit 9-8 Tacoma and Pierce County Employment by Sector, 2019

Sources: PSRC, 2020; BERK, 2020.

9.3 Key Findings and Implications for Plan

- Tacoma's adopted growth target is for 127,000 new residents and 97,000 new jobs by 2040.
- The city's employment targets for 2040 show a large increase in Tacoma's jobs to housing ratio from 1.2 to slightly higher than 1.4. Tacoma's ratio has trended downward over time since 2000, with housing unit increases outpacing job growth. The city's adopted employment targets and the resulting shift in jobs to housing ratio illustrate the importance of job growth to fulfilling the envisioned role of Tacoma as a regional employment center.
- With roughly 10% of the city's total employment and almost half of its manufacturing/industrial employment, the study area region accounts for a significant portion of both the City of Tacoma's and Pierce County's industrial employment.
- Ensuring job growth and retention in the study area will be an important piece of realizing the Comprehensive Plan targets.
- Existing policies supports access to a wide range of employment opportunities, growth, and competitiveness as a West Coast trade and freight hub, a regional center of diverse manufacturing, and a widely accessible base of living wage jobs, particularly for underserved and underrepresented people.
- Existing policies also support locating housing, including units that are affordable and accessible, in and around designated regional growth centers, and in areas that are opportunity rich in terms of access to active transportation, jobs, open spaces, high- quality schools, and supportive services and amenities. Policies also promote housing that is protected from noise, pests, hazardous environmental conditions and materials.

10 ECONOMIC DEVELOPMENT

This chapter describes existing economic activities, market conditions, policies and regulations related to economic development, and identified findings and implications for the Subarea Plan.

10.1 Existing Policies and Regulations

The study area, the Port of Tacoma MIC, is of great significance to the City of Tacoma, the Puyallup Tribe, the Port of Tacoma, Pierce County, and the City of Fife. As a result, many of these jurisdictions have some form of adopted economic development strategies relating to the Port of Tacoma MIC area.

Local Policy Framework

City of Tacoma

One Tacoma Comprehensive Plan

The City of Tacoma has a variety of strategies outlined in it is *One Tacoma Plan*, which is the City's Comprehensive Plan. Within the Port Container Element, the City outlined the following policies regarding the Port of Tacoma MIC (City of Tacoma, 2019):

Goal CP–3. *Promote the continued growth and vitality of port and port-related industrial activity.*

Policy CP–3.1: *Work in partnership with the Port of Tacoma to target and recruit new businesses that support port and port-related industrial activity.*

Policy CP–3.2: *Identify and consider opportunities to remove obstacles to development and to incentivize businesses that support container port and port-related industrial activity.*

Policy CP–3.3: *Consider coordinating an industrial development workforce program for local citizens. Act as a facilitator between businesses, educational institutions, trade associations and residents in order to reduce the workforce development burden of individual businesses and expand employment opportunities for citizens.*

Policy CP–3.4: *In order to build on the port area’s reputation as a prime location of port related industry, seek opportunities, such as speaking engagements, articles and others, to highlight economic development success stories in the port area.*

In addition, the City’s Comprehensive Plan also outlined the following policies regarding manufacturing/industrial centers in its Economic Development Element (City of Tacoma, 2019):

Manufacturing/Industrial Centers

Policy EC–6.19. *Provide industrial land and encourage investment in necessary services that support industrial business retention, growth and traded sector competitiveness as a West Coast trade and freight hub, a regional center of diverse manufacturing and a widely accessible base of living wage jobs, particularly for underserved and underrepresented people.*

Policy EC–6.20. *Strictly limit Comprehensive Plan Map amendments that convert industrial land and consider the potential for amendments to otherwise diminish the economic competitiveness or viability of prime industrial land.*

Policy EC–6.21. *Protect and preserve sufficient land use capacity for water-dependent and related industrial uses within the city’s industrial shorelines.*

Policy EC–6.22. *Maintain properties currently developed with industrial users and strive to offset the reduction of development capacity with the addition of prime industrial capacity that includes consideration of comparable site characteristics.*

Policy EC–6.23. *Pursue regional capital improvement opportunities to provide a competitive advantage for Tacoma’s industrial districts and ensure that industrial districts have the necessary infrastructure and capacity to support businesses engaged in activities such as transportation, logistics and international trade.*

Policy EC–6.24. *Coordinate with the Port to market and recruit businesses to vacant and undeveloped Port-owned properties.*

Policy EC–6.25. *Take advantage of trade relationships established by the Port of Tacoma to promote business attraction and expansion.*

Policy EC–6.26. *Promote and administer a sister cities program that encourages international partnerships and exchanges focused on education, culture, trade, foreign direct investment and business attraction.*

Policy EC–6.27. *Explore expansion of the Urban Clean Water Technology Innovation Partnership Zone and continue to support marketing of available properties.*

Shoreline Master Plan (2019)

The City also has several economic development objectives outlined for its shoreline areas the economic development element of its Shoreline Master Plan. This element provides for the location and design of industries, transportation facilities, port facilities, tourist facilities, commerce and other

developments that are particularly dependent upon a shoreline location and/or use of the shorelines of the state. The economic development objectives are as follows (City of Tacoma, 2019):

- Preference should be given to water-dependent uses. Secondary preference should be given to water-related and water-enjoyment uses.
- Encourage new economic development to locate in areas that are already developed with similar uses.
- Encourage new economic uses that create family wage jobs and employment.
- Ensure that only those new industries that are either water-dependent or water-related operate in the shoreline area.
- Implement economic development policies contained in the Comprehensive Plan in shoreline areas consistent with this Program and the Act.
- Encourage economic development that has minimal adverse effects and mitigates unavoidable impacts upon shoreline ecological functions and processes and the built environment.
- Support the long-term and widespread economic contribution of our international container ports and related industrial lands and transportation systems and ensure that container ports continue to function effectively alongside vibrant city waterfronts.
- Encourage shoreline development that has a positive effect upon economic and social activities of value to the City and region.

North Downtown Subarea Plan (2014)

The *North Downtown Subarea Plan* covers northern Downtown Tacoma, northern Thea Foss Waterway, and land to the east of Foss Waterway, as well as the Murray Morgan (11th Street) Bridge (City of Tacoma, 2014). The Subarea Plan has the following relevant economic development actions:

***Action ED-1.** Proactively collaborate with Tacoma's larger employers to attract further investment in North Downtown*

South Downtown Subarea Plan (2013)

The *South Downtown Subarea Plan* includes portions of the study area including the southern stretch of Thea Foss Waterway, land to the east of Foss Waterway, and the vicinity of Puyallup Avenue and E 26th Avenue west of E G Street as well as the SR 509 bridge (City of Tacoma, 2013). The Subarea Plan has policies to advance the development of the Foss Waterway, including:

***Policy 5.2.** Maximize redevelopment potential on the Foss through strategic planning and targeted investments*

***Policy 5.4.** Leverage the Waterway's potential as an urban amenity that catalyzes economic development in South Downtown*

Port of Tacoma Land Use and Transportation Plan (2014)

The Port of Tacoma's *Land Use and Transportation Plan* establishes a development vision for all port-owned property in the Tideflats area (Port of Tacoma, 2014). The vision identifies seven development designations that are consistent with adopted City of Tacoma land use and shoreline regulations. The seven designations are:

- **Marine Terminal 1:** This designation is intended to preserve lands with deep water access for marine cargo terminals and facilities.
- **Marine Terminal 2:** The development vision for this designation is to preserve waterfront land with non-deep-water access for shallow draft water-dependent commercial and maritime uses.
- **Marine Services:** This designation provides area for marine-related industries that benefit from direct water access or close proximity to navigable waters.
- **Industrial/Maritime Support:** The development vision for this 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.
- **Commercial and Mixed Commercial/Maritime Industrial:** This designation supports industrial development in the Tideflats area through complementary office and commercial uses.
- **Public Utilities:** This designation is for facilities that are part of the essential infrastructure serving the Port of Tacoma.
- **Habitat/Public Access:** This designation is for habitat mitigation sites.

City of Fife Comprehensive Plan

Much of the area just south of the MIC is zoned Regional Commercial by the City of Fife, along with some pockets of Industrial zoning. In the City's Economic Development Element of its Comprehensive Plan, the City of Fife has the following relevant policies toward the Port of Tacoma MIC (City of Fife, 2020):

Policy 1. *Strategically coordinate economic development planning efforts and establish partnerships with other economic development organizations.*

Implementation 1.1. *Work with other public agencies and private interests, including the Economic Development Board (EDB), Port of Tacoma, Chamber of Commerce, Washington State Departments, and others to coordinate resources, programs, promotions, information tools, and other materials to recruit and successfully locate new business interests in Fife.*

Implementation 1.3. *Coordinate recruitment and retention efforts with other organizations.*

Implementation 1.5. *Work with other agencies involved in economic development to identify and support established and emerging clusters that export goods and services, import capital and have growth potential.*

Policy 4. Expand socioeconomic opportunities for residents of the City.

***Implementation 4.1.** Work with other public agencies and private interests, including the Economic Development Board, Port of Tacoma, Chamber of Commerce, and others to inform businesses of employment, occupational training and advancement programs.*

***Implementation 4.3.** Actively recruit business enterprises that will provide resident household working member's employment wages at or above County median income levels.*

County Policy Framework

Pierce County Countywide Policies

Pierce County's *Countywide Planning Policies (CPP)* outlines countywide economic development goals and policies (Pierce County, 2020). These goals call for achieving a prospering and sustainable regional economy by supporting business and job creation investing in all people, sustaining environmental quality, and creating great central places, diverse communities, and high quality of life. Specific goals relevant to the Port of Tacoma MIC include:

- **Goal 1.1:** Considering the future development of commercial and industrial facilities [RCW 36.70A.210(3)(g)] and creating in the land use element of each comprehensive plan a designation of areas for "commerce" and "industry" [RCW 36.70A.070(1)].
- **Goal 1.3:** Designating and zoning large tracts of developable land equitably distributed throughout the various jurisdictions based on the related population, employment base and land areas of the jurisdiction for planned commercial and industrial centers, and local housing and employment targets.
- **Goal 1.6:** Developing and adopting standards at the municipal level to guide commercial and industrial development in a setting that is appropriately landscaped.
- **Goal 1.8:** Leveraging the region's and county's position as an international gateway by supporting businesses, ports, and agencies involved in trade-related activities.
- **Goal 1.10:** Maximizing the use of existing designated manufacturing and industrial centers by focusing appropriate types and amounts of employment growth in these areas and by protecting them from incompatible adjacent uses.
- **Goal 2.9:** Targeting the appropriate creation and retention of specific firms and industries within established and emerging industry clusters that export goods and services, import capital, and have growth potential.
- **Goal 5.7:** Concentrating a significant amount of economic growth in designated centers.
- **Goal 5.8:** Ensuring the efficient flow of people, goods, services, and information in and through the region with infrastructure investments, particularly in and connecting designated Centers.

As mentioned above, the Port of Tacoma MIC has been designated as a Manufacturing/Industrial Center under the Regional Growth Strategy for Pierce County. These Centers are areas where employee- or land-intensive uses are located. These areas are characterized by a significant

amount of manufacturing, industrial, and advanced technology employment uses. Large retail and nonrelated office uses are discouraged. Other than caretakers' residences, housing is prohibited within Manufacturing/Industrial Centers. However, these Centers should be linked to high density housing areas by an efficient multimodal transportation system. The efficiency of rail and overland freight to markets is the critical element for manufacturers and industries located in these Centers.

Regional Policy Framework

PSRC Vision 2050

The Puget Sound Regional Council (PSRC)'s *Vision 2050* plan, which establishes a long-term land use and transportation framework for the region, designates the Tideflats as one of ten Manufacturing/Industrial Centers (MIC) in the region (PSRC, 2019). The Tideflats is one of four MICs designated as industrial growth centers. Vision 2050 recognizes MICs as important employment locations that preserve lands for living-wage jobs in basic industries and trade and provide areas for employment to grow in the future. Vision 2050 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.

State and Federal Policy

State of Washington Maritime Sector Strategy

In 2013, the Washington State Department of Commerce developed a study on the State's Maritime sector in response to a State legislature directive to develop "an economic cluster strategy to leverage the state's unique maritime assets, geography, history, and infrastructure. Goals include growing employment, targeted economic activity, environmental considerations, tax revenue to state and local governments, and quality of life associated with the maritime sector by working with the industry to understand workforce needs, parity considerations with Oregon and British Columbia, and tax structure and regulatory barriers" (ESSB 5034 Chapter 4, Laws of 2013, 128(15)).

Relative to the State's ports, especially the Ports of Tacoma and Seattle, the study found the following strategies that could help support the State's ports continued competitiveness:

- Funding transportation infrastructure, specifically, investment in freight related projects such as the Puget Sound Gateway.
- Exploring tax incentives to encourage shippers to move additional cargo through the state.
- Considering the potential negative impacts tax, environmental, and regulatory policies could have on freight movement, trade, and port activity.

Puyallup Tribe of Indians Land Claims Settlement (1990)

In 1990, the Puyallup Tribe of Indians and the Port of Tacoma, along with numerous other governments and private entities entered into a Land Settlement Agreement. Among other elements of the agreement was the return of close to 900 acres of land to the Tribe, including land on the Blair Waterway. This land on the Blair Waterway was envisioned by both the Port and the Tribe to be developed as an international marine terminal.

In 2008, the Tribe and the Port signed economic development agreements to aid in the development of facilities on the Blair-Hylebos Peninsula through the incorporation of the Tribe's economic arm Marine View Ventures. As part of the agreement, the parties agreed to cooperate on the ongoing development of properties on the Blair Waterway.

Marine View Ventures objectives are to increase the land asset base for the Tribe and to create jobs and job training opportunities for tribal members. Economically, MVV is focused on leveraging its existing assets to generate returns for the Tribe and its strategic partners.

10.2 Current Conditions

COVID-19 Pandemic

The information below is based on information available prior to the COVID-19 pandemic which has severely impacted Tacoma's economy. The following is a discussion of economic impacts and trends in the Tacoma Metropolitan Statistical Area (MSA) from the COVID-19 pandemic:

- The economy in the Tacoma MSA has begun to recover; however, it remains far below pre-pandemic activity. As of December 2020, the Tacoma MSA's nonfarm employment has gained back about half of the jobs lost in March, April, and May of 2020. However, nonfarm employment was still around 16,000 jobs below pre-pandemic employment levels.¹⁸
- Economic impacts are uneven among industries. As of December 2020, manufacturing employment in the Tacoma MSA was around 1,300 jobs or 7% below February 2020 levels. Meanwhile, as of December 2020, employment in wholesale trade, transportation, and utilities (WTU) has increased 600 jobs or 1% above February 2020 levels, largely driven by increases in employment for warehousing and transportation.
- At the state level, Washington State's Economic and Revenue Forecast Council (ERFC) November 2020 forecast projects that manufacturing employment at the state level will

¹⁸ Washington State Employment Security Department Employment Estimates, <https://esd.wa.gov/labormarketinfo/employment-estimates>

continue to decline in 2021 and 2022 to around 10% below 2019 levels before beginning to stabilize and grow from 2022 to 2025, the latest year of the ERFC's forecast.¹⁹

History

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.

Port of Tacoma MIC

The MIC is an active industrial area with significant existing jobs in core industrial sectors and is a catalyst for significantly more related and indirect jobs throughout the region. The area has a long history of industrial employment and is a key component of a regional industrial ecosystem. The study area's industrial strengths center around the warehousing, transportation, and utility (WTU) sector which is closely related to the Port of Tacoma's presence in the study area.

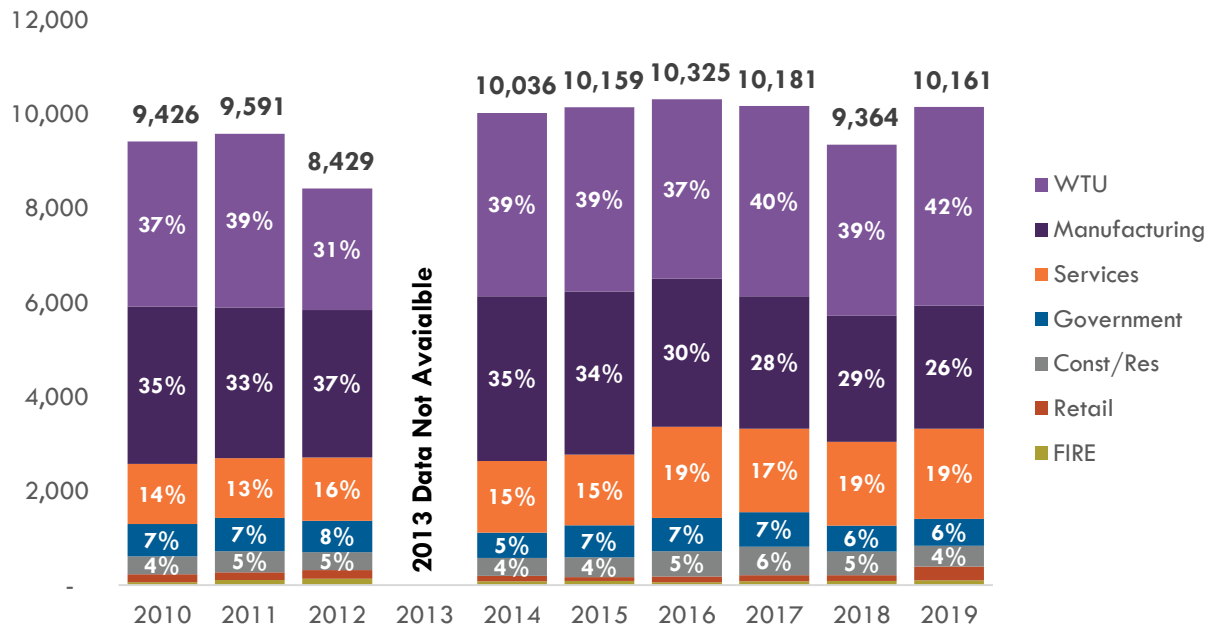
The Port of Tacoma enjoys assets such as a strategic location relative to the origins and destinations of container traffic, a naturally deep harbor with the ability to accept large ships, presence of a robust set of terminal facilities as a result of significant public investment, and efficiency of cargo handling operations. The Port of Tacoma's activities are centered around the port and industrial lands adjoining the Hylebos Waterway, Blair Waterway, Sitcum Waterway, Puyallup River, Saint Paul Waterway and Middle Waterway. The study area is home to a wide mix of industrial uses, including cargo terminals, manufacturers, warehouses, repair facilities, rail yards, and others.

Economic and Employment Profile

As of 2019, total employment within the Port of Tacoma MIC was 10,161, an increase of 735 jobs over the past 10 years. About 68% of employment in the MIC is within the Wholesale Trade, Transportation, and Utilities (WTU) sector (42%) as well as the Manufacturing sector (26%). Much of the growth over the past ten years has been driven by the WTU sector while the Manufacturing sector has shrunk from 2010 levels. See Exhibit 10-1.

Other significant industry sectors include Services (19%), Government (6%), and Construction & Resources (4%).

¹⁹ Washington State Economic and Revenue Forecast Council November 2020 Economic and Revenue Forecast, <https://erfc.wa.gov/publications/quarterly-updates>

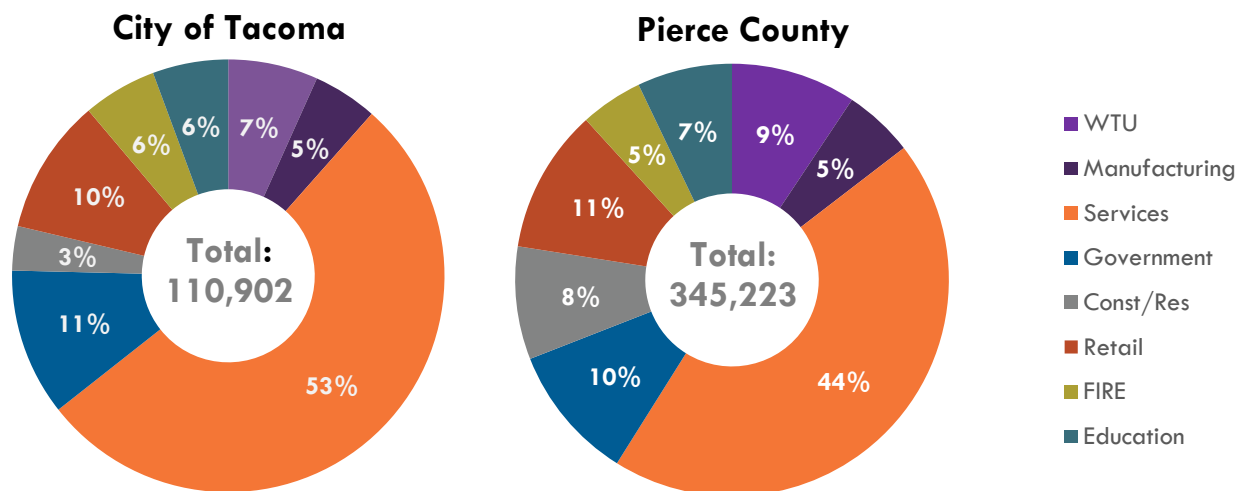
Exhibit 10-1 Tacoma MIC Employment by Sector, 2010-2019

Year	Const/Res	FIRE	Manufacturing	Retail	Services	WTU	Government	Total
2010	378	60	3,342	172	1,284	3,504	686	9,426
2011	455	112	3,198	157	1,273	3,693	703	9,591
2012	381	137	3,135	183	1,341	2,583	669	8,429
2013	Data Not Available							
2014	382	84	3,501	112	1,528	3,894	535	10,036
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2016	543	64	3,145	117	1,939	3,813	703	10,325
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2019	437	103	2,619	294	1,912	4,220	576	10,161

Notes: Total employment estimates for 2013 are currently unavailable.

Source: PSRC, 2020; BERK, 2020.

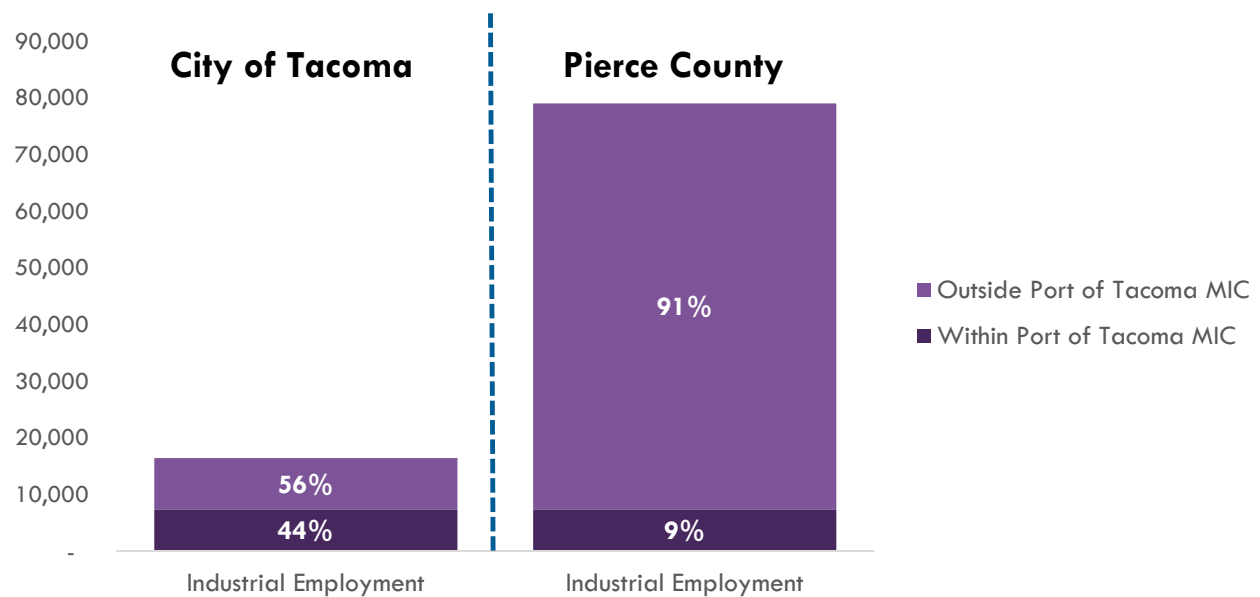
Exhibit 10-2 outlines Tacoma's and Pierce County's employment by sector for 2019, respectively. Manufacturing and WTU jobs make up about 12% and 14% of Tacoma's and Pierce County's total employment, respectively. Services are by far the most significant employment sector in both Tacoma and Pierce County at 53% and 44% of Tacoma's and Pierce County's total employment, respectively.

Exhibit 10-2 Tacoma and Pierce County Employment by Sector, 2019

Source: PSRC, 2020; BERK, 2020.

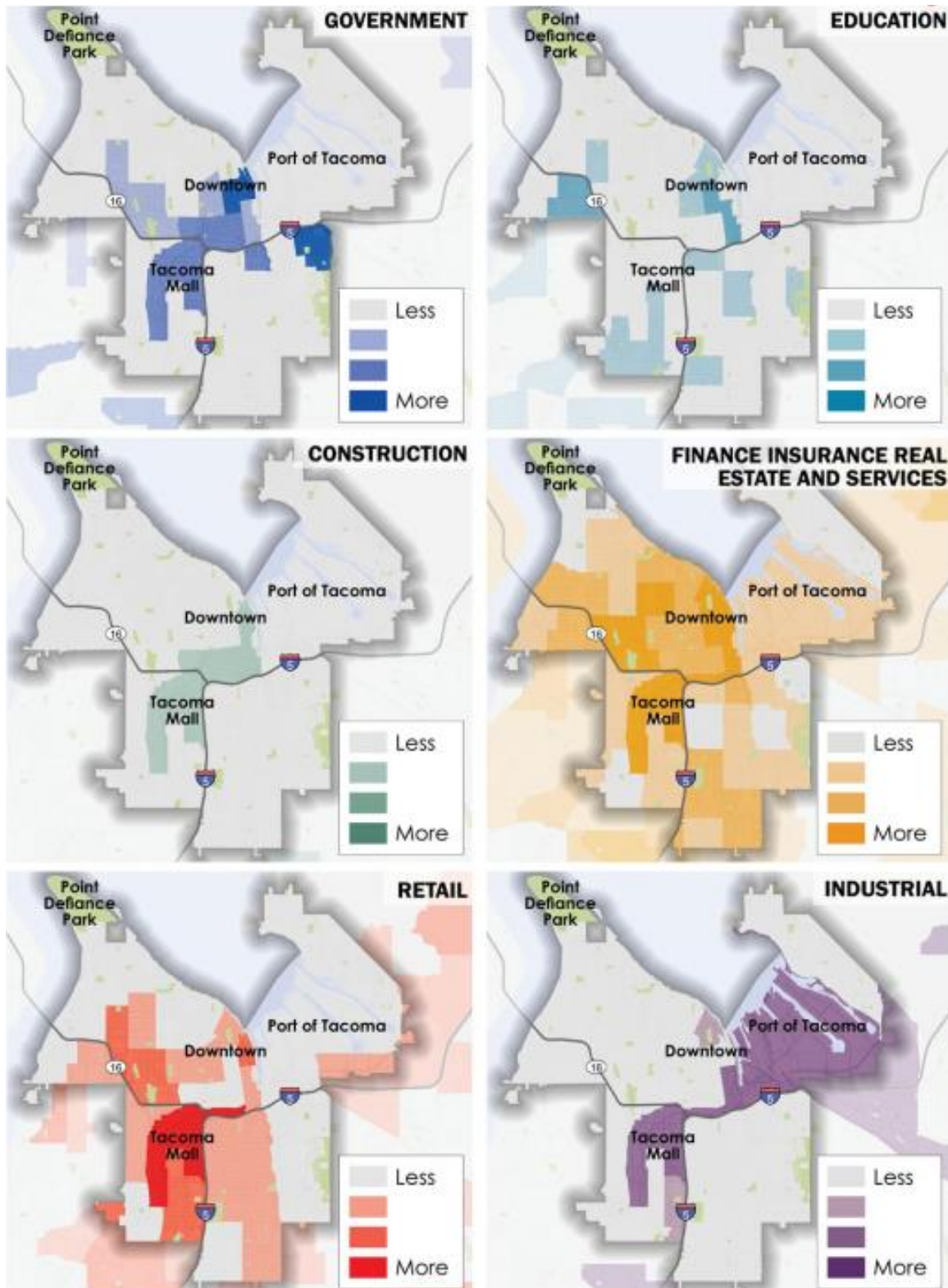
With increased competition stemming from globalization, U.S. domestic industrial activity has grown to include the storage and transportation of goods and products on their way to final consumer in addition to more traditional industrial production activities like manufacturing. A modern definition of the industrial sector describes a range of activities centered on not just the production, but including distribution, and repair of goods and materials. For the purposes of this study, we define the industrial sector as including Manufacturing, WTU (Warehousing, Transportation, and Utilities), and Construction and Resources.

Unsurprisingly given its status as a one of three manufacturing industrial centers in Pierce County, the Port of Tacoma MIC region accounts for a significant portion of both the City of Tacoma's and Pierce County's industrial employment. Exhibit 10-3 outlines the share of Tacoma's and Pierce County's industrial employment coming from within the Port of Tacoma MIC and the share coming from outside the Port of Tacoma MIC.

Exhibit 10-3 Share of Industrial Employment Within the Port of Tacoma MIC – Tacoma and Pierce County, 2019

Notes: Industrial employment defined as including manufacturing, WTU, and construction and resources jobs.
Source: PSRC, 2020; BERK, 2020.

Industrial jobs in the Port of Tacoma MIC account for 44% of all industrial jobs in Tacoma. Other clusters of industrial jobs in Tacoma include the southern portion of Central Tacoma around the Interstate 5(I-5) and Highway 16 (WA-16) crossing as well as portions of South Tacoma alongside both sides of South Tacoma Way. Industrial jobs in the city of Tacoma are clustered in these two areas while jobs in other sectors are more distributed across the city. This pattern likely reflects the locational needs and advantages of the study area and South Tacoma for industrial uses as well as zoning and land use regulations within the city. See Exhibit 10-4.

Exhibit 10-4 Employment Concentrations by Major Industry – City of Tacoma, 2015

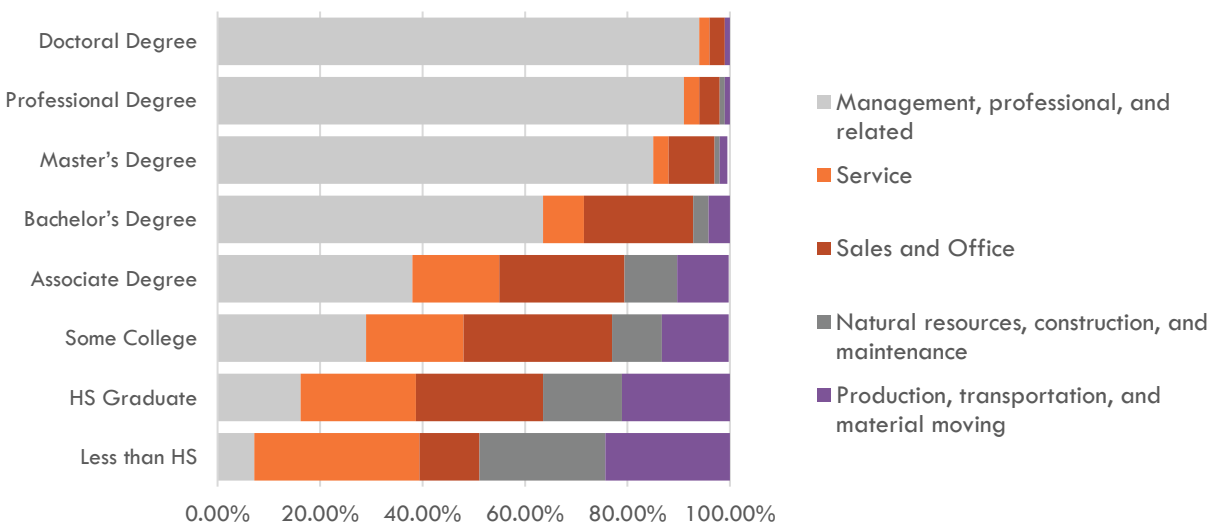
Source: City of Tacoma, 2015.

Industrial jobs in the Port of Tacoma MIC account for 9% of all industrial jobs in the County. In comparison, the Frederickson MIC accounted for about 4% of all industrial jobs in the County as of 2010 while the Sumner-Pacific MIC accounted for about 14% of all industrial jobs in the County as of 2015.²⁰

Industrial jobs can be a significant source of employment for people without high educational attainment levels. A large portion of Tacoma's population experiences barriers to employment due to lower education levels, less specialized or technical skillsets, language barriers, or lack of transportation or mobility. Only about 39% of Tacoma's population that is 25 years and above have a college degree.

As shown in Exhibit 10-5, occupations in production, transportation, and material moving as well as natural resources, construction, and maintenance are a strong source of employment for the employed civilian workforce without college degrees.

Exhibit 10-5 Educational Attainment by Occupation – Employed Civilian Workforce, 2016



Sources: BLS, 2016; BERK, 2020.

For workers without a college degree and/or lower skilled workers, industrial jobs can typically provide higher wages, better benefits, and better opportunities for career advancement and skill development compared with other employment opportunities (Exhibit 10-6). For some workers in the region, these industrial jobs are a pathway to economic advancement.

²⁰ Employment density alone does not capture the extent and impact of industrial activity, especially for an area like the Port of Tacoma MIC, since trends such as containerization have reduced the need for personnel but increased productivity.

Exhibit 10-6 Industrial Sectors Compared With Other Sectors – Tacoma, 2018

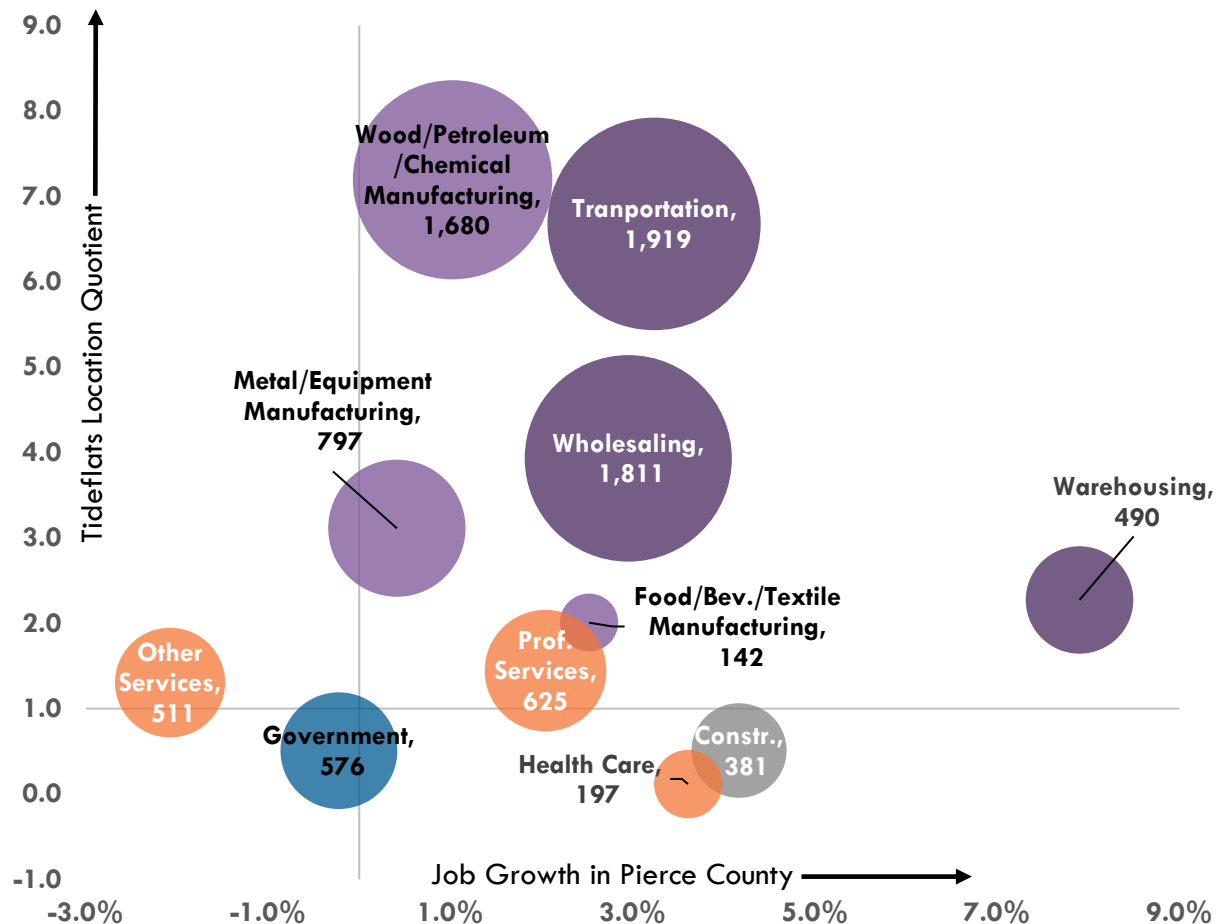
Sector	Employment	%	Median Annual Earnings
Industrial: Manufacturing, WTU, and Construction			
Manufacturing	8,922	8.7%	\$46,802
Transportation and warehousing, and utilities	6,447	6.3%	\$41,726
Wholesale trade	2,906	2.8%	\$47,832
Construction	6,711	6.5%	\$42,893
Services			
Educational services, and health care and social assistance	25,084	24.4%	\$39,701
Arts, entertainment, and recreation, and accommodation and food services	10,883	10.6%	\$22,323
Professional, scientific, and management, and administrative and waste management services	9,925	9.7%	\$51,458
Other services, except public administration	5,347	5.2%	\$27,851
Information	1,862	1.8%	\$49,432
Retail			
Retail trade	12,012	11.7%	\$27,925
Resources			
Agriculture, forestry, fishing and hunting, and mining	623	0.6%	\$24,634
Government			
Public administration	6,680	6.5%	\$59,638
Finance, Insurance, and Real Estate (FIRE)			
Finance and insurance, and real estate and rental and leasing	5,230	5.1%	\$41,058

Sources: American Community Survey (ACS) 5-Year Estimates, 2014-2018; BERK, 2020.

Port of Tacoma MIC Competitive Strengths

The Port of Tacoma MIC has competitive strengths in the sectoral clusters of manufacturing as well as WTU (Exhibit 10-7). To identify competitive strengths, BERK utilized cluster analysis based on employment data categorized to two-digit NAICS sub-sector codes derived from the Puget Sound Regional Council (PSRC). On the vertical axis of Exhibit 10-7 is the location quotient of each cluster, with sub-sectors with location quotients greater than 1.0 representing sub-sectors that have a greater concentration in the Port of Tacoma MIC than elsewhere in Pierce County. On the horizontal axis is compound annual employment growth in Pierce County over the last ten years from 2010 to 2019. The size of the bubbles represents the employment in each sub-sector in the Port of Tacoma MIC for 2019.

Exhibit 10-7 Location Quotient and Job Growth Analysis, 2019



Note: Job growth is calculated by taking the compound annual growth rate for each industry sector between 2010 to 2019 for Pierce County. Location quotients are calculated using 2019 employment information provided by PSRC.
Sources: PSRC, 2020; BERK, 2020.

The upper right-hand quadrant of the graph shows the sub-sectoral clusters in the Port of Tacoma MIC with the highest concentration of jobs and highest employment growth. Sub-sectors with both high concentration of jobs and relatively high employment growth include transportation, warehousing, and wholesaling – all sub-sectors associated with the WTU sector. The transportation (6.7 location quotient) and wholesaling (3.9 location quotient) sub-sectors are highly concentrated in the Port of Tacoma MIC. Employment in the transportation subsector is likely fueled by Port of Tacoma marine cargo operations as well as related private businesses involved in general freight trucking, coastal freight transportation, pipeline transportation, general warehousing, and storage, among others. The wholesaling subsector is made up of a diverse array of private firms wholesaling motor vehicle parts, lumber, construction equipment, professional and industrial supplies, hardware, fresh fruit, and groceries, etc.

Other sub-sectors highly concentrated in the MIC include wood, petroleum, and chemical manufacturing (7.2 location quotient) as well as metal and equipment manufacturing (3.1 location quotient). Firms in the metal and equipment sub-sector include such businesses as boat and shipbuilding firms, firms related to iron foundries and metal manufacturing, and firms manufacturing motor vehicle parts, among others. These sub-sectors are also among the slowest growing sub-sectors in Pierce County over the last several years. One potential cause for the slowing growth of these manufacturing sub-sectors may be recent innovations such as increasing automation. Studies suggest a negative relationship between automation and routine manual employment in local labor markets (Bharadwaj and Dvorkin, 2019).

Employment Centers and Location

Jobs within the MIC include employment from the Port of Tacoma as well as employment from private firms within the area. Employment supported by the Port of Tacoma includes both jobs supporting the Port's marine cargo operations as well as jobs with tenants and/or businesses leasing Port of Tacoma real estate property.

In 2015, the Port of Tacoma and Port of Seattle combined marine cargo operations to form the Northwest Seaport Alliance (NWSA). Information on employment supporting marine cargo operations is available for NWSA based on a recent economic impact analysis produced for NWSA in October 2019, but not for the Port of Tacoma specifically. As shown in Exhibit 10-8, employment supporting marine cargo operations at NWSA was around 20,100 in 2017. Employment with tenants or other businesses leasing real estate from the Port of Tacoma was around 1,500 in 2017.

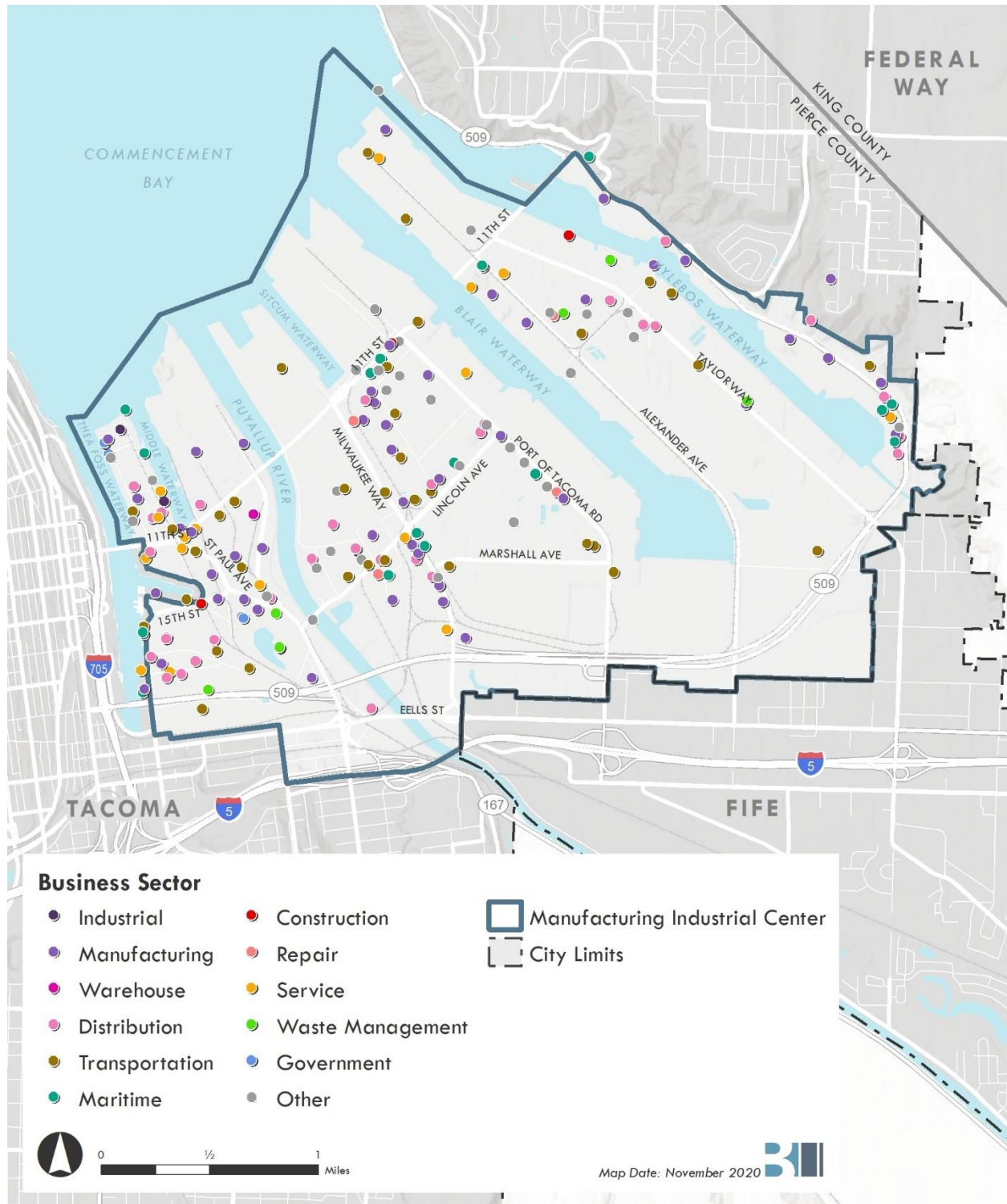
Other employment within the Port of Tacoma MIC comes from private businesses. A 2019 study from the Center of Business Analytics at the Milgard School of Business at the University of Washington-Tacoma estimated that employment from private businesses in the MIC was around 5,165 (Bergman, 2019). As of 2019, PSRC data on employment indicates there is a total of 10,161 jobs within the MIC.

Exhibit 10-8 Employment in the Port of Tacoma MIC

Category	Jobs
Port of Tacoma – Marine Cargo Operations	12,950 (2017)
Port of Tacoma Tenants and Other Business	1,500 (2017)
Port of Tacoma MIC	10,161 (2019)

Note: Northwest Seaport Alliance includes Port of Seattle employment as well as Port of Tacoma employment.
Sources: CAI, 2019; Center for Business Analytics at Milgard School of Business University of Washington, Tacoma, 2019; PSRC, 2020; BERK, 2020.

As mentioned previously, significant sub-sectors of employment from private businesses include paper and wood manufacturing, metal and equipment manufacturing, wholesaling, transportation/distribution, and warehousing/storage. These sub-sectors can often be complementary and, as a result, many firms within these sub-sectors may often be located together to take advantage of synergies. In the Port of Tacoma MIC, many of these private businesses are clustered together in the western portion of the MIC alongside the Thea Foss and Middle waterways as well as in the central portion of the MIC between the Puyallup River and Blair Waterway below the Port of Tacoma's Marine Terminal (Exhibit 10-9). Mapping of firms in the MIC is based on a 2019 study done by the School of Engineering and Technology at the University of Washington – Tacoma (West, 2019).

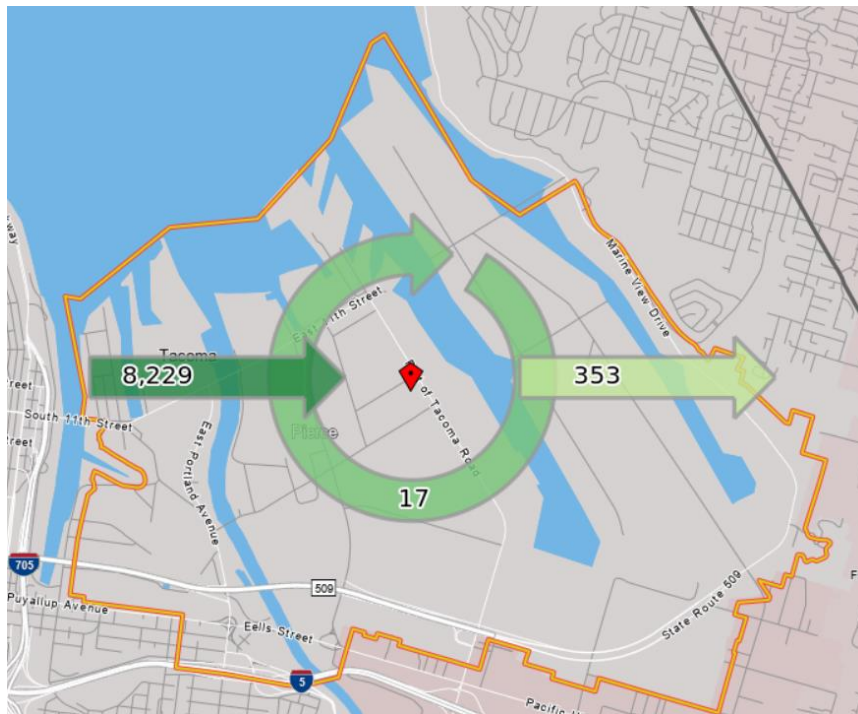
Exhibit 10-9 Map of Firms by Sector

Note: Mapping based on existing 2019 study from UW-Tacoma with additional sector classification done by BERK.
 Sources: School of Engineering and Technology, University of Washington – Tacoma, 2019; BERK, 2020.

Journey-to-Work Analysis

Exhibit 10-10 shows inflow and outflow for all jobs in the Port of Tacoma MIC for 2017. The MIC primarily sees workers who live outside of the area commuting in for work and sees very few residents who live in the area. About 8,229 workers are estimated to commute into the area for work while 353 residents are estimated to leave the area to work in another location. Only 17 residents are estimated to live and work in the MIC area.

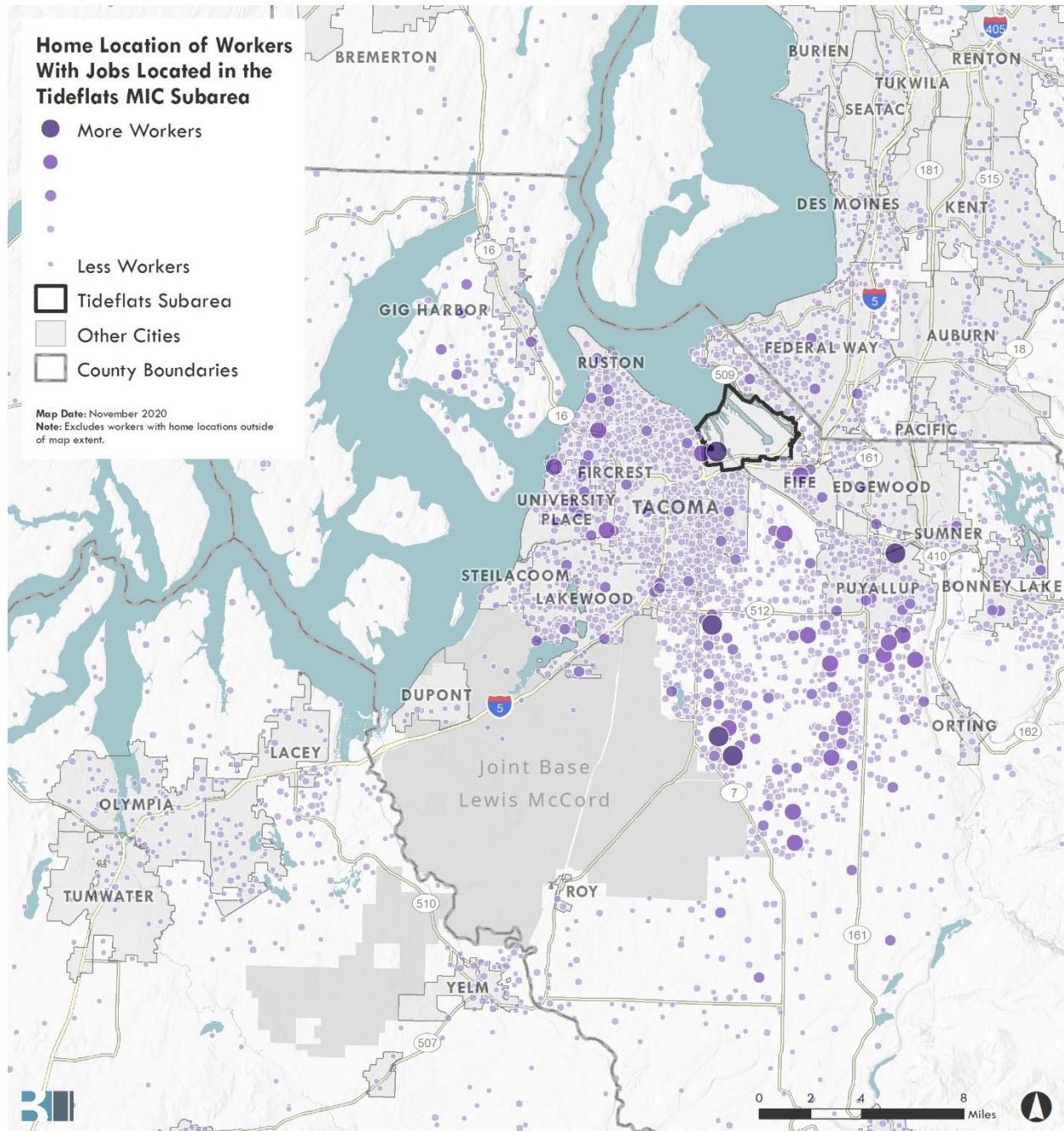
Exhibit 10-10 Inflow/Outflow Counts of all Jobs for Tacoma Tideflats, 2017



Note: Overlay arrows do not indicate directionality of worker flow between home and employment locations.
Source: US Census, OnTheMap, 2017.

- Employed in Selection Area, Live Outside
- Employed and Live in Selection Area
- Live in Selection Area, Employed Outside

This data illustrates that the MIC is a regional employment destination within the South Sound. Workers in the Port of Tacoma MIC primarily live in either the City of Tacoma or surrounding communities in the South Sound such as South Hill, Lakewood, Parkland, and Spanaway. Exhibit 10-11 outlines the home locations of workers with jobs located in the Port of Tacoma MIC.

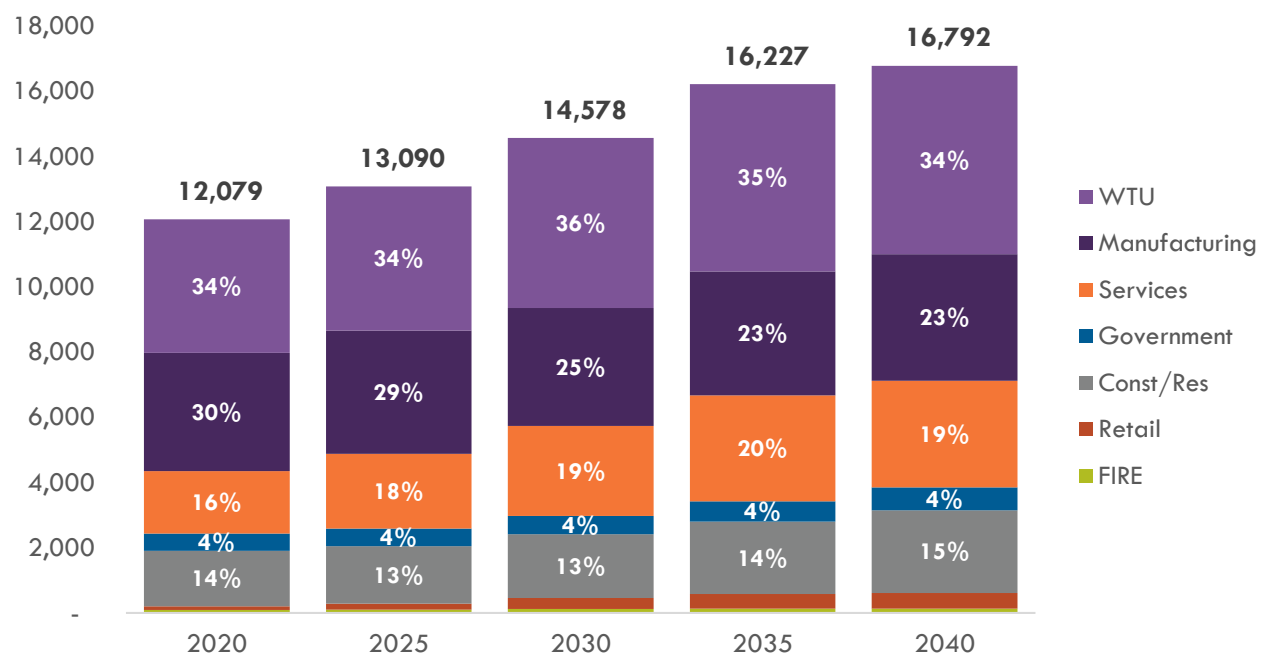
Exhibit 10-11 Home Location of Workers With Jobs Located in the Port of Tacoma MIC Subarea

Sources: U.S. Census Bureau, OnTheMap, 2017; BERK, 2020.

Industry Trends Summary

Based on employment projections by PSRC through 2040, employment in the Port of Tacoma MIC is expected to grow to 16,792 jobs, an increase of around 6,600 jobs from 2019 estimated employment. The primary projected driver of this increase in employment is the Warehousing, Transportation, Utility (WTU) sector which is projected to increase by nearly 1,700 jobs from 2020 to 2040. The Services sector is also expected to see significant growth, with a projected increase of around 1,300 jobs from 2020 to 2040. See Exhibit 10-12 below.

Exhibit 10-12 Tacoma MIC Employment Forecast by Sector, 2020-2040



Year	Const/Res	FIRE	Manufacturing	Retail	Services	WTU	Government	Total
2020	1,702	84	3,624	120	1,918	4,102	529	12,079
2025	1,766	103	3,786	177	2,295	4,424	539	13,090
2030	1,960	121	3,618	335	2,757	5,226	561	14,578
2035	2,223	131	3,802	450	3,251	5,751	619	16,227
2040	2,539	130	3,882	480	3,267	5,788	706	16,792

Sources: PSRC, 2020; BERK, 2020.

While established local and regional industry strengths are reflected in the study area, the changing role of ports, trends in sectors such as logistics, warehousing, transportation, and utilities and manufacturing, changes to shipping technology, and growing interest in environmental sustainability will influence and shape the development and composition of the area in the years to come. These trends include (World Bank Transport Division, 2007):

- **Ports are anticipated to play an increasingly important role in the regional economy.** Globalization of supply chains have meant that access to ports influences whether a local or regional producer can compete with other producers. Low-cost, efficient port services can enhance the competitive advantages of local and regional firms. Given this impact, and the anticipated growth in the regional economy, there is likely to be continued demand for efficient port services.
- **Growing strength of logistics.** A key industrial strength of the study area is the Warehousing, Transportation, Utility (WTU) sector which includes logistics. Logistics is a fast-growing sector that is anticipated to see increased demand. As businesses expand the geographic reach of their sourcing and distribution operations, logistics and transportation have become increasingly important. Specialist logistics providers have emerged who take on tasks such as preassembly, sequencing of parts, and customization of products. These emerging users are key for port areas and areas with easy access to ports. For example, the Sumner Pacific MIC has a number of logistics firms that are located there because of access to the Port of Tacoma, as do other MICs including those both north and south of Pierce County..
- **Consolidation of manufacturing:** Manufacturers have been increasingly concentrating production activity in fewer locations. This has increased demand for logistical systems and makes existing manufacturing activity highly dependent on transportation. Investments in transportation improvements are therefore a key economic development strategy.
- **Technology impacts.** Technological advances are changing industrial sectors, affecting the nature and extent of port infrastructure and services. For example, containerization has reduced personnel requirements for cargo handling, increased the productivity of existing berths, and increased the capital needs of port operations. A range of advances in automation has increased productivity in recent decades. Similar to containerization, technology advances in automation may reduce employment densities, but the resultant productivity increases are likely to grow these sectors.
- **Changing workforce needs** Technology has also changed the skills required for industrial operations, creating workforce development and retraining needs across sectors. Workforce needs are also shifting toward higher-skilled, technologically proficient workers. The relative concentration of these workers in the central Puget Sound region may be likely to give this region a competitive advantage over other industrial areas. Economic development strategies will, however, need to directly address these workforce development needs.
- **Environmental concerns:** Industrial areas and maritime ports face growing concerns about environmental protection around a wide range of topics such as water pollution, air pollution, aesthetics, noise, transfer of foreign marine species, and more. Climate vulnerability is also an issue. These concerns have increased demand for more environmentally sustainable use of land in industrial areas. Many industrial users and ports are making significant investments in facilities, and changes in operations, to address these concerns.

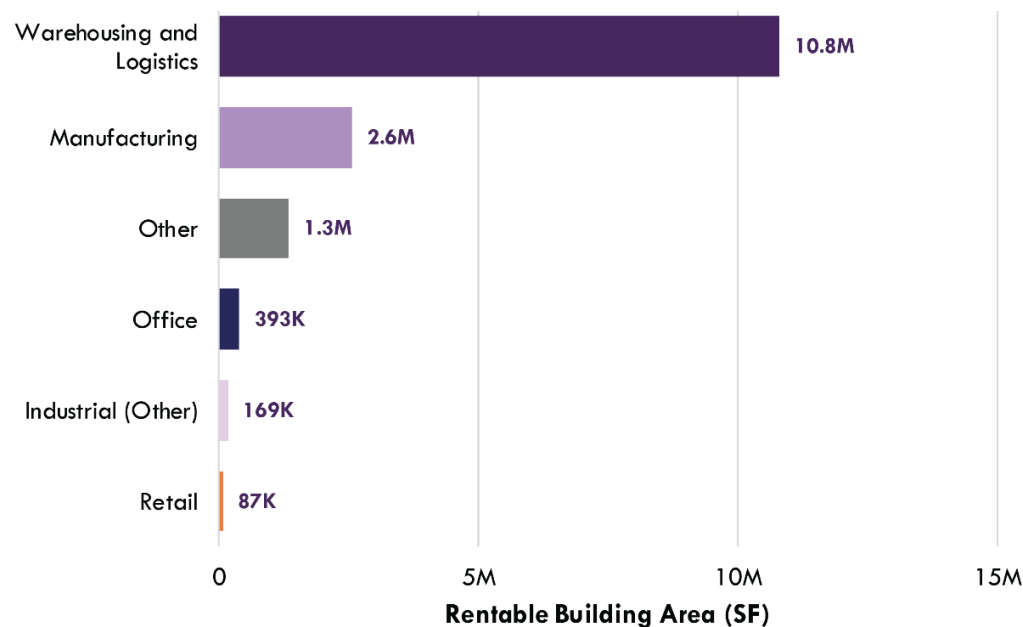
Building Area

Exhibit 10-13 provides a breakdown of rentable building area information. As suggested by the employment data, the dominant type of real estate located within the Port of Tacoma MIC is industrial/flex properties, with the largest amount of rentable building area in warehousing and logistics (with over 10.8 million square feet of space), and manufacturing (2.6 million square feet). The 1.3 million square feet of other uses include:

- Oil and chemical refining
- Resource uses, including cement and gravel plants
- Marinas and shipyards
- Lumberyards
- Railroad yards
- The federal Northwest Detention Center

There are minor amounts of other uses in this area, including retail and office uses. No multifamily residential development is located within this area, although some non-residential uses do include accessory caretaker units.

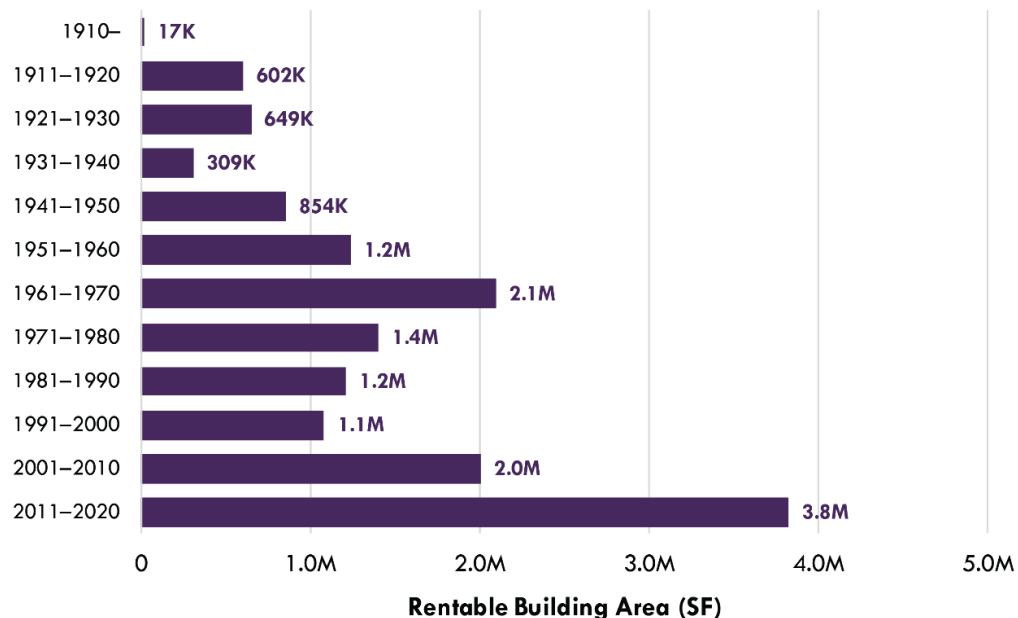
Exhibit 10-13 Breakdown of Rentable Building Area in the Port of Tacoma MIC, 2020.



Sources: CoStar, 2020; BERK, 2020.

The MIC includes both old and new buildings. Exhibit 10-14 categorizes the rentable building area in the study area. About 10%, or approximately 1.6 million SF, of identified floor area was built pre-war, and 57% or roughly 5.8 million SF of total rentable building area is 50 years old or older.

Exhibit 10-14 Rentable Building Area by Building Age, Port of Tacoma MIC, 2006–2020.



Sources: CoStar, 2020; BERK, 2020.

A significant amount of development in the study area is newer, with about 3.8 million SF of building area constructed since 2011. Exhibit 10-15 shows the characteristics of these projects, including the building locations and owners. Note that all these uses are in warehousing and distribution. Despite the large amount of development, only three property owners have had new construction on their sites: Prologis (5 buildings, 2.3 million SF), Back Creek Group (2 buildings, 1.1 million SF), and the Port of Tacoma (three buildings, 428,000 SF).

Exhibit 10-16 provides the amount of rentable building area in the study area categorized by the top 10 owners in this area. Most notably, Prologis holds the largest amount of floor area, and this almost completely consists of new construction. Similarly, Black Creek Group is the third-largest holder of floor area, with most of this space built in 2018.

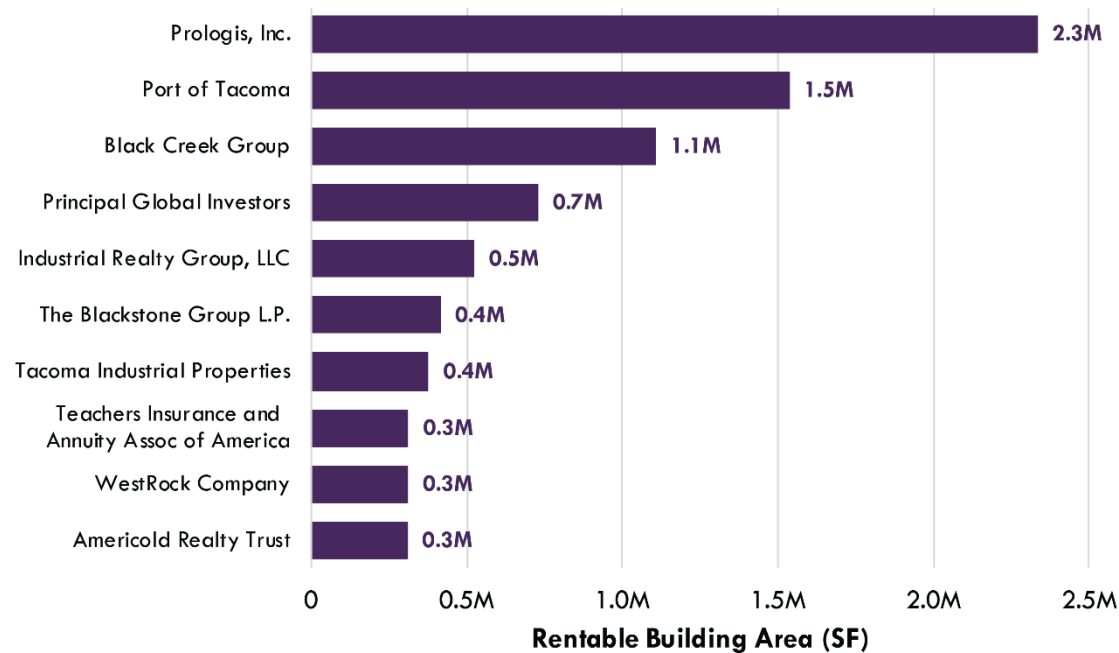
Overall, the construction of new warehousing and distribution facilities by large logistics real estate investment companies such as Prologis and the Black Creek Group indicates the market perception of the study area as an attractive location for such facilities. It will likely continue to see a trend of national and international real estate firms investing capital for larger logistics facilities in this area.

Exhibit 10-15 New Rentable Building Area, Tacoma MIC, 2011–2021

Property	Building	Address	RBA	Year	Owner
CenterPoint Properties		1651 Lincoln Ave	106,764	2021*	LBA Realty
Portside 55	Building A	1514 Taylor Way	155,100	2019	Port of Tacoma
	Building B	1614 Taylor Way	51,900	2019	Port of Tacoma
	Building C	3401 Lincoln Ave	221,010	2019	Port of Tacoma
Prologis Blair Distribution Center	Building A	2340 Taylor Way	542,750	2018	Prologis, Inc.
	Building B	2600 Taylor Way	428,228	2019	Prologis, Inc.
Prologis Park Tacoma	Building A	5015 8th St E	222,925	2017	Prologis, Inc.
	Building B	5101 E 12th St E	770,195	2017	Prologis, Inc.
	Building D	4801 E 8th St E	319,806	2018	Prologis, Inc.
Tacoma Logistics Center	Building A	927 E 11th St	280,525	2018	Black Creek Group
	Building B	917 E 11th St	828,620	2018	Black Creek Group

*Proposed.

Sources: CoStar, 2020; BERK, 2020.

Exhibit 10-16 Top Owners of Rentable Building Area in Tacoma MIC, 2020

Sources: CoStar, 2020; BERK, 2020.

There is a very small amount of retail space in the study area. Primarily, this development supports the industrial and logistics uses in this area. A larger district of highway-oriented commercial uses is located directly to the south of the study area in the city of Fife, which provides a greater local and regional draw for retail demand with more direct access from I-5.

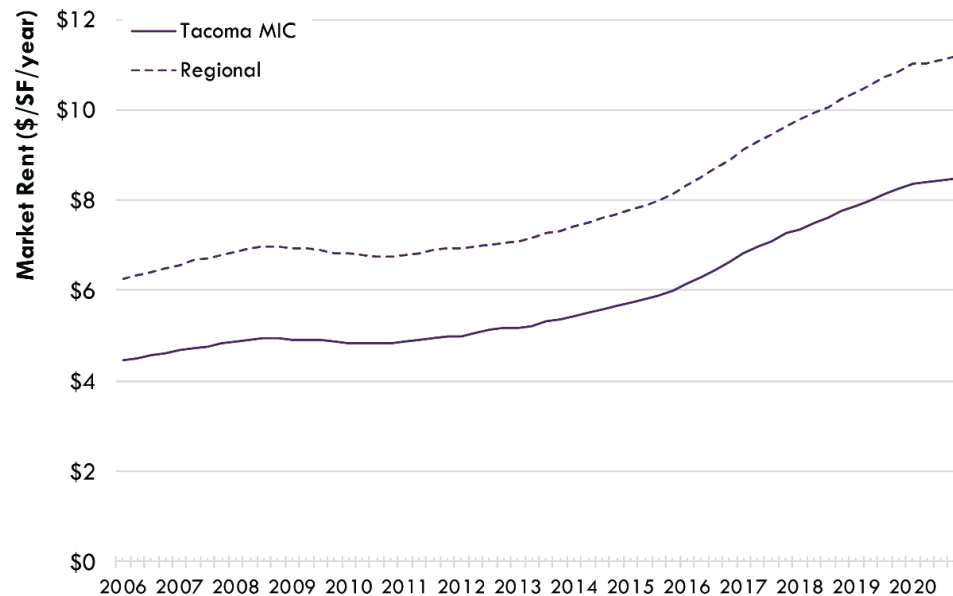
The office market in this area is also relatively small, with a total of about 393,000 SF. The largest building in this area is the Port of Tacoma's Fabulich Center, a 72,000 SF multi-tenant office building. Other significant buildings in the area include the Center for Urban Waters building (48,341 SF), the Former Salvation Army building currently owned by Summit Public Schools (45,000 SF), and the Port of Tacoma administration building (42,100 SF). Other office buildings are smaller, mostly providing support functions for industrial and warehousing activities in the study area.

Current office vacancies are around zero with projected rents of approximately \$25/SF/year. There has been some notable growth in office rents in the area, with year-over-year rent growth reaching 9% in all four quarters of 2017. The smaller amount of space in the area, as well as greater draw of office uses to downtown Tacoma directly to the west, means that this area is not as much competition for higher-end office uses, but could be a location for Class B/C office space.

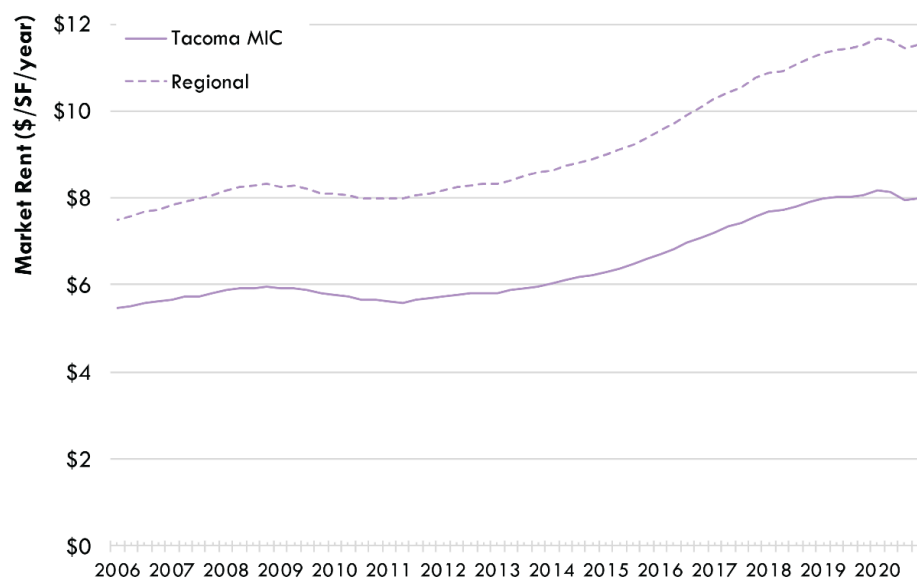
Data about local and regional real estate markets for warehousing, logistics, and manufacturing between 2006 and 2020 are provided in the following figures:

- **Rents per square foot** for the Port of Tacoma MIC and King and Pierce Counties are included for warehousing and logistics (Exhibit 10-17) and manufacturing (Exhibit 10-18).
- **Rent changes year-over-year** (YOY) for the MIC and region are provided in Exhibit 10-19 (warehousing and logistics) and Exhibit 10-20 (manufacturing).
- **Vacancy rates** for warehousing and logistics and manufacturing are provided in Exhibit 10-21 and Exhibit 10-22, respectively.
- **Net deliveries** of new rentable building area for warehousing and logistics and manufacturing are given in Exhibit 10-23.
- **Net absorption** of rentable building area for warehousing and logistics and manufacturing are provided in Exhibit 10-24.

Properties in the Port of Tacoma MIC have industrial rents that are largely below regional averages for King and Pierce Counties. For warehousing, local rents are estimated to be around 75% of the regional average, with 70% of regional rents for local manufacturing uses. In part, this reflects the high pricing of manufacturing and warehousing space elsewhere in the region, such as in the Duwamish area close to the Port of Seattle.

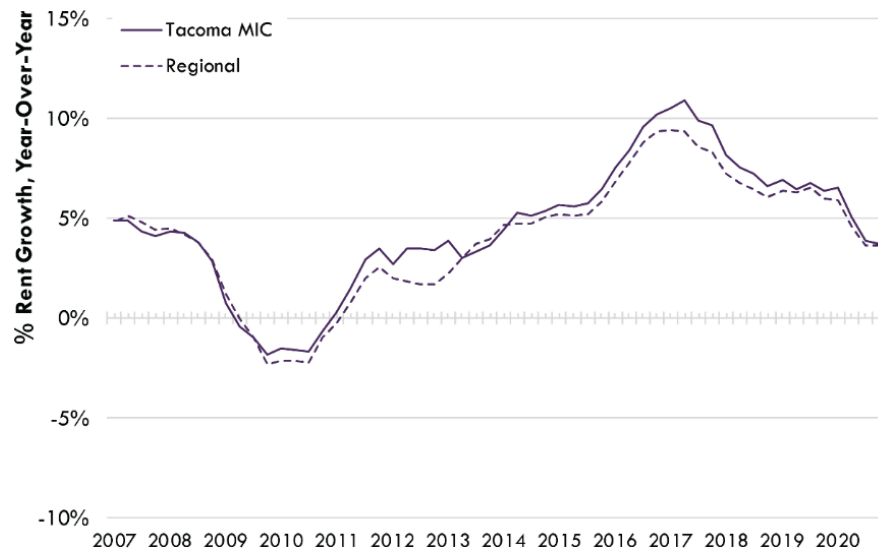
Exhibit 10-17 Warehousing and Logistics Rent per SF, Port of Tacoma MIC and Region, 2006–2020

Sources: CoStar, 2020; BERK, 2020.

Exhibit 10-18 Manufacturing Rent per SF, Port of Tacoma MIC and Region, 2006–2020

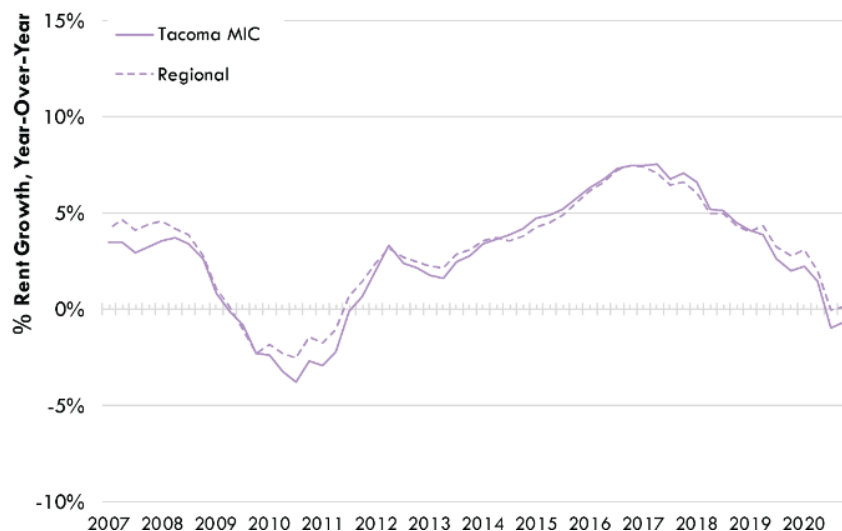
Sources: CoStar, 2020; BERK, 2020.

After a brief downturn in rents in 2009–2011, rents for warehousing and logistics uses have increased, with up to 10–11% from 2016 Q3 to 2017 Q4. Note that this was also a period of very low vacancies in this area, with less than 1% vacancy during this period. These increases in rents have stabilized but are still positive even in 2020 Q3. See Exhibit 10-19.

Exhibit 10-19 Warehousing and Logistics Rent Growth, Port of Tacoma MIC and Region, 2006–2020

Sources: CoStar, 2020; BERK, 2020.

Rent increases for manufacturing spaces have been lower in this area, with only 7–8% rent increases during the same peak in 2016–2017. Manufacturing rents have also experienced slight declines in 2020, with a 0.6–0.9% year-over-year decline in Q2 and Q3. Vacancies in manufacturing spaces have been consistent with regional averages, largely below 5% except for brief peaks due to major tenants moving. See Exhibit 10-20.

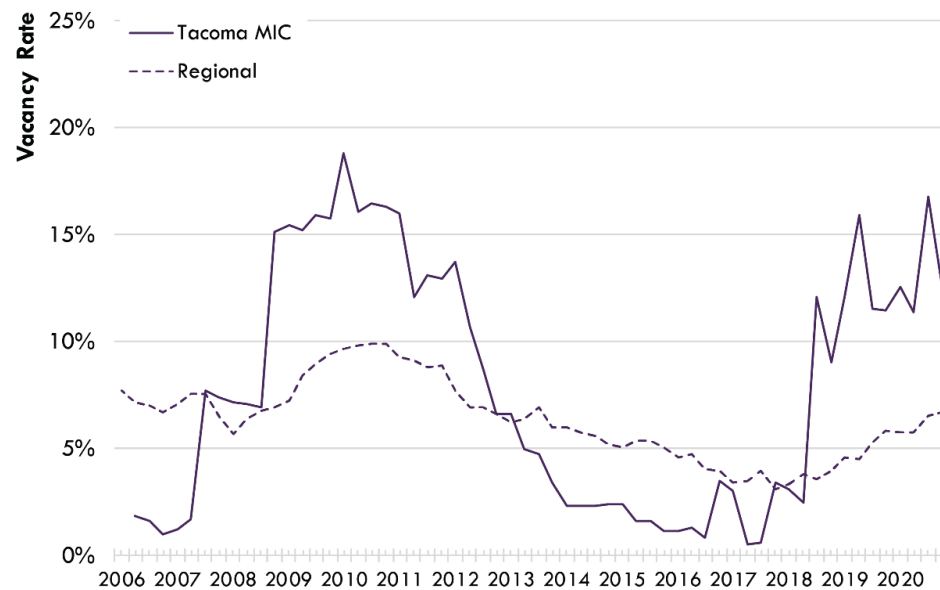
Exhibit 10-20 Manufacturing Rent Growth, Port of Tacoma MIC and Region, 2006–2020.

Sources: CoStar, 2020; BERK, 2020

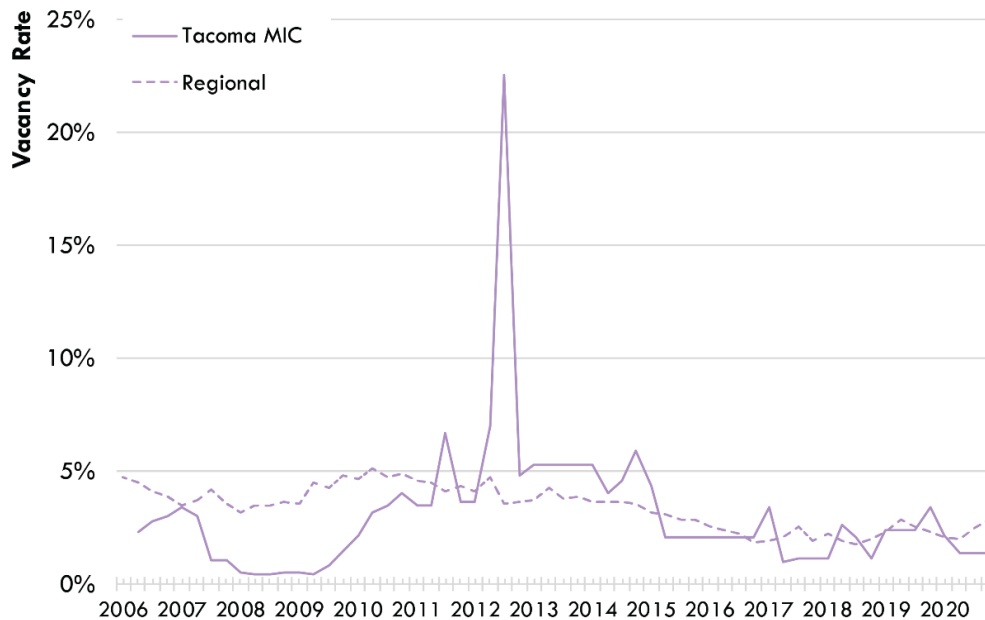
There have been distinct peaks in warehousing and logistics vacancy rates which have lagged the construction and delivery of new warehousing and logistics floor space. Delivery of floor space

refers to when a building completes construction and receives a certificate of occupancy. During the last recession, this resulted in extended vacancies for new warehousing and logistics space in 2007–2008, which was not leased up until 2013. As of 2020, warehousing and logistics vacancy rates are largely around 12–13%. This elevated rate of vacancies for warehousing and logistics space is likely related to the significant amount of new floor space delivered in from 2017 to 2019. See Exhibit 10-21 and Exhibit 10-22.

Exhibit 10-21 Warehousing and Logistics Vacancy Rates, Port of Tacoma MIC and Region, 2006–2020

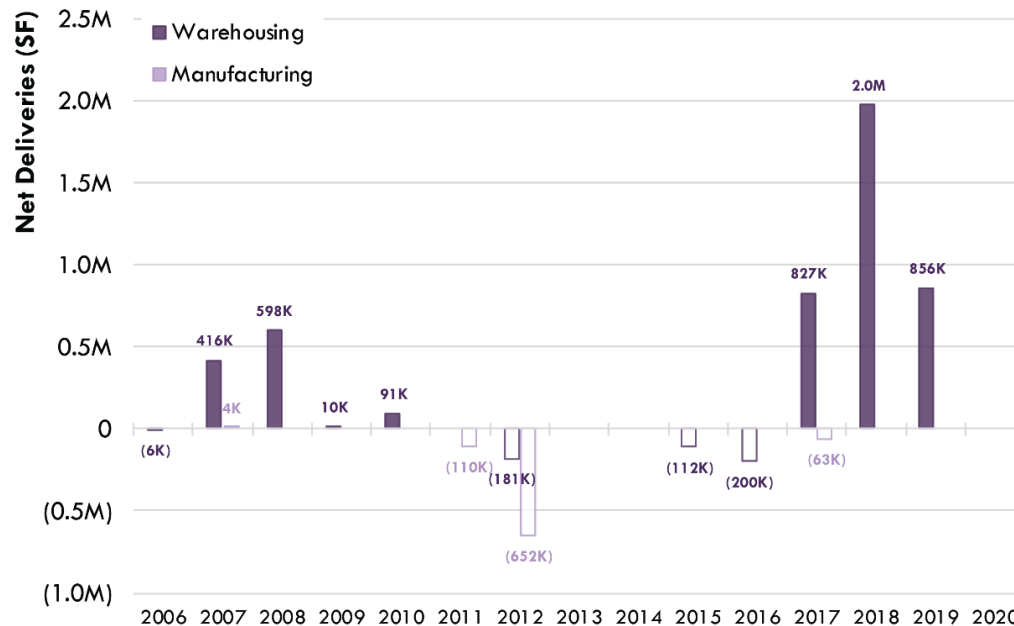


Sources: CoStar, 2020; BERK, 2020.

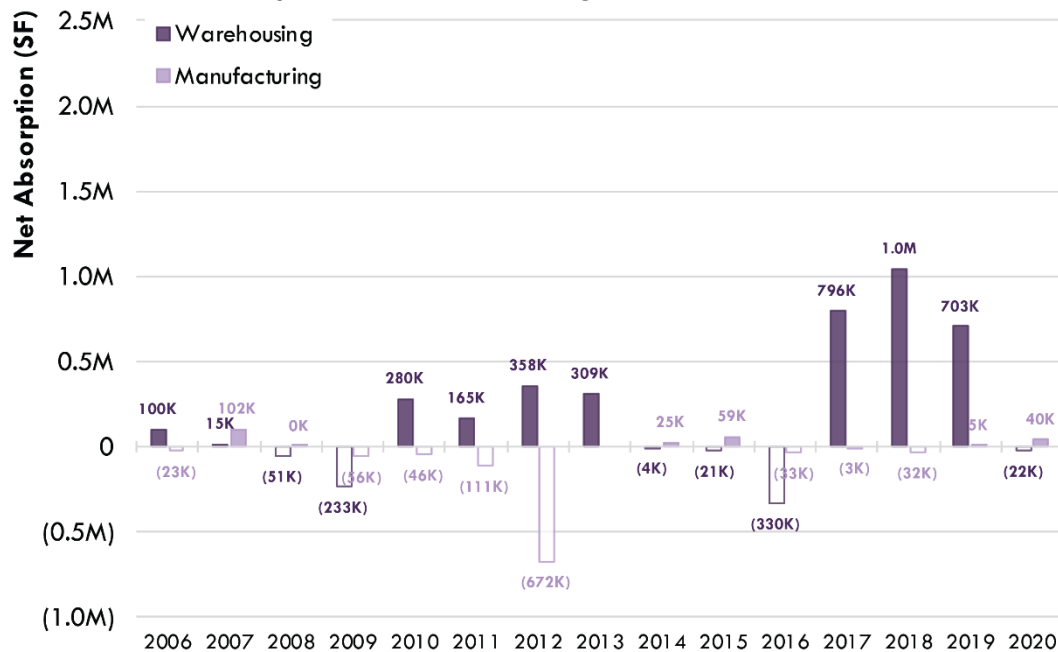
Exhibit 10-22 Manufacturing Vacancy Rates, Port of Tacoma MIC and Region, 2006–2020

Sources: CoStar, 2020; BERK, 2020.

There have been no net positive deliveries of space for manufacturing since 2007, and the area has lost about 824,000 SF of space in manufacturing uses since 2007. Manufacturing space in the Port of Tacoma MIC is typically more than a decade old, less expensive, and more depreciated. See Exhibit 10-23 and Exhibit 10-24.

Exhibit 10-23 Deliveries of Rentable Building Area in Tacoma MIC, 2006–2020

Sources: CoStar, 2020; BERK, 2020.

Exhibit 10-24 Absorption of Rentable Building Area in Tacoma MIC, 2006–2020

Sources: CoStar, 2020; BERK, 2020.

Economic Impact Assessment

As a manufacturing and industrial center, the Port of Tacoma MIC is a significant driver of the local and regional economy. The industrial activity in the MIC is inextricably linked to other key sectors in the greater Pierce County and Washington State economy, such as retail, services and agriculture. For example, food products are stored, packaged and distributed from the study area to restaurants, grocery stores, and other businesses through the city and Pierce County region. Examples of similar linkages to the local and regional economy include shipbuilding firms supplying the region's maritime economy and others.

One way to assess and quantify the impact of these linkages is to quantify the purchasing patterns of key sectors as they relate to goods and services demanded by other sectors. This form of analysis is referred to as input-output analysis.

To measure the economic impact of the private businesses in the Port of Tacoma MIC on Pierce County, a 2019 study from the Center of Business Analytics at the Milgard School of Business at the University of Washington-Tacoma utilized an input-output model. The results from this study are shown in Exhibit 10-25. It should be noted that this study was not a professional prepared study and findings should be used for reference purposes only.

Exhibit 10-25 Estimated Total Impacts from Private Businesses in the Port of Tacoma MIC

Economic Impact	Employment	Economic Output
Direct Economic Impact	5,165	\$1.99 Billion

Economic Impact	Employment	Economic Output
Indirect/Induced Economic Impact	10,640	\$3.31 Billion
Total Economic Impact	15,805	\$5.30 Billion

Sources: Center for Business Analytics at Milgard School of Business University of Washington, Tacoma, 2019; BERK, 2020.

The UW-Tacoma study found that all private businesses in the Port of Tacoma MIC directly employed a total of 5,165 people and those businesses directly generated nearly \$2 billion in annual economic output. Those businesses and employees were estimated to then support an additional 10,640 jobs indirectly in Pierce County which are estimated to generate over \$3 billion in annual economic output. The total impact of the private businesses in the Port of Tacoma MIC on Pierce County is estimated to support 15,805 jobs directly and indirectly and generate over \$5 billion in annual economic output.

As mentioned previously, another significant driver of economic activity within the Port of Tacoma MIC is the Port of Tacoma. The economic impact of the Port of Tacoma is driven by two lines of business: marine cargo operations and Port of Tacoma tenants. Economic impacts for the Port of Tacoma were estimated by a 2019 study produced by Community Attributes Inc. for the NWSA (NWSA, 2019). The results from this study are outlined in the table below

Exhibit 10-26 Estimated Total Impacts from Port of Tacoma in the Port of Tacoma MIC

Economic Impact	Employment	Economic Output
Direct Economic Impact		
Marine Cargo Operations	12,950	\$3.70 Billion
Port of Tacoma Tenants and Other Businesses	1,500	\$0.85 Billion
Indirect Economic Impact		
Marine Cargo Operations	36,900	\$7.78 Billion
Port of Tacoma Tenants and Other Businesses	5,200	\$1.55 Billion
Total Economic Impact	56,550	\$13.88 Billion

Sources: CAI, 2019; BERK, 2020.

The 2019 study found that the marine cargo operations for Port of Tacoma directly employed a total of 12,950 people and those jobs directly generated \$3.70 billion in annual economic output. Port of Tacoma tenants and other businesses were found to directly employ 1,500 people and those jobs directly generated \$0.85 billion in annual economic output.

The economic output from the direct jobs supporting marine cargo operations at NWSA indirectly supported an additional 36,900 jobs across the Washington State economy while jobs from Port of Tacoma tenants and other businesses indirectly supported an additional 5,200 jobs across the

Washington State economy. In total, the Port of Tacoma's economic impact across the state was estimated to support 56,550 jobs and \$13.88 billion in annual economic output.

10.3 Key Findings and Implications for Plan

Current Economic Activity

- **The study area is a local, regional, and national asset.** The MIC is an active industrial area with significant existing jobs in core industrial sectors. The area has a long history of industrial employment and is a key component of a regional system of manufacturing and industrial centers that stretches from the Cascade Industrial Center in the North to the Frederickson MIC in the south.
- Industrial activities rely on a diverse and concentrated support cluster present in the study area, including business engaged in fueling operations, marine electronics, refrigeration and gear manufacturers, naval architects and other professional services. The study area also includes a range of industrial services and repair, metal fabricators and machine shops, and commercial, residential and civil construction contractors and builders.
- **As of 2019, total employment within the Port of Tacoma MIC was 10,161, an increase of 735 jobs over the past ten years.** Currently about 68% of employment in the MIC is within the Wholesale Trade, Transportation, and Utilities (WTU) sector (42%) as well as the Manufacturing sector (26%). Much of the growth over the past ten years has been driven by the WTU sector while the Manufacturing sector has shrunk from 2010 levels.
- **Industrial activities provide a range of job opportunities.** Manufacturing, transportation, utility, maritime, industrial services and repair, metal fabricators, machinist, and contractor jobs are available to workers with relatively less formal education. Relative to lower wage service sector jobs these jobs provide a source of stable employment with opportunities for advancement.

Future Trends

- **A key industrial strength of the study area is logistics. Logistics is a fast-growing sector that is anticipated to see increased demand.** As businesses expand the geographic reach of their sourcing and distribution operations, logistics and transportation have become increasingly important. Specialist logistics providers have emerged who take on tasks such as preassembly, sequencing of parts, and customization of products. These emerging users are key users for port areas and areas with easy access to ports.
- **Recent market activity in new construction by national real estate investment companies in warehousing and logistics properties in the area show market demand for the area.** Given the strength of the logistics sector, strategic focus of the Port of Tacoma on cargo, as well as higher rents found in the Duwamish area, the study area may see demand for development of this type.

- **The study area includes support businesses for industrial activity which range from high-impact to low-impact uses.** While commercial land in other locations may be able to absorb some cleaner, lower-impact businesses of this type, some businesses such as metal fabrication are high-impact and are unlikely to be able to find locations that are an easy substitute for the study area. In addition to the need for buffering given their impacts, land values and rents in these locations are also unlikely to be affordable to these businesses. Potential displacement of these businesses in the face of growing demand for sites for port-related uses will need to be addressed.
- **The use of space for manufacturing in the study area is declining, with new warehousing and logistics development pressure.** Manufacturing uses that are not strongly marine- or logistics-oriented, may be forced out over time. Lower impact uses will likely be absorbed in commercial areas.
- **Based on employment projections by PSRC through 2040, employment in the Port of Tacoma MIC is expected to grow to 16,792 jobs, an increase of around 6,600 jobs from 2019 estimated employment.** The primary projected driver of this increase in employment is the WTU sector which is projected to increase by nearly 1,700 jobs from 2020 to 2040. The Services sector is also expected to see significant growth, with a projected increase of around 1,300 jobs from 2020 to 2040.
- **While established local and regional industry strengths are reflected in the study area, the changing role of ports, trends in sectors such as logistics, warehousing, transportation, and utilities and manufacturing, changes to shipping technology, and growing interest in environmental sustainability will influence the development and composition of the area in the years to come.**

11 CULTURAL RESOURCES

This chapter includes a description of recorded cultural resources and related policies and regulations within the boundary of the Manufacturing/Industrial Center (MIC) of the Tacoma Tideflats study area. For this review, a cultural resource is any district, site, building, structure, or object that has been listed in, has been determined to be eligible for listing in, or may be eligible for listing in the National Register of Historic Places (NRHP), Washington Heritage Register (WHR), Pierce County Register of Historic Places, and/or City of Tacoma Register of Historic Places. Cultural resources can be archaeological, including human remains and cemeteries, or a historic built environment resource. This chapter also describes current conditions and discusses maritime resources, Spuyaləpabš place names, and Traditional Cultural Properties (TCPs) within the study area. This chapter does not include a parcel-level review of all historic-aged buildings, structures, and objects within the study area. Finally, the chapter provides the context for development in the Tideflats area and key findings and implications for the Subarea Plan (the Plan).

Information about existing policies, regulations, and recorded cultural resources and their environmental setting was obtained from existing studies, database searches, historical maps, and historical registers. The authors also spoke with representatives from Pierce County, the Spuyaləpabš, the City of Tacoma, the City of Fife, and the Port of Tacoma. This analysis recognizes that indigenous studies, including ethnographies published in the late 19th and

Historic Register Criteria

National Register of Historic Places

National Register-eligible resources must be at least 50 years old or have documented exceptional significance; retain integrity of location, design, setting, materials, workmanship, feeling, or association; and meet at least one of the following four criteria of significance:

- **Criterion A.** Associated with important events that have contributed significantly to the broad pattern of our history.
- **Criterion B.** Associated with the lives of persons significant in our past.
- **Criterion C.** Embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D.** Have yielded, or may be likely to yield, information important in prehistory or history.

Washington Heritage Register

Washington Heritage Register-eligible resources must be at least 50 years old or have documented exceptional significance; retain integrity of location, design, setting, materials, workmanship, or feeling; and have documented historical significance at the local, state, or federal level. Establishing documented historical significance is generally based on, but not specifically limited to, meeting at least one of the four National Register criteria of significance.

early 20th centuries, may contain omissions and misinterpretations of traditional Native American culture and practices.

11.1 Existing Policies and Regulations

Cultural resources within the study area are protected by several federal, state, and local regulations, plans, and policies used to manage activities that have the potential to impact those resources. Federal laws, regulations, and policies are presented in Exhibit 11-1, and state laws, regulations, and policies are presented in Exhibit 11-2.

The study area is located within Pierce County in the City of Tacoma and the Puyallup Tribe of Indians Reservation, and bordering the City of Fife. These local governments have developed plans, policies, and codified regulations to manage activities and development within their jurisdictions that may impact cultural resources. A summary of local plans, policies, and codified regulations is presented in Exhibit 11-3.

The City of Fife is located within the boundaries of the Puyallup Indian Reservation but is governed independently. The City of Fife does not have a formal Historic Preservation Program and is guided by federal and state laws and regulations, as well as interlocal agreements with Pierce County. There are no interlocal plans or policies between the Puyallup Tribe of Indians and Pierce County, City of Fife, or City of Tacoma for managing cultural resources beyond the existing federal, state, and local laws and regulations.

Federal

Exhibit 11-1 Federal Laws, Regulations, and Policies Related to Cultural Resources

Law/Regulation/Policy	Lead Agency	Description
National Historic Preservation Act (NHPA) (Title 54 United States Code [U.S.C.]; Section 106 of the NHPA (36 Code of Federal Regulations [CFR] Part 800)	Variable	The NHPA was approved on October 15, 1966 for the management and preservation of historical and archaeological sites. Under this act, the NRHP, National Historic Landmarks List, State Historic Preservation Offices (SHPO), and Tribal Historic Preservation Offices (THPO) were created. Washington State's SHPO is the Department of Archaeology and Historic Preservation (DAHP), which is the state agency that administers NHPA compliance in Washington. The procedures for implementing the NHPA are detailed in the Protection of Historic Places regulations. Section 106 of the NHPA requires federal agencies to consider the effects of project undertakings, project approvals, or project funding on historic properties. This process requires consultation with the relevant THPO, Native American tribes, and Native Hawaiian organizations.

Law/Regulation/Policy	Lead Agency	Description
Native American Graves Protection and Repatriation Act (NAGPRA; 25 U.S.C. 2001-13)	Variable	Enacted on November 16, 1990, NAGPRA establishes rights for lineal descendants, Native Americans and tribes, and Native Hawaiian organizations to repatriate their culturally affiliated items, including human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items and the intentional and inadvertent discovery of Native American cultural items on federal and tribal lands only.
American Antiquities Act of 1906 (16 U.S.C. 432)	Variable	First United States law to provide general protection for any kind of cultural or natural resource and the first national preservation law for the United States. Provides procedures for the designation, care, protection, management, and permitting for/of national monuments, historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated on federally owned or controlled lands.
Archaeological Resources Protection Act of 1979 (ARPA, 16 U.S.C. 470aa-470mm)	Variable	ARPA was enacted to further strengthen the permitting procedures required for conducting archaeological fieldwork on federal lands. Includes ownership acknowledgement, preservation of objects and associated records in a "suitable" institution, and prohibits public disclosure.
Section 4(f) of the Department of Transportation Act (DOT Act, 49 U.S.C. 303)	U.S. Department Of Transportation	Relates to procedures for historic sites, archaeological resources, tribal lands and Indian reservations, and Traditional Cultural Properties for federal highway projects.
Abandoned Shipwreck Act, of 1988 (ASA, 43 U.S.C. 2101-2106)		Relates to providing guidelines for state responsibility of the management of abandoned resources in state waters and submerged lands.

State

Exhibit 11-2 State Laws, Regulations, and Policies Related to Cultural Resources

Law/Regulation/Policy	Lead Agency	Description
Procedures for State, Tribal, and Local Government Historic Preservation Programs (36 CFR Part 61)	DAHP and Local Governments	Federal regulation authorizing state and tribal historic preservation programs and certifies local governments to carry out the purpose of the NHPA. This is the basis for historic preservation programs and ordinances.
State Environmental Policy Act (SEPA, Revised Code of Washington [RCW] 43.21C, Washington Administrative Code [WAC] 197-11-330)	Variable (DAHP is Technical Expert for Cultural Resources)	SEPA requires government decision makers to consider the likely environmental consequences of a proposal and require mitigation measures.
Governor's Executive Order 05-05	Variable	Enacted in November 2005, Governor's Executive Order 05-05 requires state agencies to consider the impacts of project undertakings, project approvals, or project funding on significant cultural and historic properties. This process requires consultation with DAHP, the Governor's Office of Indian Affairs, and relevant Native American tribes.

Law/Regulation/Policy	Lead Agency	Description
Washington Heritage Register (Senate Bill 363; RCW 27.34.200, WAC 25-12)	DAHP	Created in the March 19, 1971, Executive Session of the State of Washington Advisory Council on Historic Preservation and maintained by DAHP. Actions affecting resources listed on this register by any subdivision of state government or recipient of state funds must comply with SEPA and Executive Order 05-05.
Washington Heritage Barn Preservation Program (RCW 27.34.400)	DAHP	Relates to the preservation of heritage barns 50 years or older.
Washington State Main Street Program (WAC 25-50)	DAHP	Relates to procedures of application for a designation of Washington main street communities.
Archaeological Sites and Resources (RCW 27.53)	DAHP	Relates to the conservation, preservation, and protection of archaeological sites and resources.
Archaeological Site Public Disclosure Exemption (RCW 42.56.300)	DAHP	Restricts the distribution of information about the location of archaeological sites to the public for the protection and preservation of those sites.
Human Remains (RCW 68.50)	DAHP	Relates to the protection, management, and processes in the care of human remains.
Indian Graves and Records (RCW 27.44)	DAHP	Relates to the protection, management, and processes in the care of Native American cemeteries, historic graves, and related records.
Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60)	DAHP	Relates to the preservation and protection of abandoned and historic cemeteries and graves including human remains.
Archaeological Excavation and Removal Permit (WAC 25-48)	DAHP	Relates to the procedures of application for and review processes of archaeological excavations and removals; permits are issued by DAHP.
Archaeological activities on state-owned aquatic lands – Agreements, leases, or other conveyances (RCW 79.105.600)		Relates to the provisions to enter into agreements, leases, or other conveyances for archaeological activities on state-owned aquatic lands.

Local

Exhibit 11-3 Local Laws, Regulations, and Policies Related to Cultural Resources

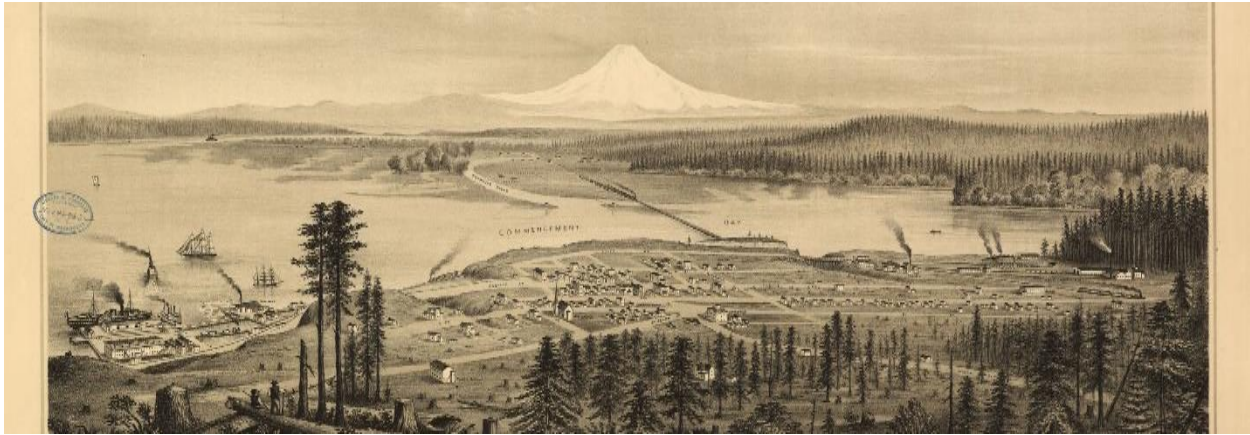
Law/Regulation/Policy	Lead Agency	Description
Pierce County Comprehensive Plan	Pierce County	Comprehensive Plan used to guide the identification, protection, and enhancement of historic properties and cultural landscapes throughout unincorporated Pierce County.

Law/Regulation/Policy	Lead Agency	Description
Pierce County Structures of Historical and Architectural Significance (Pierce County Charter [PCC] Chapter 2.88)	Pierce County	Relates to the Landmarks and Historic Preservation Commission and the designation, preservation, protection, and enhancement of historic and archaeological resources.
Pierce County Archaeological, Cultural, and Historic Resources (PCC 18S.30.020)	Pierce County	Relates to development within shorelines for the protection of archaeological, cultural, and historic resources.
Pierce County Current Use Assessment Open Space Land and Public Benefit Rating System (PCC 2.114.060)	Pierce County	Relates to the public benefit rating system; to those properties that qualify under the open space land classification in the current use assessment program, covering archaeological sites and historic landmark sites.
City of Tacoma Historic Preservation Plan (Amended Ordinance No. 27996)	City of Tacoma	Adopted in 2011, this Preservation Plan defines the City of Tacoma's preservation goals, policies, and actions for preservation and neighborhood conservation.
City of Tacoma Shoreline Master Program (Tacoma Municipal Code [TMC] Title 19, Ordinance No. 28612)	City of Tacoma	Archaeological, historic, and cultural element, relates to the management, protection, preservation, and/or restoration of buildings, sites, and areas having archaeological, historic, or cultural value or significance within the shoreline.
Landmarks Preservation Commission (TMC Chapter 1.42)	City of Tacoma	Adopted in 2005, relates to the Landmarks and Historic Preservation Commission and their duties to the designation, preservation, protection, and enhancement of historic and archaeological resources.
Preventing Neglect of Historic Properties (TMC Chapter 8.35)	City of Tacoma	Relates to encouraging the maintenance, protection, use, and enhancement of iconic and historic cultural assets and assisting the property owner as needed.
Historic Preservation Land Use Decisions (TMC Chapter 13.05.040)	City of Tacoma	Related to supporting the goals of and providing regulatory procedures for historic preservation decision-making bodies.
Tacoma Landmarks and Historic Special Review Districts Code (TMC Chapter 13.07, Ordinance 27429 § 3)	City of Tacoma	Relates to the designation, preservation, protection, and enhancement of historic resources including designated City landmarks and historic resources that are eligible for state, local, or national listing.
Archaeological, Cultural, and Historic Resources (TMC Chapter 13.12.570)	City of Tacoma	Part of the Environmental Code relating to the process, content, and format of an EIS, and to set forth the procedures for two specific kinds of non-project EIS reviews. This code addresses archaeological, cultural, and historic resources for projects located within the Downtown Tacoma Regional Growth Center and within the Tacoma Mall Neighborhood Regional Growth Center in areas where a Subarea Plan and a companion area-wide, non-project EIS have been completed.
Arts Commission (Fife Municipal Code [FMC] Chapter 4.16)	City of Fife	Related to the stewardship of public art, arts education, and cultural development; includes guidance for the commission, for Fife's cultural and tribal heritage.

Law/Regulation/Policy	Lead Agency	Description
Naming Public Parks and Recreation Facilities - Selection of Name – Criteria (FMC 12.32.010)	City of Fife	Guidance for naming public parks and recreation facilities and their relationship with a historical figure, place, event, or other instance of historical or cultural significance.
SEPA Guidelines (FMC 17.04)	City of Fife	Provides supplementary authorization to WAC 197-11-660 for the City to improve and coordinate plans, functions, programs, and resources to preserve historic, cultural, and natural aspects of national heritage.
Fish and Wildlife Habitat Conservation Areas (FMC 17.15)	City of Fife	Definitions of Habitats of Local Importance including areas established by the Puyallup Tribal government as habitat areas of Tribal importance for economic, social, cultural, and ceremonial reasons.
Low Impact Development Permitting - Site Assessment (FMC 21.10.010, Ordinance 1685 § 1[Exh. A], 2009)	City of Fife	Related to site design process for low impact development. Requires a soils report prepared by a geotechnical professional engineer detailing any known historic, archaeological, and cultural features located on or adjacent to the site if present.
Resolution 1471	City of Fife	Authorizes interlocal agreement with Pierce County ratifying countywide planning policies (Special).
Resolution 1647	City of Fife	Authorizes City Manager to execute interlocal agreement with Puyallup Tribe, government services (Special).

11.2 Current Conditions

The Tacoma Tideflats area holds a rich history of land use that began long before non-Native American settlement. This area has been a valuable resource for subsistence, travel, trade, and economic opportunity to Native American communities living along the shores of Puget Sound and the Puyallup-White River watershed. It has also played a dynamic role in the development of the City of Tacoma and history of ocean cargo operations in the Pacific Northwest (Exhibit 11-4).

Exhibit 11-4 1878 Birds-eye View of Commencement Bay

Note: View of New Tacoma and Mount Rainier, Puget Sound, Washington Territory, 1878.
Source: Library of Congress, 1878.

Archaeological Context

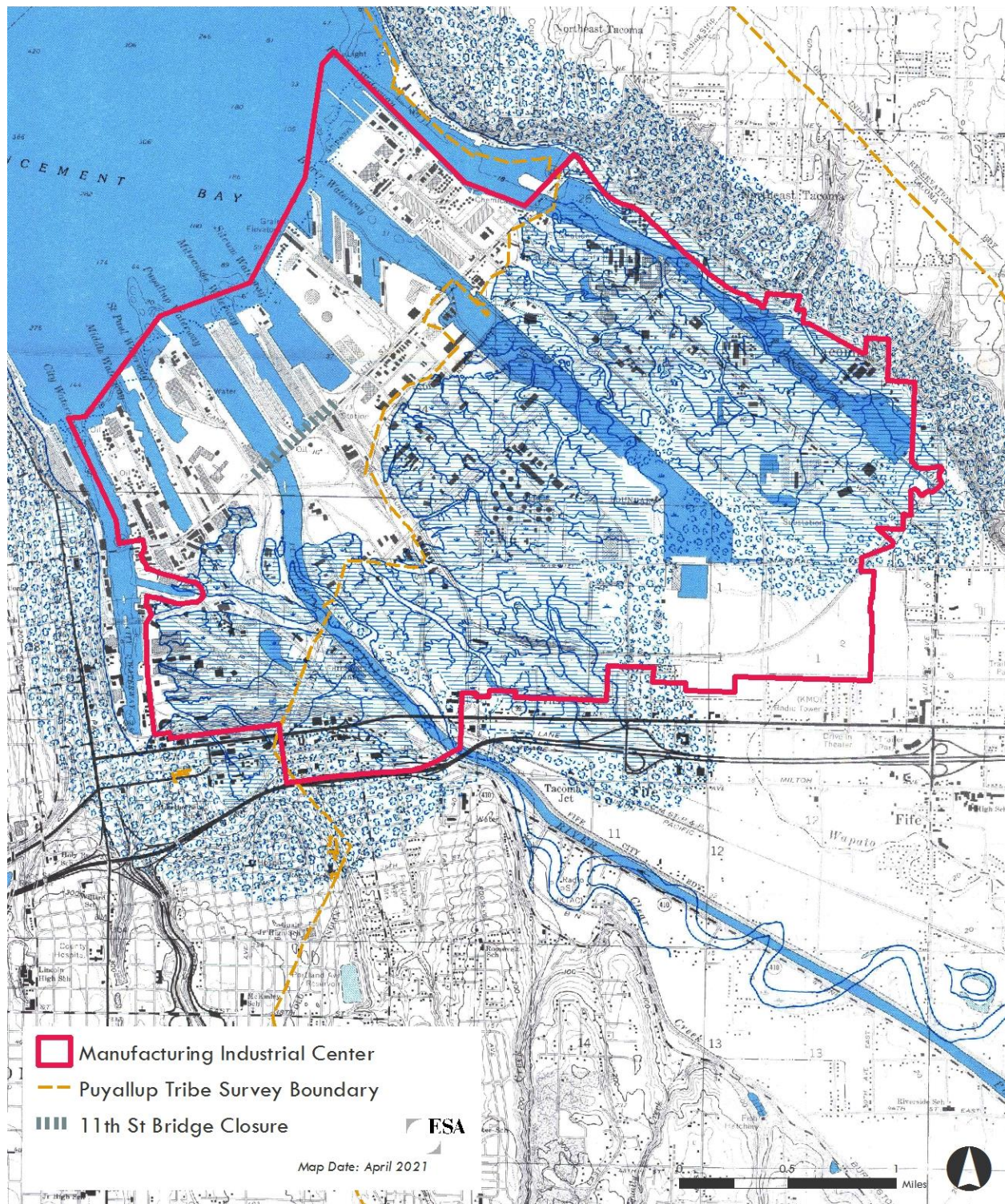
The Tacoma Tideflats area is situated at the modern delta front of the Puyallup River as it emerges into Commencement Bay. Commencement Bay is “an infilled marine embayment of the Puget Sound characterized by a complex history of glacial scouring, sediment infilling, deltaic progradation, compaction, tectonic subsidence, and eustatic sea level rise” (Rinck 2014). This dynamic history has important implications for the formation and preservation of archaeological sites in the past.

During the Vashon stade (approximately 17,400–16,400 year ago) of the Fraser glaciation, the Puget lobe of the Cordilleran ice sheet advanced southward out of Canada, overran the Puget Lowland, and advanced as far south as present-day Tenino, Washington before rapidly retreating. At the late glacial maximum, Tacoma was covered by approximately 0.5 mile of ice. Because global sea level was substantially lower during the last glacial maximum, glacial retreat exposed dry land. Global sea level rose quickly until about 7,000 years ago, and then more slowly until reaching current conditions approximately 2,000 years ago. Nevertheless, the mouth of the Puyallup River was situated near Sumner, Washington, some 13 miles southeast of Tacoma, around 6,000 years ago.

The Puyallup River embayment between Sumner and Tacoma began to fill about 5,700 years ago following a sector collapse on the flank of Mount Rainier. The collapse spawned the Osceola Mudflow, a lahar that flowed into the Puyallup River and White/Green River drainages (Dragovich et al. 1994; Zehfuss et al. 2003). The introduction of massive amounts of lahar runout sediment caused the Puyallup River delta front to prograde at the rate of approximately 6 meters per year, reaching Commencement Bay around 4,200 years ago (Pringle and Palmer 1992; Dragovich et al. 1994; Pringle and Scott 2001). Subsequently, smaller debris avalanches also caused lahars to flow in the Puyallup River, triggering further progradation (Curl et al. 1988).

The current position of the Puyallup River delta shoreline became supra-tidal after 4,200 years ago (Pringle and Scott 2001; Rinck 2014). Historically, the Puyallup River followed a meandering course as it approached Commencement Bay and then divided into a series of distributaries (Exhibit 11-5). As it followed this course, the river's environment shifted from floodplain to freshwater wetland and bog to saltwater wetland, and finally to tidelflat.

Evidence of the location of the Puyallup River delta front is seen in geological mapping of the study area. Toward the south and east, the Tideflats area is underlain by Holocene alluvium, marking the supra-tidal portion of the delta front (Exhibit 11-6). Toward the north and west, the Tideflats area is underlain by artificial fill. This fill was placed over the tideflats, creating new industrial lands. The study area also contains small areas that are underlain by Pleistocene-aged glacial deposits, such as the area of glacial drift north of the Hylebos Waterway.

Exhibit 11-5 Historic Shoreline Changes

Source: Bortleson et al., 1980.

Exhibit 11-6 Geological Map

Source: ESA, 2020; BERK, 2020.

The different geologies have different implications for the formation and preservation of archaeological sites. Areas underlain by Pleistocene glacial deposits have been relatively stable since the end of the last Ice Age. These areas have been available for human occupation and activity since the appearance of people in western Washington. However, such areas have generally not been subject to substantial natural deposition during this time. Thus, while such areas might have been used by people, the traces of their activities were not likely to have been buried in a manner conducive to their preservation. Portions of the Tideflats area underlain by alluvium had effectively stabilized by around 4,200 years ago. Whether these areas consisted of wetland (which is unlikely to have been favored for sustained human occupation) or drier floodplain, this setting would have experienced natural deposition capable of preserving archaeological sites, whether they were occupation or resource extraction (hunting, gathering, and fishing) sites. Depending on the relative depths of site burial and ground disturbances caused by historic and recent development, this area has the potential to still contain Holocene archaeological sites. Portions of the Tideflats area that were built on filled lands are over the historic tideflats or mudflats. These areas were naturally intertidal and, therefore, not favored for Native occupation. However, tideflats were critical zones for shellfishing and fishing, and would have been an important locus for Native subsistence activities. Intertidal zones may harbor remains of material culture and technology involved in these pursuits such as fishing net weights and hooks, as well as organic items that are less frequently preserved in the archaeological record, such as basketry and wooden fish weirs. Such items could be encased in intertidal muds, as well as being capped by fill used to create new land.

DAHP's Statewide Predictive Model classifies the study area as Very High risk for archaeological sites (DAHP 2010). For this analysis, those resources located within the study area (i.e., within the MIC) and within 200 feet of the MIC boundary were reviewed. It is usually not possible to fully delineate or determine the true boundaries of archaeological sites, particularly in urban and industrial settings; this is because sites often extend beyond project and even parcel boundaries where there is no right to access. Therefore, an arbitrary 200-foot buffer around the MIC has been used in this discussion; it does not imply that sites falling within the 200-foot buffer actually extend into the study area (i.e., within the MIC).

Sensitive information on archaeological and Tribal resources is exempt from public disclosure requirements (see Exhibit 11-1) and is described only in general terms. The Statewide Predictive Model does not account for historic and recent landform changes that may impact the archaeological sensitivity of the study area.

Cultural Context

The study area is located within the ancestral lands of the Spuyaləpabš' who are also known today as the Puyallup Tribe of Indians. This section presents a broad overview of Spuyaləpabš' history and cultural practices. It is primarily based on information provided by the Puyallup Tribe of Indians (Keating, personal communication, 2020) and is supplemented with published 20th and

21st century ethnographic studies and histories (Douglas 2016; Lane 1975; Puyallup Tribe of Indians, 2020a, 2020b; Puyallup Tribe of Indians GIS Department 2017; Wright 2002). General studies were also reviewed regarding named places (Hilbert et al. 2001; Palmer & Palmer 1996; Smith 1940) and cultural practices (Suttles and Lane 1990; Spier 1936; Taylor 1974). Other sources consulted include historical maps and local histories. Less emphasis has been placed on these sources as they often omit or misrepresent Native lifeways.

The Spuyaləpabs̓ have lived in and utilized the study area since time immemorial. The Spuyaləpabs̓ continue to live and practice traditional lifeways in this area such as hunting, fishing, and gathering. There are 19 recorded named places known to be within or near the study area; these include locations of important events, village sites, and geographical features (Exhibit 11-8). Some of these locations were imprecisely recorded by ethnographers and may be outside of the study area, and other unpublished locations may be present. Permanent Spuyaləpabs̓ villages were located along Commencement Bay, on rivers or smaller streams, either at the mouths or confluences, and also along the Puget Sound shoreline (Hilbert et al. 2001; Palmer and Palmer 1996; Smith 1940).

The Spuyaləpabs̓ are connected in many ways to neighboring Native groups through marriage, shared language, cultural practices, and oral traditions. The traditional language of the Spuyaləpabs̓ is the southern dialect of Lushootseed.

The traditional Spuyaləpabs̓ diet was based on fishing, shellfish harvesting, hunting, and gathering of roots, bulbs, and berries. Traditionally, salmon was not only a dietary staple but also an important trade commodity and source for making other byproduct commodities. Along with Commencement Bay, the Puyallup River and its tributaries are important fishing areas. Traditional fishing techniques for saltwater environments include trolling, long-lining, raking, spearing, harpooning, and seining. Techniques for riverine settings include lift nets associated with weirs, gaffing, falls traps, river seines, and spearing. Berries, roots, and other plants provide additional key components of the traditional diet along with shellfish and select terrestrial and marine animals. A wide variety of plants serve many purposes in traditional practices.

In the 19th century, the U.S. Government entered into a series of treaties with Native people throughout the Puget Sound region. The Spuyaləpabs̓ are signatories to the 1854 Treaty of Medicine Creek. Under this treaty, the U.S. Government established three reservations: the Puyallup, Nisqually, and Squaxin Island Reservations. The reservations were too small and poorly situated to provide proper access to resources. In 1855–1856, the Spuyaləpabs̓ participated in the Treaty Wars, which were a series of regional wars that spanned Puget Sound and east across the mountains. One outcome of the wars was the renegotiation of the Medicine Creek Treaty in 1856. This led to the expansion of the Puyallup Indian Reservation.

In 1886, the U.S. Government divided the Puyallup Indian Reservation into 178 allotments that were assigned to Spuyaləpabs̓ heads of households who were appointed non-Native guardians. This land division was intended to discourage the traditional village structure. It was a precursor to the Dawes Act of 1887, also known as the General Allotment Act, which used the same allotment

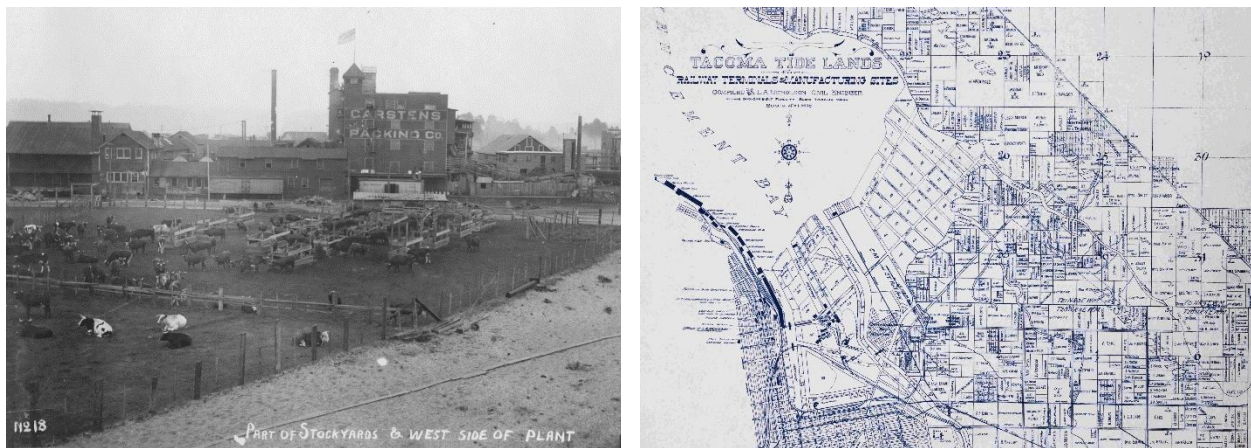
methods to divide reservation lands across the nation. Under this arrangement, the Spuyaləpabš lost ownership of a significant amount of the land within the Puyallup Indian Reservation. Some of these lands were regained under the Puyallup Land Claims Settlement of 1990.

Development in the Tideflats Area

Non-Native settlement in Commencement Bay began in the mid-1800s. Drawn to the area by abundant logging resources and a deep harbor, Nicholas Delin opened the first sawmill and barrel factory on the bay in 1852. Two years later, the Northern Pacific Railroad (NPRR) chose Tacoma as its northern terminus, and subsequently constructed a wharf and warehouses in the Tideflats area (Magden et al. 1982). Development of the Tideflats area continued through the 1880s.

Dredging along the current Thea Foss Waterway started at the turn of the 20th century and has continued within the Tideflats area to aid in flood control, improve useable land, and develop shipping channels (Magden et al. 1982; Bundy 2018). By the 1900s, electric street cars, additional railway holdings and lines, manufacturing sites, log ponds, tracts of expanded tideflats land, and the beginnings of one of the largest meat packing companies on the west coast reflected the bustling harbor (Exhibit 11-7). At that time, ship building was booming and four waterways – City (current Thea Foss), Middle, Puyallup, and Hylebos Creek – had been built along the Tideflats waterway (Thompson 1914; USGS 1900; White 1907).

Exhibit 11-7 Tideflats Activities in the 1900s



Note: Left image, Carsten's Packing Company ca. 1909, view to the east. Right Image, Nicholson's Atlas of Tacoma and Vicinity, Tacoma tide flats for railway terminals & manufacturing sites, 1910.

Source: Tacoma Public Library, 2020; Nicholson, 1910.

World War I brought another economic boom to the region with increased demand for ships. By 1917–1918, foreign and domestic trade had reached a new high, and 38 municipal streetcars were needed to carry workers across the Tideflats area (Magden et al. 1982; Ott and Malloy 1993). In 1918, Pierce County established the Port of Tacoma (Port of Tacoma 2018a).

By 1921, the Port's Pier One was dredged and developed (Magden et al. 1982; Port of Tacoma 2018b). In 1922, plans to extend Pier One and build Pier Two were in motion (Magden et al. 1982). The first dredging contract was also the basis for the Port of Tacoma's policy for dredging companies to use excess dirt as fill for low-lying sites (Magden et al. 1982). These policies have since been updated to apply the best management practice for dredging material on a case-by-case basis. Depending on the sediment quality, placement of these materials can include but are not limited to raising the grade of an already-filled site, improve habitat areas, or placed in Commencement Bay open water disposal site (Warfield, personal communication, 2020). The Great Depression slowed business on the harbor but development continued on. A new publicly owned grain elevator and Port cold storage facility saved the region's agricultural goods from spoiling (Gallaci 2001). Under the New Deal, Pier Two was extended by the Public Works Administration and a new Port-owned Industrial District formed by 1940 (Magden et al. 1982). During World War II, activities in the Tideflats area were reprioritized to support the war effort.

The mid-20th century expanded industrial growth in the Tideflats area. Growth, increased dredging, and landfill activities along with new industrial construction led to the establishment of eight waterways: City (Thea Foss), Middle, St. Paul, Puyallup, Milwaukee, Sitcum, Blair, and Hylebos. Businesses operating in the Tideflats area at this time included lumber, steel manufacturing, petroleum, shipbuilding, aluminum smelting, and engineering (Gleason 1949; Port of Tacoma 2018b; Van Pelt 2008). The U.S. Army Corps of Engineers (Corps) completed levee construction and straightening of the lower 3 miles of the Puyallup River in the 1950s (Gallaci 2001). The Tacoma Belt Line (now known as Tacoma Rail) ended its use of electrically powered cars and completed a much-needed switchyard at the end of the Sitcum Waterway to service the expanding manufacturing and industrial area (Ott and Malloy 1993). Modernization at the Port necessitated the widening and lengthening of the Hylebos and Blair Waterways in the 1960s and included new pier construction, warehouses, and specialized cargo facilities (Magden et al. 1982). These developments cemented the Tideflats area as one of the largest ports in North America.

The Tacoma Tideflats area has been continually updated to meet the needs of the region since non-Native American settlement. These changes can be visualized for future generations through the preservation of historic buildings, structures, utility, and infrastructure alignments.

Existing Resources

The following is a summary of previously recorded cultural resources within the study area. The identification and preservation of archaeological sites, Spuyaləpabš place names, and historic built environment resources, is an important key to understanding the cultural context of the area. Burial places associated with the Spuyaləpabš were identified within the study area. No TCPs were identified in the study area.

Datasets reviewed for existing resources include the following:

- 20th and 21st century ethnographic studies
- Puyallup Tribe of Indians publications

- Washington Information System for Architectural and Archaeological Records Database (WISAARD) system maintained by DAHP
- Pierce County Register of Historic Places
- Tacoma Register of Historic Places
- Tacoma Historic Properties Inventory Database

Spuyaləpabš Place Names

As described above, there are 19 recorded places names within or near the study area. These include locations of important events, village sites, and geographical features (Exhibit 11-8). Some of these locations were imprecisely recorded by ethnographers and may be outside of the study area, and other unpublished locations may be present.

Exhibit 11-8 Recorded Ethnographic Place Names

<i>Spuyaləpabš</i> Name	English Translation / Name	Source
Spuyaləp stulək ^w	Puyallup River	Puyallup Tribe of Indians GIS Department 2017
Ḳʷəlč	Puget Sound / saltwater	Puyallup Tribe of Indians GIS Department 2017
Puyaləp	Curved on the bottom of the water; Winding river	Hilbert et al. 2001:247, 250, no. 4; Palmer & Palmer 1996:13, no. 1; Smith 1940:9, no. 1
Dəxʷwadačəb	Place of the tide; Place of where the tide has gone out / [mouth of stream]	Hilbert et al. 2001:247, 250, no. 5; Palmer & Palmer 1996:13, no. 2; Smith 1940:9, no. 2
Čadz	Hide [creek]	Hilbert et al. 2001:247, 250, no. 6
Kō'yōb	[unrecorded] / [creek]	Hilbert et al. 2001:247, 250, no. 7
Qəlḡabid	Coming from the salmon eggs / [creek]	Hilbert et al. 2001:247, 251, no. 8
Bəsxʷuqid	A place that has swans / Swan Creek	Hilbert et al. 2001:247, 251, no. 9
Ḳiliḡali	Where there was a battle	Hilbert et al. 2001:247, 251, no. 10
Ca'sqwED	Clear / [creek]	Hilbert et al. 2001:247, 251, no. 11
Casqwo'd-tsid	Mouth of Ca'sqwo'd-tsid	Hilbert et al. 2001:247, 251, no. 12
Səxʷuḡiḡiliḡ	By means of battle	Hilbert et al. 2001:248, 252, no. 13
ʔasxʷap	Seals all over the ground	Hilbert et al. 2001:248, 252, no. 14
Qəlqaləqʷ; Stuləḡʷali; Spiqʷulc	Circles; Place of river; Potato / Wapato Creek	Hilbert et al. 2001:248, 252, no. 15
Ḳaḡḡ	Brushy / Hylebos Creek	Hilbert et al. 2001:248, 252, no. 16
LtcEIEb	[unrecorded]	Hilbert et al. 2001:248, 252, no. 17
Cátcqad	[unrecorded]	Palmer & Palmer 1996:13, no. 3; Smith 1940:9, no. 3
Qəlqaləqʷ	Circles / Flats between Hylebos Creek and Wapato Creek	Hilbert et al. 2001:248, 252, no. 19; Palmer & Palmer 1996:14, no. 5; Smith 1940:10, no. 4
Sháxtl'abc	[unrecorded]	Palmer & Palmer 1996:14, no. 6; Smith 1940:10, no. 5

Note: Some locations were imprecisely recorded and may be adjacent to the study area. *Spuyaləpabš* name from Hilbert et al. (2001) Lushootseed Orthography if available. It is possible that some entries refer to the same location due to inaccurate spelling by ethnographers.

Source: Hilbert et al., 2001; Palmer & Palmer, 1996; Puyallup Tribe of Indians GIS Department, 2017; Smith, 1940.

Archaeological Resources

There are three recorded archaeological sites within the study area and seven located just beyond the study area (Exhibit 11-9). The three sites located within the study area include historic-era components related to the early to mid-20th century and a precontact-era fish weir. The sites located just beyond the study area were reviewed to provide a better understanding of the types of resources that have been recorded on land that was not necessarily altered by historic dredging and fill activities, and would be related to land and shoreline use within Commencement Bay. These seven sites include a precontact-era village, campsite, midden, and lithic isolate, and historic-era debris scatter and piling, a road, and an isolate.

Exhibit 11-9 Recorded Archaeological Sites

Area	Site No. and Time Period		Approximate Age	NRHP Status
	Precontact-era	Historic-era		
In study area		45-PI-706	Late 19 th – mid 20 th century	Not Evaluated
In study area		45-PI-1463	Prior to AD 1896–1951	Determined Not Eligible
In study area	45-PI-47		Indeterminate	Not Evaluated
Outside study area	45-PI-974		Indeterminate	Not Evaluated
Outside study area	45-PI-1188		<500 years	Isolate/Not Eligible
Outside study area	45-PI-1203		<500 years	Not Evaluated
Outside study area		45-PI-975	AD 1886–1959	Not Evaluated
Outside study area		45-PI-1458	Late 19 th century	Not Evaluated
Outside study area		45-PI-1290	AD 1935-1968	Determined Not Eligible
Outside study area	45-PI-930		AD 680–1040	Not Evaluated

Note: Not Evaluated = the resource has not yet been evaluated by DAHP for listing in the NRHP.
Source: DAHP, 2020.

Previous Cultural Surveys

Fifty-nine previous cultural resources surveys have been conducted within the study area and mapped since 1996 (DAHP 2020). These surveys have been conducted for various projects including: habitat restoration; flood control; Port facility improvements; waterway improvements; transportation, bridge, and rail projects; storage tank facilities; pipeline projects; site remediation; construction of new buildings; and demolition of historic-aged built environment resources. Of the fifty-nine cultural resources surveys, two were historic structure surveys conducted in 2003 and 2008 (National Archaeological Database [NADB] No. 1352498 and 1350256); both surveys recommended the surveyed resources Not Eligible for listing in the NRHP. About less than half of the study area has been surveyed, and several of these surveys are located along road corridors and waterways. Surveys conducted in 2008, 2009, and 2010 identified (through archival research) potential and identified burial sites associated with the Spuyaləpabš within the study area (Berger and Hartmann 2008; Gillis et al. 2010; Hartmann 2010; Sharpe et al. 2009).

Historic-aged Built Environment Resources

The DAHP WISAARD system contains 325 historic-aged built environment records within the study area. Of those, 24 have been determined Not Eligible and 12 have been determined Eligible for listing in the NRHP (4 of those determined Eligible are no longer present but still mapped as an existing resource; Exhibit 11-10). Current DAHP guidelines are to use one record per inventoried resource; in some cases, however, more than one record per resource may exist due to legacy data included in the database. These resources include levees, bridges, industrial buildings, and structures. Some of these resources may have been incorrectly mapped, are no longer present, or were inventoried over 10 years ago. DAHP considers inventories completed over 10 years ago out of date.

The City of Tacoma conducted a series of cultural resources surveys between 1978 and 2004 to identify resources within the City of Tacoma that were potentially historically significant at the time of survey; this information is available in its Historic Property Inventory Database (City of Tacoma 2020a). A total of 48 property ID records relating to industrial and commercial buildings and structures were identified within the study area by their georeferenced points.

Register Evaluated Historic-aged Built Environment Resources

There are 13 built environment resources that are historic register-listed or have been determined Eligible for listing in the NRHP in the study area. These include bridges, a substation, buildings associated with fire stations, and commercial/industrial development; they were built between 1909 and 1962. These resources are summarized in Exhibit 11-10 and shown in Exhibit 11-11. Four of these resources no longer exist within the study area and are therefore not shown in Exhibit 11-11.

Exhibit 11-10 Historic Register-listed and Determined Eligible Resources

Map ID No.	Resource	Built Date	Site No.	Determined Eligible for NRHP	Listed on NRHP	Listed on WHR	Listed on Pierce County Register	Listed on City of Tacoma Register	DAHP Property ID
1	11 th Street Bridge/Murray Morgan Bridge/ City Waterway Bridge	1911	45-PI-654	x	x	x		x	54223
2	Fire Station No. 18 (Fireboat Station)*	1929	45-PI-653	x	x	x		x	31062
3	Lincoln Avenue Bridge	1929		x					90499
4	Puyallup River Bridge	1927		x					31786
5	Milwaukee Railroad – Puyallup River Bridge	1910		x					31231
6	Concrete Technology Corporation Plant	1951, 1956		x					91536
7	Fire Station No. 15	1905	45-PI-650		x	x		x	31605
8	Educators Manufacturing Company Building	1956 / 1957 / 1962		x					709853
9	Tacoma Substation (BPA)	1942		x					705968
NA	Puyallup Waterway Crossing**	1909	45-PI-260	x	x	x			700295
NA	Unnamed Building**	1925		x					158399
NA	Fire Station No. 12**	1948		x					705766
NA	M.V. Kalakala Ferry**	1935	45-PI-742	x	x	x			700376

Note: * Resource is adjacent to the study area; ** Resource is mapped within the study area by DAHP but is no longer present.
Source: DAHP, 2020; Tacoma Register of Historic Places, 2019.

Exhibit 11-11 Historic Register-listed or Determined Eligible Properties Within the Study Area

Source: ESA, 2020

Maritime Resources

The WISAARD system includes six recorded resources associated with maritime activities. These include four submerged resources listed as “unknown wreckage,” the Port of Tacoma (1918), and Todd SeaTac Shipyard (1919).

Maritime Washington National Heritage Area

The shores of Commencement Bay are part of the Puget Sound-wide, congressionally approved Maritime Washington National Heritage Area, which is coordinated by the Washington Trust for Historic Preservation. A National Heritage Area designation does not impose regulatory controls. In preparation for this designation, DAHP commissioned a Maritime Resources Survey for Washington’s Saltwater Shores (Artifacts Consulting 2011). This survey identified the areas and properties within the study area that could contribute to interpreting this National Heritage Area.

11.3 Key Findings and Implications for the Plan

The following topics related to cultural resources should be considered in the development of the Tacoma Tideflats Subarea Plan:

- Depending on the relative depths of site burial and ground disturbances caused by historic and recent development, this area has the potential to still contain Holocene archaeological sites.
- DAHP’s Statewide Predictive Model classifies the study area as Very High risk for precontact-era archaeological sites (DAHP 2010).
- The recorded Spuyaləpabš place names and identified burial locations are located within the study area.
- The Spuyaləpabš have lived in and utilized the study area since time immemorial. The Spuyaləpabš continue to live and practice traditional lifeways in this area such as hunting, fishing, and gathering. There are 19 recorded named places known to be within or near the study area; these include locations of important events, village sites, and geographical features (Exhibit 11-8) and should be considered when planning.
- There are three recorded archaeological sites within the study area and seven within 200 feet of the study area (Exhibit 11-9).
- Thirteen NRHP-listed and/or determined Eligible to be listed in the NRHP historic-aged built environment resources have been recorded within the study area. A comprehensive inventory of the study area has not been conducted in 10 years.
- The Subarea Plan should take into account its location within the Maritime Washington National Heritage Area as well as documented submerged resources identified within the study area.
- Compliance with 4(f) of the Department of Transportation Act is required for recommendations that would result in the construction of transportation facilities funded by the U.S. Department of Transportation, including the Federal Aviation Administration, Federal

Highway Administration, Federal Motor Carrier Safety Administration, Federal Railroad Administration, Federal Transit Administration, and Maritime Administration. Section 4(f) applies to all historic sites and to publicly owned parks, recreational areas, and wildlife and waterfowl refuges. Any project that affects Section 4(f) land must include a Section (4f) assessment. A transportation program or project requiring the use of such land will be approved only if there is no prudent and feasible alternative to using that land and if the program or project includes all possible planning to minimize harm to the land or resource.

12 TRANSPORTATION

This section presents a review of multimodal transportation conditions in the study area, which comprises the Port of Tacoma Manufacturing Center. The current land-side transportation environment is documented for automobiles, trucks, transit, pedestrians, bicycles, safety, rail, and parking. Many studies have been completed over the past decade to determine the transportation facilities needed to accommodate population and employment growth, and to maintain and improve freight mobility needs of the Port, railroad hubs, and industrial businesses in the Tideflats. A summary of those key studies is presented in this section.

Overview

The study area is bound by Interstate 705 (I-705) and Dock Street on the west, I-5 on the south, 70th Avenue E and State Route (SR) 99 on the east, and Marine View Drive and East 11th Street on the north, as shown in Exhibit 12-1. SR-509 runs through the study area, connecting I-705 in downtown Tacoma to NE Tacoma, also serving as a bypass to SR 99 and I-5. Bridges are an important part of the transportation network, providing connectivity between peninsulas, as well as to downtown Tacoma and nearby highways across the Puyallup River.

Roadways within the study area primarily serve Port of Tacoma and other freight, manufacturing, and industrial facilities. In addition to their important freight and goods movement role, Pacific Highway, Portland Avenue, Port of Tacoma Road and Puyallup Avenue are also key corridors that serve transit, general purpose traffic, and emergency access. Many of the roadways in the study area were developed to primarily serve auto and freight purposes and are consequently challenging for bicycle and pedestrian access.

Transit facilities within the study area include Tacoma Dome Station, a regional transportation facility where multiple routes and services converge, including Tacoma Link streetcar, Sounder commuter rail, and local and regional bus service. Tacoma Dome Station Parking Garage draws users making a connection to transit and is also utilized during events at Tacoma Dome. Sound Transit's Tacoma Dome Link Extension (TDLE) Project is planned to connect between Federal Way and the Tacoma Dome with two new stations in the Tideflats study area, at Fife and Portland Avenue.

Freight movement is a primary purpose of the study area transportation system as the Tideflats is home to all of the Port of Tacoma's maritime terminals and related freight activity. The Port owns and maintains facilities related to maritime commerce, including facilities for containerized cargo, automobiles, dry bulks such as grain, logs, breakbulk cargo, heavy-lift cargo and project cargoes. Port properties also include warehouse/industrial sites, a grain terminal, and two major areas for industrial development. The NWSA is a marine cargo operating partnership of the Port of Seattle and Port of Tacoma. Under a port development authority, the NWSA manages the container, breakbulk, auto and some bulk terminals in Seattle and Tacoma. In addition to the Port's properties, there are other privately owned facilities including warehouses, distribution centers, and pipelines.

The Tideflats is bounded by three federal navigation channels including the Blair Waterway, the Hylebos Waterway, and the City Waterway (Thea Foss). These waterways are maintained by the US Army Corps of Engineers. Other waterways in the Tideflats including the Sitcum Waterway and the Milwaukee Waterway also support maritime commerce.

The Tideflats has a robust rail network connecting port terminals and major industries to the national rail network served by the Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) railroads. Switching and terminal services are provided by Tacoma Rail, which is part of Tacoma Public Utilities. The Port has three on-dock intermodal rail yards and one near-dock intermodal rail yard where containers are transferred between rail and ship, along with other rail yards that support activity throughout the Tideflats.

The marine and rail terminals in the Tideflats as well as the many industrial businesses also generate high volumes of truck traffic. The primary access routes include arterials that connect to I-5, SR 509, and SR 167.

Exhibit 12-1 Tideflats Subarea Transportation Study Area

Source: Fehr & Peers and Heffron Transportation, 2021.

12.1 Existing Transportation Plans and Studies

This section provides summaries of recent plans, programs, and studies related to the Tideflats area. These summaries help provide a background understanding of the prior transportation planning and regulatory framework in the Tideflats study area. Plans and studies are organized into (1) Tideflats area plans, (2) project specific plans, and (3) areawide transportation plans. These are presented in chronological order with most recent plans first.

Tideflats Area Plans

Port of Tacoma GCP Traffic Study (2018)

The Port of Tacoma plans to modernize container terminal and support facilities on its General Central Peninsula (GCP), which is located in the study area on the peninsula between the Sitcum and Blair Waterways north of E 11th Street. The *Transportation Technical Report for the Port of Tacoma GCP Uplands Modernization* (Heffron, 2018) describes the transportation effect of the GCP Improvement Program, to increase the capacity and operational efficiency of two container terminals. This includes creating an off-dock truck gate and staging yard at the Thorne Road Properties, and changing the terminal entry and exit configuration near Port of Tacoma Road/11th Street East.

Port of Tacoma Comprehensive Scheme of Harbor Improvements (2017)

The Port of Tacoma maintains a *Comprehensive Scheme of Harbor Improvements* as mandated by state law (Port of Tacoma, 2017). The intent of this document and its amendments are to give the public a reasonably detailed picture of the Port's planned improvement projects and the geographic limits of development needed to support these projects, prior to the Port Commission's vote and adoption of a comprehensive scheme of harbor improvements.

Tideflats Emergency Response Plan (2016)

The *Tideflats Emergency Response Plan* assesses the ability for emergency services to access and egress the study area considering the impact of rail and traffic congestion through 2035 (Tacoma Fire Department, 2016). The plan outlines a set of recommendations that can address emergency response needs in the Tideflats over the short, medium and long term based upon emergency response analysis. The recommendations are related to transportation infrastructure, fire station locations, staffing and operations. Two high-priority infrastructure improvements identified in the plan are the Fishing Wars Memorial Bridge Replacement and Port of Tacoma Road and I-5 Interchange. The document acknowledges that the planned roadway projects would improve overall accessibility to and from the Tideflats, but they alone would not be sufficient to

substantially affect emergency response times given the locations of existing fire stations and general increases in traffic congestion in 2020 and 2035.

Tideflats and Port of Tacoma ITS Strategic Plan (2015)

The *Tideflats and Port of Tacoma Intelligent Transportation Systems (ITS) Strategic Plan* identifies the needs and strategies to improve safety, increase freight mobility and accommodate growth in the Tideflats area (Port of Tacoma and City of Tacoma, 2015). The plan assesses six high-level ITS strategies including signal optimization, signal priority and pre-emption, incident management, Tideflats area “511” Service, active lane management and supporting ITS infrastructure. Specific projects tied to the strategies were developed and prioritized for short (0-5 years), mid (6-10 years) and long-term (over 10 years) phasing, with cost estimates for short-term projects. Two short-term ITS projects recommended constructing initial ITS infrastructure needed for basic information sharing among stakeholders and adding cameras to key existing at-grade rail crossings.

Port of Tacoma’s 2012-2022 Strategic Plan (2014)

The *Port of Tacoma’s 2012-2022 Strategic Plan*, adopted in 2012 and updated in 2014, aims to improve the Port’s competitive and financial position and reduce environmental impact (Port of Tacoma, 2014a). The plan includes ten targets such as doubling container volume to 3 million TEUs,²¹ doubling dry bulk throughput to 12 million metric tons and increasing breakbulk volume by 30% to 200,000 tons over the 10 years of the plan. One highlighted strategy is to invest \$500 million to improve existing facilities with actions such as redeveloping the General Central Peninsula (GCP) and other terminal complexes to increase container throughput and improve efficiency of the Tideflats rail system. The plan also outlines the long-term development of Port properties. Another strategy considered is collaborating with neighboring jurisdictions to enhance public infrastructure, specifically, providing leadership in securing funds to complete SR 167 and improve operations of Port of Tacoma Road. An update to the Port of Tacoma Strategic Plan is currently underway and is slated to be completed in April 2021.

Port of Tacoma Land Use & Transportation Plan (2014)

The *Port of Tacoma Land Use and Transportation Plan* guides future development and infrastructure priorities to achieve the goals considered in the Port’s 2012-2022 Strategic Plan, as described above (Port of Tacoma, 2014b). The plan establishes a development vision for all port-owned property in the Tideflats using seven development designations: marine terminals, commercial, mixed commercial/maritime support, marine services, industrial/maritime support, public utilities/public safety, and habitat/public access. These designations are consistent with the adopted City of Tacoma land use and shoreline regulations. The transportation section of the plan

²¹ “TEU” means “twenty-foot equivalent unit,” which is a unit of measure for containerized cargo. A 20-foot container is equivalent to one TEU; a standard 40-foot container is equivalent to two TEUs.

prioritizes freight system improvement strategies and investments in four user group areas: regional and port access, Tideflats circulation and preservation, rail facilities and waterways. Two of the high priority projects highlighted in the plan are the SR 167 Completion project and the Port of Tacoma Road/I-5 Interchange project. These two facilities would serve major port-related traffic once completed. Regarding rail infrastructure, the plan considers nine Tacoma Rail capital projects and eight Port and Tacoma Rail collaborative projects. High priority rail projects include the connection of East Blair One terminal to the railroad system (now completed) and the construction of industrial lead tracks and preservation of Taylor Way crossings to support future cargo customers on the Blair Peninsula.

Tideflats Area Transportation Study (2011)

The *Tideflats Area Transportation Study* examines the multimodal transportation network within the Tideflats area, with project partners including the Port of Tacoma, City of Tacoma, City of Fife, Puyallup Tribe, and Pierce County (Port of Tacoma, 2011). Based upon input from stakeholders, future travel demand forecast and micro-simulation of the roadway network, the plan recommends a package of roadway and rail transportation improvements to increase mobility, accessibility and safety. The plan highlights the need to complete the portion of SR 167 between SR 161 in Puyallup and SR 509, to reduce the potential for a highly congested network. The recommended projects, which have an estimated cost of \$290-335 million (in 2010 dollars), are categorized according to the user group that they most benefit: Tideflats area, Port, Industrial and local access. Two additional high priority projects include extending Canyon Road from Pioneer Way across the Puyallup River to 70th Avenue E and adding truck lanes on Port of Tacoma Road.

East Thea Foss Waterway Transportation Corridor Study (2008)

The *East Thea Foss Waterway Transportation Corridor Study* analyzes and develops a transitional transportation corridor system to improve access, circulation, and functional separation in the East Foss Peninsula area (City of Tacoma, 2008). The recommendations focus primarily along the East D Street corridor and are elaborated for two future scenarios, with and without an operational Murray Morgan Bridge. The study's priority recommendations include improving the East 11th Street/ East F Street/St Paul intersection, and moving forward with the East D Street / SR 509 ramp feasibility study working with WSDOT and BNSF.

Project Specific Plans

I-5/Port of Tacoma Road Interchange Improvement Project (Ongoing)

The City of Fife's I-5 Port of Tacoma Road Interchange Improvement Project has been developed over the past decade and is currently under construction (City of Fife, 2020). The project will reconstruct the interchange at Port of Tacoma Road & I-5, a key access point for freight to and from the Tideflats, as well as enhance surface streets and intersections. Traffic analysis completed

as part of this project showed that without improvements the area would experience high levels of congestion by 2040; all intersections are expected to operate at LOS D or better by 2040 with the project. The first phase of the project is complete; the City of Fife has applied for grant funding to complete the second phase.

WSDOT Gateway Program SR 167/509 (2020)

WSDOT's Gateway Program SR 167/509 includes three projects that provide essential connections to the Port of Tacoma (WSDOT, 2020a). The SR 167 Completion Project will address a critical missing link in WSDOT's highway network, completing the remaining four miles of SR 167 between Meridian Avenue in Puyallup and SR 509 in Tacoma. This new highway segment will provide two general purpose lanes in each direction between Puyallup and I-5, and one lane in each direction between I-5 and the Port of Tacoma at SR 509. There will also be a westbound off-ramp and eastbound on-ramp connecting to 54th Avenue E with a roundabout intersection north of 8th Street E. When completed, the divided highway will have interchanges in key locations including SR 509, 54th Avenue E, I-5, Valley Avenue E, and SR 161. All lanes on the new portion of SR 167 will be tolled using two electronic toll points with no tollbooths. An early element of this project will build a new four-lane bridge over I-5 at 70th Avenue E (currently under construction), and construct a roundabout at the new intersection of SR 99/70th Avenue E. The full project, which would first construct the SR 509 spur to I-5 and then build the connection from Puyallup to I-5, is expected to be complete by 2028.

Sound Transit Tacoma Dome Link Extension (TDLE) Project (2020)

The Tacoma Dome Link Extension (TDLE) project would extend Sound Transit's regional light rail network from the Federal Way Transit Center (opening in 2024) to the Tacoma Dome Station, with four new stations: South Federal Way, Fife, Portland Avenue in Tacoma, and at the Tacoma Dome (at or near the existing Tacoma Link terminus). The new light rail alignment would be on a dedicated guideway including a rail-only fixed bridge crossing the Puyallup River. Parking garages with approximately 500 stalls are proposed at the South Federal Way and Fife Stations. The Draft Environmental Impact Statement is anticipated to be published in late 2021/early 2022 (Sound Transit, 2020). Project completion is currently targeted for 2030.

Fishing Wars Memorial Bridge Study/Puyallup Fishing Wars Bridge Design Criteria Report (2020)

The City of Tacoma is planning to replace Fishing Wars Memorial (FWM) Bridge across the Puyallup River. This bridge, (formerly the Puyallup River Bridge) which is on Pacific Highway E, connects the City of Fife and City of Tacoma and was originally built in 1927. The *Draft Fishing Wars Memorial Bridge Design Criteria Report* describes the need for the project and some of its benefits (City of Tacoma and TY Lin International, 2020). The west approach to the FWM Bridge was replaced and the bridge re-opened in September 2019 after an 18-month closure. The

proposed project would replace the remaining segments of the bridge, including the segment over the river, and the east approach that extends beyond the Milwaukee Way underpass. Those segments are currently subject to a 20-ton weight limit.

Canyon Road Regional Connection Project (2020)

The Canyon Road Regional Connection Project, led by Pierce County in collaboration with the City of Fife, Puyallup Tribe of Indians, BNSF Railway, and WSDOT would extend Canyon Road E between Pioneer Way E and 70th Avenue E (Pierce County, 2020a). It includes a new bridge over the Puyallup River to replace the aging Milroy Bridge. While this connection would reduce congestion and decrease travel times for all of its users, it would be particularly valuable for freight as it would provide an alternate route between the Tideflats and the Frederickson Industrial Area. Design and right-of-way are fully funded; pending funding for construction, this final connection is slated to be complete by 2027.

11th Street Bridge Corridor Study (2019)

The East 11th Street Bridge and adjacent viaduct were built in 1930 to provide access over the Puyallup River, but were closed in 2014 due to deterioration of the structures. The *East 11th Street Bridge Corridor Study* provides a high-level evaluation of whether the existing structure should be replaced, repaired, or demolished. Pending further analysis as part of the Tideflats subarea plan, the study recommends that the existing structures be replaced with a new three-lane bridge to provide sufficient capacity for future traffic volumes, emergency vehicle access, and enhanced freight mobility. A multi-use path is also recommended as part of the bridge replacement.

SR 509 East D Street Interchange Project (2015)

The City of Tacoma completed an Interchange Justification Report in 2012 which examines the feasibility of providing new ramp connections to/from SR 509 at East D Street in the East Thea Foss area east of downtown Tacoma. The proposed project would provide improved freight access to the BNSF rail yards and other industrial properties, while expanding route options for travelers accessing the Tacoma Dome district.

Local Jurisdiction and Agency Plans

City of Tacoma

Tacoma Environmental Action Plan (2016)

The *Tacoma Environmental Action Plan* outlines actions the City and residents can take to become more environmentally sustainable (City of Tacoma, 2016). The focus of the report is on near-term actions. A number of transportation-related targets are identified for reductions in single

occupancy vehicle trips, fossil fuel use, and bicycle and pedestrian collisions. Strategies generally involve improving bicycle and pedestrian infrastructure and access; transit improvements; and increasing availability of electric vehicle infrastructure including joining the West Coast Electric Fleets program. Longer term goals include reducing greenhouse gas emissions from transportation and petroleum fuel use; protecting public health and the environment from air pollution; prioritizing the movement of people and goods that have the least environmental impact and greatest contribution to livability; building a transportation network that provides options, accessibility, and economic vitality; and designing an environmentally, socially and fiscally sustainable transportation system through strategic planning efforts, funding and projects.

Tacoma Transportation Master Plan (2015)

The *Tacoma Transportation Master Plan (TMP)* is an element of the One Tacoma Comprehensive Plan and contains a vision for how the future transportation network will serve additional growth (City of Tacoma, 2015). The TMP states that the City is moving toward a more multimodal approach that considers more than the traditional vehicle delay metrics. Currently, the City uses two metrics to evaluate transportation performance: first, a system completeness measure to track progress in implementing the multimodal transportation network, and second, an intersection level of service (LOS) standard of D in the Tideflats area.

The City has designated a network of Heavy Haul Routes which carry the highest volumes of truck traffic and require roadway designs to accommodate freight. The TMP recognizes the importance of coordination between the City and the Port of Tacoma on the development of level of service for transportation and impact fees. There are several policies related to freight mobility in the TMP, including addressing inter-modal conflicts and strengthening Tacoma as a primary hub for goods movement by integrating freight considerations into the transportation network.

Tacoma Comprehensive Plan – Container Port Element (2014)

The Container Port Element was added to the Comprehensive Plan in 2014 and is mandated by the State Growth Management Act in support of land use and transportation planning for marine ports in Tacoma and Seattle. The Container Port Element provides goals and policies related to the Port Industrial Area and establishes a policy framework to ensure land use decisions consider the needs of container ports and freight corridors. The land use goal for the Core Industrial Area (see Exhibit 12-1) is to identify the core port and port-related container industrial area and protect the long-term function and viability of this area. The overall goal for transportation is to identify, protect, and preserve the transportation infrastructure and services needed for efficient multimodal movement of goods and between the Core Industrial Area, Industrial/Commercial Buffer Area, and regional transportation system. A key planning principle for the Core Area notes that uses should be prioritized as follows:

- (1) cargo facilities and activities,
- (2) water-dependent port uses,
- (3) water-related port uses, and

- (4) other uses permitted in Port Maritime Industrial zoning.

North Downtown Subarea Plan (2014)

The *North Downtown Subarea Plan* covers northern Downtown, northern Thea Foss Waterway, and land to the east of Foss Waterway, as well as the Murray Morgan (11th Street) Bridge (City of Tacoma, 2014). Mobility considerations are generally concentrated on areas west of the waterway and the study area, but address connections between Downtown and the study area. The study recommends adoption of an impact fee program to help fund transportation improvements and a shared use path along the east side of Foss Waterway.

South Downtown Subarea Plan (2013)

The *South Downtown Subarea Plan* includes portions of the study area including the southern stretch of Thea Foss Waterway, land to the east of Foss Waterway, and the vicinity of Puyallup Avenue and E 26th Avenue west of E G Street as well as the SR 509 bridge (City of Tacoma, 2013). The plan proposes phased-in impact fees to fund transportation improvements and a transportation performance monitoring plan with thresholds for public transit speed, reliability and capacity, and connections to the state highway system. The plan recommends a cycle track on S 21st Street, bicycle lane on Puyallup Avenue, a Complete Streets reconfiguration of Puyallup Avenue, and transit priority strategies in the Tacoma Dome station area.

City of Fife

I-5/54th Avenue E Improvement Project (Ongoing)

The City of Fife is currently leading a study to develop improvements to the I-5/54th Avenue E interchange, which is integral to freight operations for the City of Fife and Port of Tacoma. They have been working with WSDOT, Federal Highway Administration, Port of Tacoma, and the Puyallup Tribe of Indians since 2013 to evaluate improvement alternatives. The project is being designed to address vehicle delay and queuing, providing better mobility within the City of Fife, and an improved connection for freight to access the Tideflats area.

City of Fife Transportation Element (2012)

The *Transportation Element* of the City of Fife's Comprehensive Plan documents current transportation facilities and long-range plans to accommodate growth to a horizon year of 2040 (City of Fife, 2012). The City adopted an intersection level of service (LOS) standard of D or better. Two intersections within the Tideflats are forecasted to operate below this threshold by 2040: Port of Tacoma Road & Pacific Highway E and 54th Avenue E & Pacific Highway E. The Transportation Element recommends creating truck routes to ensure industrial and commercial areas are adequately served while minimizing truck traffic on residential streets. Additionally, the plan identifies future bicycle facility needs including on roadways connecting to the study area.

Puyallup Tribe of Indians

Climate Change Impact Assessment and Adaptation Options Study (2016)

The Puyallup Tribe of Indians' *Climate Change Impact Assessment and Adaptation Options Study* addresses climate change and the challenges it presents to natural resources (Puyallup Tribe of Indians, 2016). The document cites the WSDOT Climate Impacts Vulnerability Assessment study which identifies four highways that may be highly vulnerable to climate change impacts including the following key corridors within and connecting to the study area: SR 509, SR 99, SR 167, and I-5.

Pierce County

Countywide Planning Policies (2020)

Pierce County's *Countywide Planning Policies (CPP)* outlines countywide goals and policies applicable to transportation facilities (Pierce County, 2020b). These goals call for maintaining and operating the existing transportation system in a safe and efficient way; developing transportation systems that support travel to and from regional centers; and addressing alternatives to driving alone including access to various mobility options. The policies require that municipalities adopt measures to ensure growth is supported by the provision of adequate public facilities including transportation concurrent with development.

Puget Sound Regional Council

Vision 2050 (2019)

The Puget Sound Regional Council's (PSRC) *Vision 2050* provides strategies for accommodating growth in the Central Puget Sound until the horizon year of 2050 (PSRC, 2019). Tacoma is listed as one of the area's five central base cities. The document states that the movement of people and goods is crucial to the continued success of the economy and envisions a transportation system that connects the region's centers. The Regional Transportation Plan contains recommended goals and policies, including:

- MPP-T-11: Design, construct, and operate a safe and convenient transportation system for all users while accommodating the movement of freight and goods, using best practices and context sensitive design strategies.
- MPP-T-14: Integrate transportation systems to make it easy for people and freight to move from one mode to another.
- MPP-T-25: Ensure the freight system supports the growing needs of global trade and state, regional, and local distribution of goods and services.
- MPP-T-26: Maintain and improve the existing multimodal freight transportation system in the region to increase reliability, efficiency, and mobility, and prepare for continuing growth in freight and goods movement.

Regional Center Plans Checklist (2014)

PSRC's *Regional Center Plans Checklist* guides jurisdictions in updating their center plans, including for Regional Manufacturing Industrial Center Plans (PSRC, 2014). The study area is designated by the PSRC as the Port of Tacoma Manufacturing/Industrial Center (MIC). The checklist includes the following requirements for Regional Manufacturing Industrial Center Plans with respect to transportation:

- Describe the transportation networks to and within the manufacturing/industrial center and plans to identify and address deficiencies.
- Describe strategies that address freight movement (such as rail, trucking facilities, or waterway, as appropriate), including local and regional distribution.
- Describe strategies that address employee commuting (such as by encouraging modes such as fixed-route and high-capacity transit).
- Describe relationships to regional high-capacity transit (including bus rapid transit, commuter rail, light rail, and express bus) and local transit, and coordination with transit agencies.
- Include mode split goals.

U.S Department of Defense***Power Projection Platform Route Study (2020)***

The Strategic Highway Network (STRAHNET) is a 62,791-mile national system of roads that is essential to support emergency mobilization and peacetime movement of heavy armor, fuel, ammunition, repair parts, food and other commodities to support U.S. military operations. A subset of the STRAHNET is approximately 15,000 miles of public roadways that are most critical to support the movement of Department of Defense (DOD) equipment from large military installations. These are called Power Projection Platform (PPP) Routes, and are specifically designated to deploy military equipment over public roadways to Strategic Seaports during a national emergency.

The Joint Base Lewis-McChord (JBLM) PPP Route study focused on evaluating the condition and effectiveness of the PPP route connecting JBLM to the Port of Tacoma. This PPP route is broken into two separate segments: PPP Route 14A from JBLM to the East Sitcum Terminal via Port of Tacoma Road and PPP Route 14A-2 to the East Blair Terminal via 54th Avenue E/Taylor Way. The study found that both routes have adequate infrastructure within the Tideflats subarea to continue to support large deployments from JBLM to the Port of Tacoma, with the exception of some height clearance issues at bridges that will be addressed in the next 10 years. The study also noted that congestion along I-5 and into the Tideflats subarea during peak periods remains an issue, but can be addressed through proper scheduling and coordination with local agencies.

WSDOT

Joint Transportation Committee Prioritization of Prominent Road-Rail Conflicts in Washington State (2017)

At the direction of the Washington State Legislature, the Joint Transportation Committee (JTC) conducted a study to evaluate the impacts of prominent road-rail conflicts and develop a corridor-based prioritization process for addressing the impact on a statewide level. The study found 2,180 crossings that were active, at-grade and public out of the 4,171 total crossings statewide. The crossings were evaluated based on mobility, safety, and community criteria, and assigned an overall score used for prioritization. Specific data related to rail crossings in the Tideflats were compiled for use in this report.

Freight Mobility Plan/Freight System Plan (2014/2017)

The Freight Mobility Plan outlines strategies and goals for ensuring that the transportation system supports and enhances trade and sustainable economic growth. The plan was created to meet state and federal policies and goals including economic vitality, preservation, safety, mobility, environment, and stewardship in support of the *Washington Transportation Plan 2030*. A technical update called the Washington State Freight System Plan was completed in 2017 to address necessary regulatory and technical updates since the 2014 plan.

Applicable to Tideflats, the 2014 Plan identifies an unfunded project to improve transit movements within the Tideflats by connecting the northerly end of the existing Washington United Terminals Intermodal Yard to the rail line on the west side of Port of Tacoma Road. Additionally, the 2017 update cites a Joint Transportation Committee *Road-Rail Study* (2017), which identifies rail crossing statewide and prioritizes locations for improvement based on a number of variables. The rail crossing on E 11th Street & Thorne Road near the Port of Tacoma Administration Building is on the prioritized list.

12.2 Current Conditions

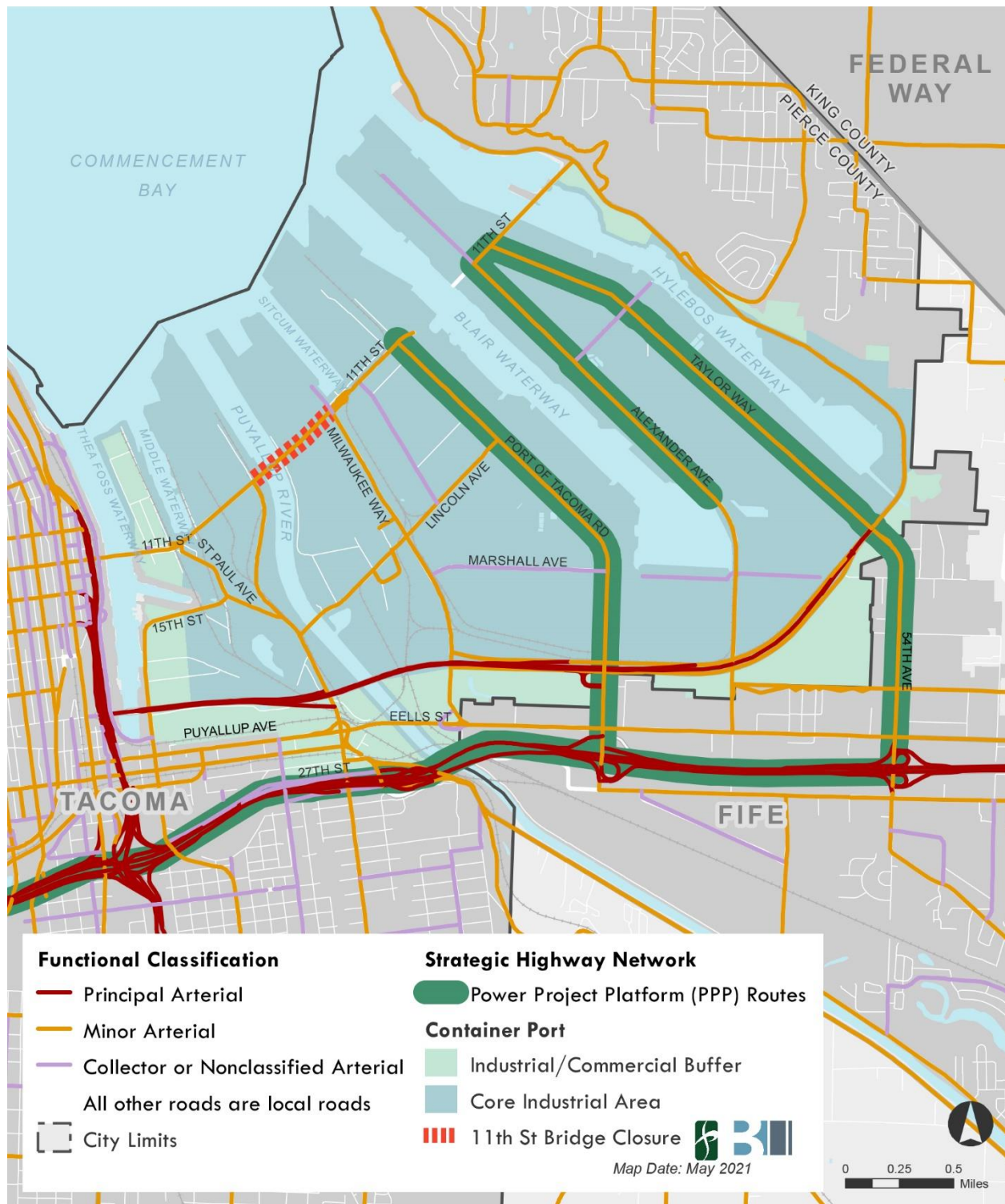
This section presents a multimodal transportation evaluation of existing conditions in the study area. Existing land-side transportation conditions are documented for automobiles, trucks, freight rail, transit, and active transportation. Parking conditions and traffic safety are also discussed.

Roadway Network

The Tideflats subarea is a predominantly vehicle-oriented environment, with a large share of truck freight traveling between the study area and regional roadways as well as along arterials that connect to industrial areas in Fife and beyond.

Exhibit 12-2 shows the functional classification of major roadways in and around the study area. Major roadways in the study area that connect to I-5 and SR 167 include Portland Avenue, Port of Tacoma Road, and 54th Avenue, with Milwaukee Avenue and Alexander Avenue also serving as north-south corridors. Major east-west corridors connecting the study area to I-5, I-705 and downtown Tacoma include SR 509, Pacific Highway E which continues east of 54th Avenue E as SR 99. SR 509 also provides a connection between the three study area peninsulas and Lincoln Avenue connects the two western peninsulas. Key roadways allowing for internal movement of traffic within the Thea Foss Peninsula include Portland Avenue, 11th Street and East D Street/E 15th Street; key roadways within the GCP include Port of Tacoma Road, Milwaukee Way, 11th Street, and Lincoln Avenue; and key roadways within the Blair-Hylebos Peninsula include Taylor Way, 11th Street and Alexander Avenue. The exhibit also shows the location of the DOD's Power Projection Platform (PPP) routes which are a subset of the Strategic Highway Network. The PPP routes are public roadways that are most critical to support the movement of DOD equipment from large military installations, in this case JBLM, such that military equipment can be deployed to Strategic Seaports during a national emergency.

Exhibit 12-3 shows the freight corridors within the study area. This includes designations by the Cities of Tacoma and Fife as well as WSDOT's Freight and Goods Classification System (FGTS; WSDOT, 2020b). The FGTS system classifies the state's freight corridors by the amount of annual freight tonnage carried. Lincoln Avenue, Port of Tacoma Road, Taylor Way/54th Avenue E, Pacific Highway E, and I-5 carry more than 10 million tons per year and are therefore classified as T-1 corridors. SR 509, I-705, Portland Avenue, St. Paul Avenue, East D Street, and River Road E/SR 167 among others carry between 4 and 10 million tons per year and are therefore classified as T-2 corridors. Together, these two classifications are considered to be Strategic Freight Corridors by the Freight Mobility Strategic Investment Board (FMSIB), an important designation that determines FMSIB grant eligibility due to their status as "transportation corridors of great economic importance within an integrated freight system."

Exhibit 12-2 Functional Classification of Roadways for the Study Area

Source: City of Tacoma, City of Fife, Department of Defense, 2020. Data compiled by Fehr & Peers, 2021.

Exhibit 12-3 Freight Corridors Within the Study Area

Source: City of Tacoma and WSDOT, 2020. Data compiled by Fehr & Peers, 2020.

Traffic Operations

To evaluate existing traffic operations within and along the regional network serving the Tideflats subarea, the project team relied on current observations of the study area and reviewed previously completed plans and studies. Those studies included the *Tideflats Area Transportation Study* (2012), *Tideflats Land Use Transportation Plan* (2014), and *Tacoma Transportation Master Plan* (2013), among other plans and traffic impact analyses. Both the City of Tacoma and City of Fife apply a LOS standard of LOS D to intersections within the study area.

The Tideflats roadway system accommodates a substantial amount of truck traffic. It is generated by a variety of uses, including Port of Tacoma terminals, large warehouses and distribution centers within and around the subarea, and industrial businesses. Based on an origin-destination study completed by the NWSA several years ago, Port trucks accounted for less than a third of daily vehicle traffic on roadways within the Tideflats, with the majority being passenger vehicle or non-Port trucks. On regional roadways connecting to the Tideflats, the number of Port trucks typically drops to less than 2 percent of daily traffic, with the exceptions of Pacific Highway South and 70th Avenue E where Port trucks make up roughly 14 percent of daily traffic.

There is also a temporal aspect to the truck traffic generated by Port of Tacoma terminals. Approximately 12 percent of daily truck trips accessing Port of Tacoma terminals occur during the AM peak hour, while only 3 percent access the terminals during the PM peak hour. The majority of truck trips accessing the terminals are spread throughout the day, lessening their overall effect on the surrounding roadway network during the most congested periods of the day.

The roadways connecting the Tideflats subarea to I-5—54th Avenue E, Port of Tacoma Road, and Portland Avenue—experience congestion and queuing leading up to the I-5 interchanges due in large part to the high regional auto and truck volumes and close spacing of intersections. These delay and queuing issues extend north of I-5 along these roadways into the study area. The topography of the area, including multiple peninsulas and the Puyallup River, also contributes to congestion by funneling traffic to a few key corridors. Congestion is especially prevalent on Pacific Highway E between Portland Avenue and Milwaukee Way, as well as on SR 509 on the east and westbound approaches to Port of Tacoma Way. SR 509 also experiences high delay at the intersection with Alexander Avenue.

Because there are few over-water connections to the subarea, traffic generated by the Tideflats area has a limited number of access points to the regional network, which limits mobility and resiliency within the subarea. Based on the NWSA's origin-destination study of trucks accessing Port terminals, roughly one-quarter travel via I-5 to the south, one-quarter travel via the 70th Avenue E/Valley Avenue corridor to the southeast, and one-quarter are bound for nearby industrial areas within the study area such as the Thea Foss Peninsula and vicinity of SR 509 and I-5. The remaining trucks are distributed among routes include Pacific Highway, I-5 to the north, Portland Avenue, Pioneer Way, River Road, and SR 167.

In addition to delay along regional roadways accessing the Port of Tacoma, there is traffic congestion within the subarea itself. Congestion within the port area is most pronounced during the AM peak period. This includes, but is not limited to, trucks arriving early to queue up before accessing the terminals, large warehouses and distribution centers within and around the subarea. These issues are summarized by peninsula, as follows:

- **Thea Foss Peninsula:** The 11th Street bridge between Dock Street and the peninsula experiences high delay. Due to the intersection geometry on the western end of the bridge, large trucks cannot use the bridge so this delay is typically experienced by passenger vehicles or smaller trucks. Additionally, westbound 15th Street as it transitions to East D street experiences delay, and the intersection of Lincoln Avenue and Portland Avenue can be congested during the peak periods.
- **General Central Peninsula (GCP):** Northbound Port of Tacoma Road between Marshall Avenue and E 11th Street can experience high delay during some periods of the day due to terminal accesses along this segment of roadway. For that reason, Port of Tacoma Road was designed to accommodate some truck queuing. In addition, the Port of Tacoma recently opened “Lot F”-- an off-street truck queuing area bounded by Port of Tacoma Road, Maxwell Way, Thorne Road and E 19th Street which is designed to serve trucks waiting to enter the Husky and WUT terminals and thereby minimize queues on northbound Port of Tacoma Road. This strategy helps to reduce effects on public roadways and creates efficiencies for port operators, however this requires sufficient space outside the main terminal area. Lincoln Avenue experiences congestion between Portland Avenue and E Marc Street/Lincoln Avenue Loop with high signal delay at the intersections at either end. This condition follows a typical commuting pattern with eastbound congestion in the morning as employees are traveling to worksites on the GCP and westbound congestion in the afternoon.
- **Blair-Hylebos Peninsula:** Taylor Way experiences congestion between SR 509 and Lincoln Avenue. North of Lincoln Avenue, there can be northbound queuing in the morning at the access to MacMillan-Piper Inc.

In addition to major roadways within the study area, it is important to consider delay on the I-5 and I-705 freeways. While these freeways are critical for local Tideflats access, they serve users throughout the Puget Sound area and beyond and are therefore predominantly affected by regional traffic and travel patterns. Frequent bottlenecks on southbound I-5 between I-705 and SR 16 cause congestion along I-5 as well as queues stretching to Portland Avenue and the ramps to I-705. Another challenging stretch of southbound I-5 occurs between 54th Avenue E and Port of Tacoma Road where high volumes converge from both the on-ramp and the mainline. I-705 generally operates efficiently with the exception of moderate congestion near the 9th Street on-ramp. Incidents that disrupt traffic flow on these freeways, as well as along SR 509, can limit or completely sever access to the GCP for hours at a time. The Port of Tacoma and the City of Tacoma collaborated on an ITS Strategic Plan that identifies potential improvements to the signals and corridors in the Tideflats subarea. These improvements could potentially address some of the existing delay and queuing issues presented above. Many of these potential improvements have

not yet been implemented and therefore could be revisited as strategies for the Tideflats Subarea Plan to improve traffic operations and safety.

Freight

The Tideflats is served by three federal navigation channels including the Blair Waterway, the Hylebos Waterway, and the City Waterway (Thea Foss). These waterways are maintained by the US Army Corps of Engineers so that they can support the movement of commerce, national security, and recreation. Other waterways in the Tideflats including the Sitcum Waterway and the Milwaukee Waterway also support maritime commerce and the Sitcum Waterway supports national security.

Port of Tacoma and NWSA Facilities

The Port of Tacoma owns approximately 2,650 acres in the Tacoma Tideflats area. The Port owns and maintains facilities related to maritime commerce, including facilities for containerized cargo, automobiles, dry bulks such as grain, logs, breakbulk cargo, heavy-lift cargo and project cargoes. Port properties also include warehouse/industrial sites, a grain terminal, and two major areas for industrial development. The NWSA is a marine cargo operating partnership of the Port of Seattle and Port of Tacoma. Under a port development authority, the NWSA manages the container, breakbulk, auto and some bulk terminals in Seattle and Tacoma. The marine facilities described below are owned by the Port of Tacoma but managed by the NWSA. Major port facilities in Tacoma include:

- Six deep water terminals for containerized cargo. Exhibit 12-4 summarizes transportation characteristics of the Port's container terminals.
- Four deep water terminals for bulk and breakbulk cargo:
 - Terminal 7 is used for breakbulk and project cargo and as a secondary location for auto discharge. It includes on-dock rail ramps.
 - East Blair One (EB1) Terminal also includes on-dock rail ramps and is used for breakbulk and project cargo.
 - Blair Terminal is used as main auto offloading location and it has near-dock rail ramps.
 - West Hylebos Terminal was utilized as a bulk log facility with off-dock rail ramps. It is currently vacant but the Port anticipates redeveloping the site in the near future.
- Rail facilities: The Port is served by a rail system that connects most of its major facilities within the Tacoma Tideflats area. South of the Port, the local rail system connects to the BNSF Railway Company (BNSF) and Union Pacific (UP) railroads, which provide transcontinental rail service. Switching and terminal services are provided by Tacoma Rail, which is a division of Tacoma Public Utilities. Three on-dock intermodal rail yards and one near-dock intermodal rail yard are located in the Port of Tacoma on the lands in the GCP:

- North Intermodal (NIM) Yard – Provides on-dock access to the Husky Terminal and East Sitcum, with capacity of 76 double-stack cars. Containers can be moved between the terminals and the intermodal yard without leaving Port property or traveling on public right-of-way.
- South Intermodal (SIM) Yard – This near-dock facility is adjacent to the West Sitcum Terminal, with capacity of 80 double-stack cars.
- Hyundai Intermodal Yard – Provides on-dock access to the Washington United Terminals (WUT), with capacity of 52 double-stack cars. The yard is operated by WUT and serves Ocean Network Express (ONE).
- Pierce County Intermodal Yard – Provides on-dock access to the Pierce County Terminal (PCT), with storage capacity of 72 double-stack cars on 12 ramps tracks. The yard is operated by Ports America and serves Evergreen Marine and Italia Marittima.

In addition to those listed, the Marshall Avenue Auto Facility and the Taylor Way Auto Facility serve both rail and truck carriers. The Marshall Avenue Auto Facility is located at the south end of the Central Tideflats. This facility is operated by Auto Warehousing Company (AWC) and serves Port BMW, Kia, Mazda, Mitsubishi, Isuzu, Fuso Trucks, and GM. The Taylor Way Auto Facility is located on the Blair Hylebos Peninsula close to the EB1 Terminal. The facility is operated by Wallenius Wilhelmsen Solutions.

Exhibit 12-4 Transportation Characteristics of Container Terminals

Terminal	Acreage	Berths (#)	Cranes (#)	Truck Gate	Rail
West Sitcum (WST)	108	2	8	8 inbound lanes 6 outbound lanes 6 scales	Near-dock access to the South Intermodal Yard.
Husky Terminal (Terminals 3 & 4)	118	2	8	7 inbound lanes 6 inbound scales 4 outbound lanes 1 outbound scale	On-dock access to the North Intermodal Yard.
East Sitcum (EST)	36	1	4	5 inbound lanes 2 outbound lanes 2 scales	On-dock access to the North Intermodal Yard.
Pierce County Terminal (PCT)	189	2	7	10 inbound lanes 6 outbound lanes 6 scales	On-dock access to the Pierce County Intermodal Yard.
Totem Ocean Trailer Express (TOTE)	48	2	Roll on/Roll off operation uses 3 ramps	5 inbound lanes 4 outbound lanes 4 scales	No rail connection.
Washington United Terminals (WUT)	142	2	6	9 inbound lanes with oversized scales; 4 outbound lanes	On-dock access to Hyundai Intermodal Yard.

Terminal	Acreage	Berths (#)	Cranes (#)	Truck Gate	Rail
2 reversible lanes					

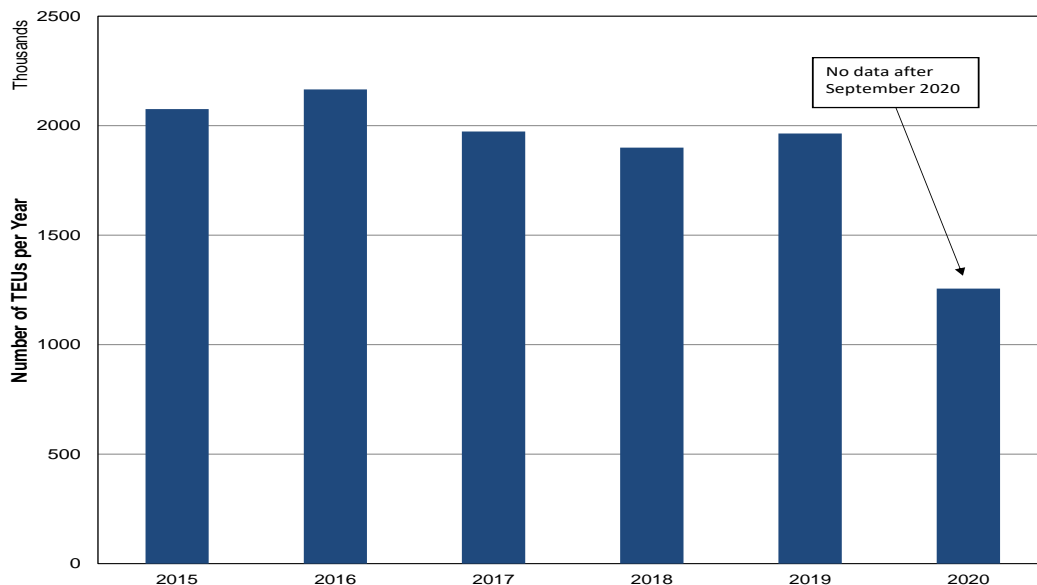
Source: NWSA, Facilities Guide for North and South Harbors, 2020; City of Tacoma, Comprehensive Plan—Container Port Element, 2014.

Terminal Throughput

The NWSA tracks terminals and intermodal rail yard throughput.²² Data for the 5.75 year-period between January 2015 and September 2020 were compiled to determine historical trends in throughput and intermodal use.²³ The NWSA tracks the number of lifts, which reflects a whole container being discharged or set to a ship, as well as the volume of throughput in twenty-foot equivalent units, or TEUs. A standard 40-foot container is equivalent to two TEUs. In recent years, shipments through the Port of Tacoma have averaged 1.80 TEUs per container (Heffron, 2018).

Exhibit 12-5 shows the Port of Tacoma's overall container throughput in TEUs by year. The Port container volumes peaked in 2016 at 2.17 million TEUs per year. In 2019, the throughput was about 1.96 million TEUs per year, very close to the average throughput over the 5.75-year period.

Exhibit 12-5 Container Terminal Throughput, 2016 - September 2020



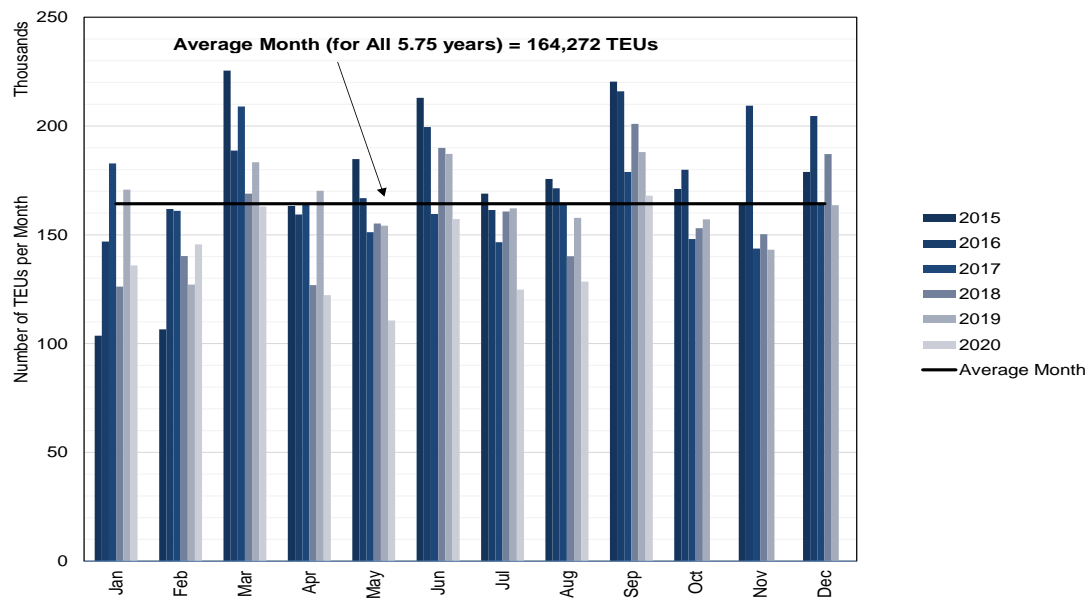
²² Volume of container cargo that passes through a terminal.

²³ A transfer of cargo from one mode to another. In the shipping business, an “intermodal container” generally refers to one that will be transported from or to a ship by rail. The NIM and SIM yards in Tacoma Tideflats allow the direct transfer of containers between rail and ship using yard equipment or short dray movements by truck.

Source: NWSA, October 2020. Data compiled by Heffron Transportation, Inc.

Exhibit 12-6 shows the Port of Tacoma's overall container throughput in TEUs by month. The figure shows seasonal variations in port throughput throughout the year with volume peaking typically in September. The average throughput over the 5.75-year period was approximately 164,000 TEUs per month.

Exhibit 12-6 Seasonal Variations in Port's Throughput, 2016 - 2020



Source: NWSA, October 2020. Data compiled by Heffron Transportation, Inc.

Intermodal Throughput

As described above, there are four intermodal yards at the Port of Tacoma. There are two near-dock intermodal yards—the NIM and SIM—that are shared by several terminals, and the ONE and PCT Yards that are on-dock yards within those terminals. The percentage of the Port's throughput that is transported to and from the Port by rail (intermodal) has decreased in recent years. In the past decade, intermodal freight has accounted for 50% to 65% of the Port's throughput, with international cargo having higher intermodal rates than domestic cargo. With the decline in international cargo in recent years, intermodal use has decreased to a current rate of about 43% of the Port's throughput. For the purpose of evaluating existing conditions, it was assumed that intermodal use would rebound to 60% of all throughput.

The number of trains generated by the NIM and the SIM was estimated for the peak direction of travel (eastbound). Train estimates for 2017, when intermodal throughput was highest, were used. These were based on detailed estimates provided for the NIM as part of the *Port of Tacoma GCP Uplands Modernization Program Transportation Technical Report* (Heffron, 2018). That analysis determined that about 2% of the annual lifts occurred in the average week, and of those about two-

thirds (63%) were for eastbound trains. The peak week activity reflected an increase of about 150% above average week conditions. The number of trains would vary depending on the railroad and route. Trains destined over Stevens Pass are typically limited to 7,200 feet, which can accommodate about 530 TEUs; trains through the Columbia Gorge can be up to 9,500 feet, which can accommodate about 720 TEUs.

Based on these metrics, it is estimated that the NIM now generates 6 to 8 trains per week on an average week, and 9 to 12 trains per week during the peak week. The SIM is estimated to generate 3 to 4 trains on an average week and 4 to 6 trains on the peak week. Weekly lift and train estimates are also summarized in Exhibit 12-7.

Exhibit 12-7 Weekly Trains to NIM and SIM, Existing, 2017

Condition/Period	Lifts per Week			Peak Direction Trains per Week ¹
	Eastbound	Westbound	Total	
NIM ²				
Average Week	2,420	1,410	3,830	6 to 8
Peak Week	3,490	2,310	5,800	9 to 12
SIM				
Average Week	1,100	630	1,730	3 to 4
Peak Week	1,650	950	2,600	4 to 6

(1) Range estimated assuming full unit train with 530 TEUs/Train for a 7,200-foot train and 720 TEUs per train for a 9,500-foot unit train. Train lengths assume no engines. Each intermodal lift is assumed to average 1.8 TEUs.

(2) Port of Tacoma, Based on NIM Lifts for 2017. Reported in the Port of Tacoma GCP Uplands Modernization Program Transportation Technical Report (Heffron, 2018).

Terminal Truck Trips

The number of truck trips generated by the Port terminals was derived using factors developed from prior studies. The following assumptions were used to estimate truck trips:

- Average day assumes there are 260 working days per year, which includes some weekend or holidays.
- Design Day volumes are 40% higher than Average Day conditions and reflect the 85th-percentile condition for throughput at a terminal's gates.
- Trucks are generated for non-intermodal containers, which represent 40% of the terminal throughput.
- Average container size is 1.8 TEUs
- Truck trips per non-intermodal lift = 1.87. This accounts for truck gate moves that involved a dual transaction (trucks that drop off one container and pick up a second during the same trip through the terminal). The trip rate also accounts for moves through the gate that may not

involve a lift to or from the ship, which can occur for empty container repositioning, container repair, or additional inspection.

- AM peak hour trips represent 12% of daily trips and PM peak hour trips represent 3% of daily trips.

Assuming an average annual throughput of about 2 million TEUS and 60% intermodal, it is estimated that the collective Port terminals generate about 3,200 truck trips (1,600 enter and 1,600 exit) on an average day, with about 4,480 truck trips (2,240 enter and 2,240 exit) on the Design Day. These Design Day trips exactly match the 85th-percentile truck trips for the first nine months of 2020 that the Port now collects using radio-frequency identification (RFID) tags.

Rail

Two Class I railroads serve the study area: the BNSF Railway (BNSF) and the Union Pacific Railroad (UP). However, east of the Puyallup River, all local switching is performed by Tacoma Rail, a division of Tacoma Public Utilities. Tacoma Rail's service area extends from the Port of Tacoma southeast to Frederickson and other areas of rural Pierce County, as well as freight rail service for South Tacoma and the Lakewood Industrial Park. The Tidelands division of Tacoma Rail serves all four intermodal terminals at the Port of Tacoma:

- North Intermodal Yard (NIM)
- South Intermodal Yard (SIM)
- Pierce County Terminal
- Washington United Terminal

It also serves the Port's breakbulk facilities and about 40 industrial clients, handling commodities such as automobiles, food, forest and building products, metals, minerals, and petroleum products.

The study area includes several other rail yards that support rail activity throughout the Tideflats. These include the Tacoma Rail rail yard bounded by SR 509, Milwaukee Way, Marshall Avenue, and Port of Tacoma Road, which acts as a marshaling yard to feed the various facilities in the Tideflats. There are additional rail yards located in the vicinity of SR 509 and the Puyallup River:

- the BNSF rail yard just west of the Puyallup River and south of SR 509;
- two rail yards adjacent to the MacMillan Piper and Quality Transport facilities west of the Puyallup River and north of SR 509; and
- a rail yard east of the Puyallup River stretching between SR 509 and Lincoln Avenue alongside the Tri-Pak #2 facility.

Although all of the major rail line connections are grade-separated from major highways such as SR 99, SR 509 and I-5, there are many at-grade crossings where the railroad tracks cross local arterials or access roads. At-grade rail crossings are shown on Exhibit 12-8. These have been separated into "Major Crossings," which for the purpose of this study are defined as high volume

crossings of an arterial or major port access route, and “Minor Crossings” that may serve individual business sidings or cross local street.

Exhibit 12-8 Rail Crossings Within the Tideflats Subarea

Source: Fehr & Peers and Heffron Transportation, 2020.

Transit

The study area is served by both Pierce Transit and Sound Transit, providing a mix of bus, light rail, and Sounder commuter rail service. Transit routes are primarily located in the southwest and west parts of the study area including Tacoma Dome Station, and the Pacific Avenue and Commerce Street corridors in downtown. Exhibit 12-9 shows transit routes in the study area.

Tacoma Dome Station is a transit hub where Sound Transit Express, Pierce Transit, Tacoma Link, and Sounder services converge, allowing users opportunities to transfer between services and make local or regional connections. Many of these same services are present on Pacific Avenue and Commerce Street, though not all share the same stops. Exhibit 12-10 shows existing transit routes near the study area.

Exhibit 12-9 Transit Service in the Study Area

Agency	Route Number	Destination	Peak Frequency
Pierce Transit	1	6 th Ave – Pacific Ave	15 minutes
	2	S 19 th St – Bridgeport	20 minutes
	3	Lakewood – Tacoma	30 minutes
	11	Point Defiance	60 minutes
	13	N 30 th St	60 minutes
	16	North End	30 minutes
	28	S 12 th St	30 minutes
	41	S 56 th – Salishan	30 minutes
	42	McKinley Ave	30 minutes
	45	Yakima	30 minutes
	48	Sheridan – M St	30 minutes
	57	Union – S 19 th St – Hilltop	30 minutes
	63	NE Tacoma Express	2 daily trips
	400	Puyallup – Downtown Tacoma	30 minutes
	500	Federal Way	30 minutes
	501	Milton – Federal Way	60 minutes
Sound Transit	590	Tacoma – Seattle	20 minutes
	594	Lakewood – Seattle	20 minutes
	Tacoma Link	Tacoma Dome Station – Theatre District	12 minutes
	Sounder	Seattle – Lakewood	20 minutes

Source: Pierce Transit, 2020; Sound Transit, 2020.

Exhibit 12-10 Existing Transit Network, 2020

Source: Pierce Transit and Sound Transit, 2020. Data compiled by Fehr & Peers, 2020.

Making a connection between the Port of Tacoma area and transit can be challenging because the study area's industrial core is not directly served by transit. Tacoma Dome Station is located about 0.3 miles south of SR 509 & East D Street, about a 7-minute walk. From downtown Tacoma, transit users can access the Tideflats area via the E 11th Street/Murray Morgan Bridge, about a 0.5 mile walk from Pacific Avenue to E 11th Street & St. Paul Avenue intersection. From these key access points users need to walk, bike, carpool, or take a TNC to travel within this Tideflats area.

Planning is currently underway for the Sound Transit Tacoma Dome Link Extension project, which will provide a light rail connection between the Tacoma Dome Station and Federal Way. Two new stations in the Tideflats are proposed: at E Portland Avenue and at 54th Avenue E (Fife Station).

Active Transportation

Pedestrian Network

Major roadways within the study area generally have sidewalks on at least one side of the street outside of the Core Industrial Area. However, some of the sidewalks do not meet the City's 5-ft minimum width standard, lack Americans with Disabilities Act (ADA) compliant ramps, and/or do not provide for continuous travel. Within the Core Industrial Area, sidewalks are generally not present except for on portions of selected major roadways, and those that are may be substandard. This creates a challenging environment for pedestrians given the amount and type of vehicle traffic on these roadways.

Marked crossings are primarily located on Puyallup Avenue, in downtown Tacoma, and in Fife at major signalized intersections. Crossing opportunities can be scarce on certain corridors, as found between Portland Avenue E and East E Street on Puyallup Avenue where crossings are 0.8 miles apart. This can be challenging for users accessing bus stops, neighborhood connections, and other facilities such as the Amtrak Station on Puyallup Avenue. Marked crossings are generally not present within the Core Industrial Area. The existing pedestrian network is shown in Exhibit 12-11.

The public can access shoreline at points along Thea Foss Waterway including at Waterway Park and at the City of Tacoma Fire Department facility. The City of Tacoma Shoreline Public Access Plan (2010) describes other possible opportunities to provide public access to waterways in the area while meeting the goals outlined in the Shoreline Master Plan (2019).

Exhibit 12-11 Pedestrian Network Within and Near the Study Area

Source: City of Tacoma and City of Fife. Data compiled by Fehr & Peers, 2021.

Bicycle Network

The study area contains a mixture of bicycle facilities including striped lanes, multiuse trails, and wide shoulders as shown in Exhibit 12-12^{Error! Reference source not found.}. Bicycle lanes are generally only located on corridors connecting to the study area such as E 11th Street, East D Street/McKinley Avenue, while a multiuse trail is located adjacent to the waterways in downtown that provides recreational opportunities. The City of Fife provides east-west bicycle connectivity via a striped bike lane on 12th Street E from 46th Avenue E to 2,000 feet east at the UPS facility entrance. Most major roadways do not have shoulders, requiring cyclists to share the roadway with vehicles.

Roadways within the core industrial areas are generally wide with shoulders, which is beneficial to freight mobility. The wide roadway surface, in addition to lower traffic volumes found in the area, can allow space for bicyclists. However, the lack of street lighting on many internal roadways can lead to visibility challenges between truck drivers and bicyclists. Additionally, bicyclists may not be comfortable sharing roadways with freight vehicles. Rail crossings also present challenges for crossing bicyclists.

Exhibit 12-12 Bicycle Network Within and Near the Study Area

Source: City of Tacoma, 2020. Data compiled by Fehr & Peers, 2020.

Parking

Public parking for general purpose vehicles is generally provided at surface parking lots as well as on-street, and there is no managed parking in the study area. Additional facilities are located outside the Industrial/Commercial buffer in the Tacoma Dome area as well as in downtown Tacoma and in Fife, and vendors generally charge an hourly or daily fee for use. Parking at Tacoma Dome Station Park and Ride garage is currently free for the public to use and does not require the purchase of a transit ticket to park. This location experiences high demand in the morning when people arrive to transfer to Sounder service, as well as during events at the Tacoma Dome.

On-street parking is primarily regulated by the City of Tacoma, which requires an hourly fee for parking during the day. Payment is collected via meter or using digital fare media. There are a number of off-street, informal parking areas around Tacoma Dome Station and near the SR 509 corridor that are generally not regularly enforced by parking attendants. On-street parking is not typically provided in the City of Fife. Within the core area, some businesses provide surface lot parking for employees and/or customers. Where dedicated parking is not provided, employees park on-street or on the shoulder of roadways. Freight vehicles also use these on-street facilities for parking.

Commercial vehicle parking is prohibited along streets in many zoning districts in Tacoma and Fife. Per Tacoma Municipal Code Sec. 11.05.200, it is unlawful to park any commercial vehicle over 10,000 pounds Gross Vehicle Weight on any public right-of-way in a Residential District or Mixed-Use Center District for over one hour unless engaged in legitimate loading/unloading activities. Fife Municipal Code Sec. 10.24.065 restricts parking and storage of vehicles in city streets. The Tideflats industrial areas is one area where on-street commercial vehicle parking is allowed; however, many of the streets have inadequate shoulders or parking lanes to accommodate parking. Trucks have been observed to park along sections of Milwaukee Way, Thorne Road, the Lincoln Avenue Loop, Alexander Avenue E and some of the local industrial streets.

Private truck stops and rest areas provide long-haul truck drivers with safe places to take their mandatory rest breaks. WSDOT's 2016 Truck Parking Study identified state-wide truck parking issues and unmet parking demand along Washington's top three corridors (I-5, I-405, and I-90). This study also acknowledges that parking issues are most prevalent in urban areas. Closest to the study area, WSDOT's truck parking study identified three private truck stops and one WSDOT operated safety rest area along the I-5 corridor between Federal Way and Lakewood. One of those private truck stops is located on Port of Tacoma Road north of Pacific Highway E.

While some larger firms provide off-street parking lots for their truck drivers, many drivers own their own trucks and contract with brokers for larger accounts. Because many of those drivers are unable to drive their truck home, they park in the Tideflats area overnight and commute in using their personal vehicle. This results in high demand for overnight truck parking. While there is

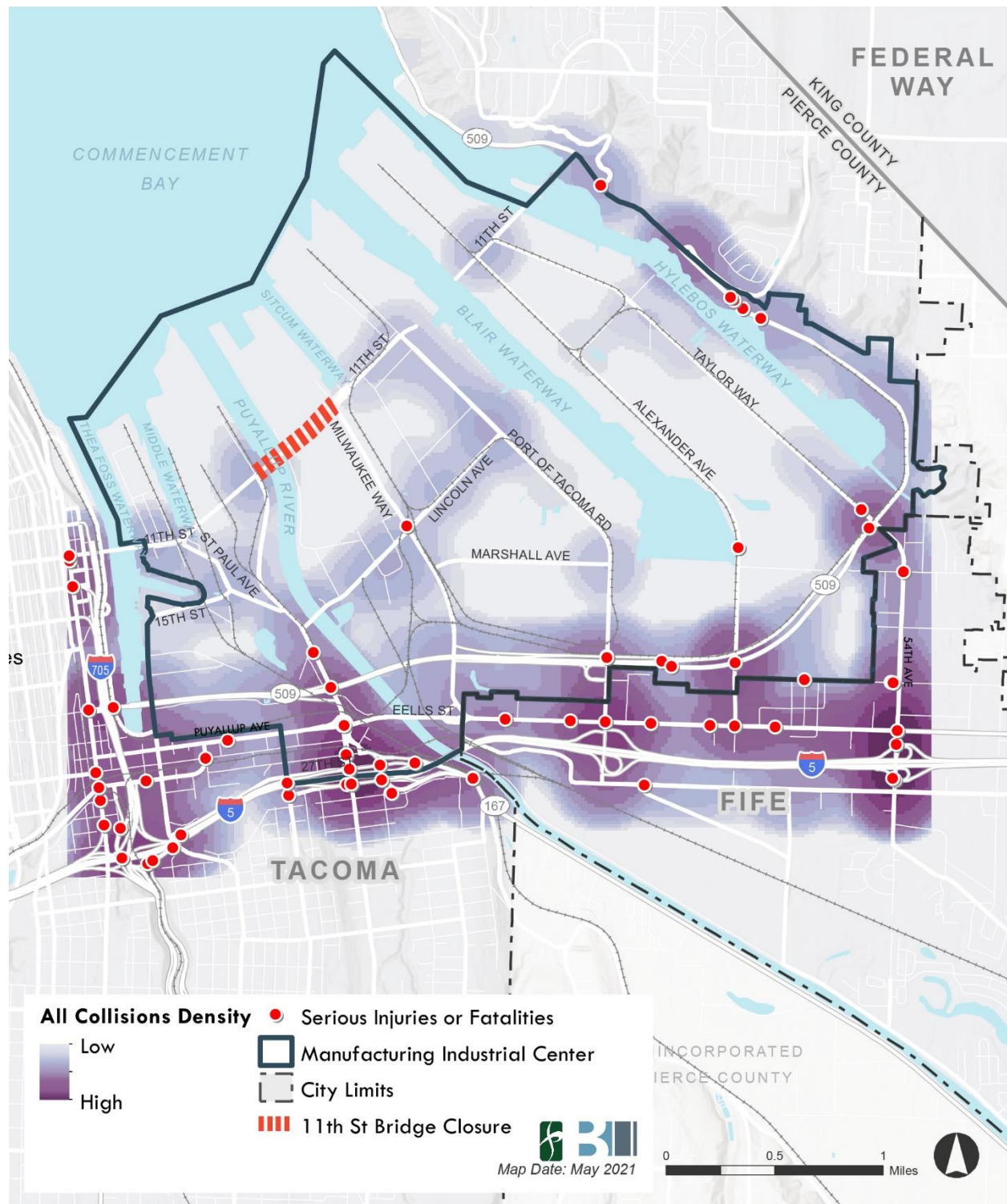
generally enough supply to accommodate the current demand, it is critical to maintain the existing supply and perhaps explore options to support truck parking through a more centralized approach. This could address issues that arise when overnight parking conflicts with adjacent businesses or complaints regarding trucks parking for long periods of time. Shorter term truck queuing and staging is also an important issue in the Tideflats, as discussed in the Traffic Operations section.

Safety

To determine potential areas of safety concern within the study area, five years of collision data (2015-2019) were obtained from WSDOT. Exhibit 12-13 shows a heat map of total collisions within the study area, with fatal or serious injury collisions superimposed. As is typical, collisions tend to be highest where roadways intersect and higher volume facilities tend to have higher numbers of collisions. Major collision hot spots stretch along Portland Avenue, Port of Tacoma Road, and 54th Avenue/Taylor Way between SR 509 and their respective I-5 interchanges, where traffic volumes are higher due to the combination of regional background traffic and Tideflats-related traffic. There are also hotspots at each of the major intersections along SR 509, as well as along Lincoln Avenue and along Marine View Way north of the Port of Tacoma. Lincoln Avenue and Marine View Way, as well as other smaller hot spots observed on the Port of Tacoma, experience lower volumes than roadways near the I-5 interchanges. Fatal and serious injury collisions are concentrated on arterials with larger traffic volumes and higher speeds outside the Core Industrial Area.

There were 15 rail-related collisions during the 2015-2019 period; the locations are mapped in Exhibit 12-14. Ten of the collisions resulted in no injuries, four resulted in minor injuries, and one resulted in a fatality. The fatal collision occurred near the SIM at the Milwaukee Way crossing just northwest of Lincoln Avenue. There were two other fatal/serious injury collisions that occurred in close proximity to rail crossings, but review of the individual records suggested that rail was not involved.

As noted in the Traffic Operations section, the Port of Tacoma and the City of Tacoma collaborated on an ITS Strategic Plan that identifies potential improvements to the signals and corridors in the Tideflats subarea. These improvements could potentially improve safety at some of the locations discussed above. Many of these potential improvements have not yet been implemented and therefore could be revisited as strategies for the Tideflats Subarea Plan to improve traffic operations and safety.

Exhibit 12-13 Heat Map of Total Collisions Within the Study Area, 2015-2019

Source: WSDOT data analyzed by Fehr & Peers, 2021.

Exhibit 12-14 Rail-Related Collisions Within the Study Area, 2015-2019

12.3 Key Findings and Implications for Plan

- Roadways that connect I-5, Pacific Highway E, and SR 509 to the study area experience high levels of vehicular delay and queuing, as Tideflats-related traffic accesses regional facilities that are congested for long periods of the day. Within the Tideflats area, localized congestion can develop during shorter high activity periods at specific warehouses, distribution centers, or terminals.
- Congestion on I-5 is present on segments connecting to I-705 and between 54th Avenue E and Port of Tacoma Road, which can slow the movement of freight to and from the study area.
- Truck queuing on the public right-of-way can be an issue during certain periods of the day. Off-street truck queuing facilities, similar to the Port's Lot F facility, could minimize the queuing that occurs on public roadways.
- The Port of Tacoma Road and 54th Avenue E/Taylor Way corridors serve as essential PPP routes connecting JBLM via I-5 to the Port of Tacoma. Studies have found that these roadways currently provide adequate access as part of the Strategic Highway Network, but it will continue to be essential ensure large deployments can be supported along these corridors.
- Many of the roadways in the study area, both local and regional, are classified as Strategic Freight Corridors by the Freight Mobility Strategic Investment Board (FMSIB), meaning they are transportation corridors of great economic importance eligible for FMSIB grants.
- Limited over-water connections to the Tideflats subarea limit mobility and resiliency within the subarea.
- There is substantial rail infrastructure within the study area to support the intermodal terminals and other facilities. With this infrastructure come many at-grade crossings that can delay vehicle traffic along local arterials and access roads and create the potential for conflicts between trains and other users in the right-of-way.
- The Tacoma Dome Station is a key regional transportation facility where Pierce Transit and Sound Transit services converge and that generates many regional commute trips. Tacoma Dome Link Extension will bring additional light-rail service to the station area by 2030. The industrial core of the study area is not currently served by transit.
- Sidewalks are generally present on one or both sides of the roadway on streets outside the industrial area, however there are issues with connectivity, substandard condition and/or width, and lack of ADA ramps at crossings. Additional street lighting and crossings could improve the pedestrian environment. Pedestrian facilities are lacking within the industrial areas.
- There are gaps in the pedestrian and bicycle networks, with the primary needs being improving local connections to land uses within the Tideflats as well as addressing major gaps between non-industrial uses that are separated by the Tideflats (for example, Downtown, Northeast Tacoma, and Fife).

The study area currently has an abundance of both on and off-street parking for general purpose vehicles outside of the industrial area, though demand is high in certain areas like the

Tacoma Dome during certain times of day. Parking options for large trucks, which are a critical component of the freight activity in the subarea, are more limited.

13 PUBLIC SERVICES

This section documents existing levels of service and estimated needs and demand for police services, fire/emergency medical response, and parks and recreation facilities serving the study area. Exhibit 13-1 lists the public services analyzed here and notes what service plans or capital planning documents guide those services.

Exhibit 13-1 Public Services Included in this Baseline Report

Service	Provider	Guiding Documents
Police Protection	City of Tacoma Police Department	<ul style="list-style-type: none"> ■ Tacoma Police Department Calls for Service ■ Washington Association of Sheriffs and Police Chiefs Crime in Washington Annual Reports, 2015-2019 ■ Tacoma Capital Facilities Program, 2021-2026 (proposed) ■ One Tacoma Comprehensive Plan, 2019
Fire/EMS Protection	City of Tacoma Fire Department	<ul style="list-style-type: none"> ■ Tacoma Fire Department Annual Reports, 2015-2019 ■ Tacoma Capital Facilities Program, 2021-2026 (proposed) ■ One Tacoma Comprehensive Plan, 2019
Parks	City of Tacoma Public Works Department and Metro Parks Tacoma	<ul style="list-style-type: none"> ■ Metro Parks Tacoma Mission-led Comprehensive Plan, 2016 ■ Metro Parks Tacoma Strategic Master Plan, 2018 ■ Metro Parks Tacoma 2019-2020 Budget and Draft 2021-2022 Budget ■ Tacoma Capital Facilities Program, 2021-2026 (proposed) ■ Passive Open Space Restoration Plan, 2016 ■ One Tacoma Comprehensive Plan, 2019

Sources: BERK, 2020.

13.1 Police

The Tacoma Police Department (TPD) provides law enforcement for the City of Tacoma, including the Tideflats study area. The Department is focused on community-oriented policing, relationship-building, and reducing crime through effective partnerships and is organized into three bureaus (Tacoma Police Department, 2020; City of Tacoma, 2020):

- **The Administrative Services Bureau** oversees the Internal Affairs Section, which is responsible for the investigation of police conduct and citizen complaints, and the Support Services Division, which manages the training, recruitment, hiring, accreditation, finance, crime analysis, information technology, public information, and community relations functions.
- **The Investigations Bureau** conducts follow-up investigations of crimes against persons and property, prioritized by the seriousness of the offense, availability of personnel, and factors related to the solvability of crimes, patterns, and trends. The Violent Crimes Section is comprised of the Homicide/Aggravated Assaults Unit and Special Assaults Unit. The Major Crimes Section

investigates career criminals, financial crimes, juvenile/domestic violence, and arson. The Special Investigations Section handles narcotics and vice related criminal activity. The Forensic Services Section is responsible for processing crime scenes and collection of evidence. The Investigations Bureau is also responsible for oversight of the Hazardous Environment Team.

- **The Operations Bureau** is comprised of the Patrol Division and Community Policing Division. The Patrol Division provides 24/7 patrol coverage within the City of Tacoma. Patrol Officers respond to emergency and non-emergency calls for service and conduct initial investigations of crimes. The Community Policing Division focuses on prevention and crime reduction through innovative, proactive, and collaborative efforts with the community and various public and private entities. The bureau plans special events for the Police Department and oversees Homeland Security which includes the Specialty Teams to include, SWAT, Bomb Squad, Special Response Team, Marine Services Unit, K-9, Search and Rescue, and Dive Team.

TPD is accredited by the Commission on Accreditation for Law Enforcement Agencies (eight law enforcement agencies and three communications centers in Washington and about 2% of agencies nationwide hold this accreditation). The accreditation assures the Department's policies and procedures, management, operations, and support services meet the highest standards of contemporary law enforcement (Tacoma Police Department, 2020). TPD received their initial accreditation on November 20, 2010 and has been reaccredited twice since in 2013 and 2016 (CALEA, 2020).

TPD's service area is comprised of four sections (Sectors) each divided into four subsections (Districts) within the city. The Tideflats study area falls within District 1-4 in Sector 1. The Port of Tacoma has its own security team with port officers that monitor facilities, rail and road systems, respond to calls, and have authority to access all marine terminals and cargo at the Port. The port patrol coordinate with many government agencies that also provide public services in the Tideflats. Enforcement officers commissioned by the Puyallup Tribe also enforce Puyallup Tribal Law over the native population and Tribal lands within the Survey Area Boundary. See Exhibit 13-3 below.

Port of Tacoma

The Port of Tacoma has its own security team with port officers that monitor facilities, rail and road systems, respond to calls, and have authority to access all marine terminals and cargo at the Port. The port patrol coordinate with many government agencies that also provide public services in the Tideflats.

Current Conditions

Personnel

For the 2019-2020 biennium, TPD has 406.3 authorized full-time equivalent (FTE) employees including 207.3 FTE patrol service officers, 19 homicide or special assault officers, 5 homeless outreach team members, and several administrative or support service specialists (City of Tacoma, 2018). Emergency calls for Tacoma police are dispatched through South Sound 911, a regional dispatch center for Pierce County.

Calls for Service and Offenses

The Tacoma Police Department's call load continues to increase as development occurs. Exhibit 13-2 lists districtwide calls for police service in Tacoma over the last five years (2015-2019).

Exhibit 13-2 Five-year Calls for Service, Group A Offenses, and Group B Arrests, 2015-2019

	2015	2016	2017	2018	2019	5-Yr Average
Population	202,300	206,100	208,100	209,100	211,400	
Calls for Service	???	???	???	???	???	per capita (per 1,000 residents)
Group A Offenses	27,708	29,484	26,250	26,957	27,968	0.13 per capita (133.48 per 1,000 residents)
Group B Arrests	1,895	1,607	1,794	2,260	2,473	0.01 per capita (9.66 per 1,000 residents)

Sources: Personal Communication with , 2020; Washington Association of Sheriffs and Police Chiefs Crime in Washington Annual Reports, 2015-2019; OFM, 2020; BERK, 2020.

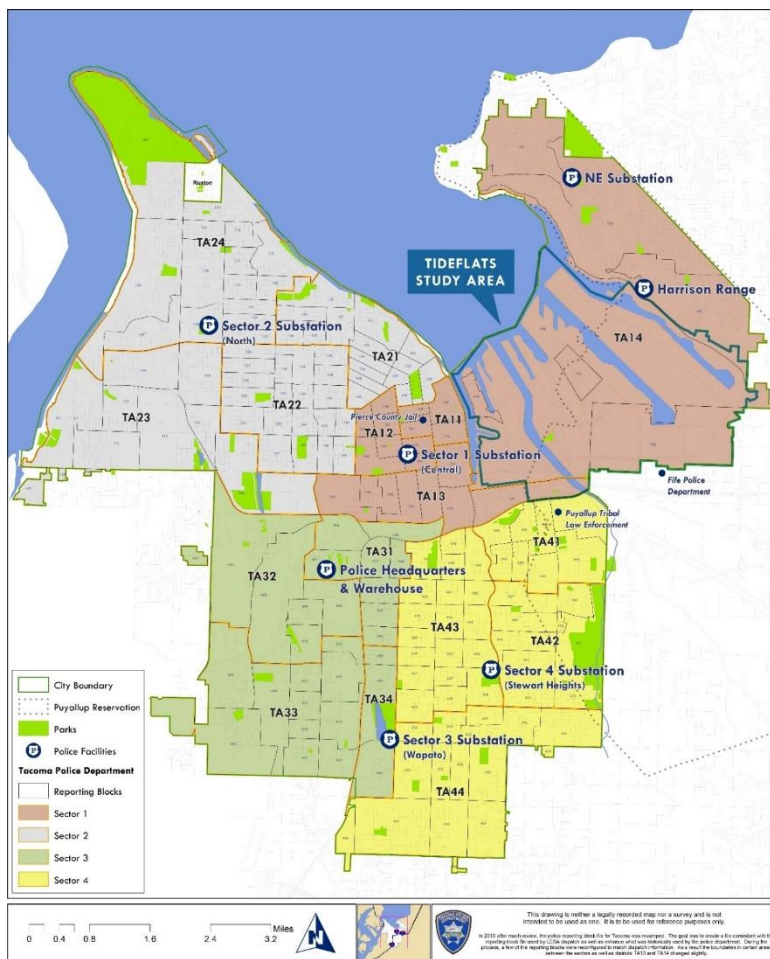
Police responded to calls for service districtwide in 2019, a % increase over 2015. Between 2015-2019, the Department responded to an average of calls per capita (the 5-year average calls per capita). Exhibit 13-2 also shows Group A offenses and Group B Arrests from 2015-2019. The 5-year average Group A offenses and Group B arrests committed per 1,000 residents were 0.13 and 0.01, respectively, or 133.48 Group A offenses per 1,000 residents and 9.66 Group B arrests per 1,000 residents (Washington Association of Sheriffs and Police Chiefs, 2015-2019).²⁴

²⁴ The National Incident-Based Reporting System (NIBRS) divides offenses into two categories: Group A – Incident and Group B – Arrest. Group A offenses collected in the NIBRS program are: Arson, Assault, Bribery, Burglary, Counterfeiting/Forgery, Destruction/Damage/Vandalism of Property, Drug/Narcotic Offenses, Embezzlement, Extortion/Blackmail, Fraud Offenses, Gambling Offenses, Homicide Offenses, Human Trafficking Offenses, Kidnapping/Abduction, Larceny/Theft Offenses, Motor Vehicle Theft, Pornography/Obscene Material Offenses, Prostitution Offenses, Robbery, Sex Offenses, Non-Forcible Sex Offenses, Stolen Property Offenses, and Weapon Law Violations; in Washington State, an additional Group A offense is collected: Violation of No Contact/Protection Order. Group A offenses include statistical data on the incident, all offenses committed, property involved, weapons

Capital Facilities and Equipment

TPD facilities include the Police Headquarters located at 3701 S Pine Street, five substations (one in each sector within the city and one in Northeast Tacoma), a firing range, and a warehouse (Exhibit 13-3 and Exhibit 13-4). Each of the five substation is staffed by a Sector Lieutenant and Community Liaison Officers. Each facility has a public meeting space and some sites also have a shared satellite office area for police partners. All facilities are within Tacoma city limits with a combined square footage of 141,392 feet (City of Tacoma, 2020). The Central and Northeast Substations are closest to the Tideflats study area (Exhibit 13-3).

Exhibit 13-3 Tacoma Police Department Service Sectors and Facilities, 2020



Sources: Pierce County GIS, 2020; City of Tacoma 2021-2026 Capital Facilities Plan, 2020; BERK, 2020.

involved, victim and offender demographics, arrest information, and clearance status. Group B offenses, for which only arrest data are collected, include: Bad Checks; Curfew/Loitering/Vagrancy Violations; Disorderly Conduct; Driving Under the Influence; Drunkenness; Non-Violent Family Offenses; Liquor Law Violations; Peeping Tom; Trespass of Real Property; and All Other Non-Traffic Offenses.

Exhibit 13-4 Existing Law Enforcement Facilities, 2020

Facility	Location	Size or Capacity (sq. ft.)
Police Headquarters	3701 S Pine St	72,740
Sector 1 Substation (Central)	1524 MLK Way	3,600
Sector 2 Substation (North)	5136 N 26 th St	3,600
Sector 3 Substation (Wapato)	1501 S 72 nd St	3,600
Sector 4 Substation (Stewart Heights)	400 E 56 th St	3,600
Northeast Substation	4731 Norpoint Way NE	3,600
Harrison Range	101 McMurray Road NE	3,800
Police/Warehouse	3639 S Pine St	46,852
		Total: 141,392

Source: City of Tacoma 2021-2026 Capital Facilities Plan, 2020.

The TPD holds those lawfully in the custody of police at the Pierce County Sheriff's Department Corrections Bureau, a direct supervision jail located at 910 Tacoma Ave S between S 9th Street and S 11th Street (Exhibit 13-3). The Pierce County Jail has an operational capacity for 1,700 inmates and currently employs approximately 300 correctional staff. The Pierce County Jail is made of two facilities: "New Jail" and "Main Jail." The New Jail was built in 2003 and the Main Jail was built in 1985.

The Puyallup Tribe's Law Enforcement office and a Fife Police station are located to the south of the Tideflats study area (Exhibit 13-3).

Police vehicles are managed by the City of Tacoma's Public Works Facilities Division. The Facilities Division manages approximately 860 General Government non-utility vehicles (including police vehicles), nearly half of which are currently overdue for replacement (City of Tacoma, 2018).

Recent Projects, Planned Improvements, and Identified Future Needs

Several projects were recently completed, are currently under way, or are planned in the City of Tacoma's proposed 2021-2026 CFP to improve police services (City of Tacoma, 2020):

- **Police Headquarter/Fleet Warehouse:** The exterior portion of the warehouse at police headquarters was recently re-sealed and painted with siliconized paint which now prevents water from entering the building through the walls. Interior and exterior lighting upgrades are ongoing at this site as well.
- **Tacoma Police Substations:** All exterior lighting fixtures at the five substations were replaced from high wattage lamps to LED.
- **Harrison Range Improvements:** Harrison Range needs major maintenance and upgrades and the upper range lacks adequate facilities to meet operational needs. As part of a larger expansion project, an initial phase of work was previously funded and includes adding one classroom and two ranges. Improvements are underway but the project was delayed due to

other City projects (excavation is complete at this site and the power and sewer have been installed) – this phase is expected to be completed by the end of 2020. The City of Tacoma’s proposed 2021-2026 CFP calls for an additional \$575,000 of maintenance and upgrades between 2023-2026 though funds are unconfirmed.

- **Float Installation (MSOC):** A new float system at the Marine Security Operations Center (MSOC) at 3301 Ruston Way will allow the Tacoma Police Department and Tacoma Fire Department to moor vessels at the center and enhance maritime response capabilities for the Commencement Bay and south Puget Sound area. The project is fully funded and currently under construction.

Research and planning are also currently in progress to address an identified need for increased parking space at the Police Headquarters campus. The Headquarters building will also need upgrades to its lighting control system and video security system. The proposed 2021-2026 CFP proposes a desired future project for energy efficiency improvements/conservation measures at Police Headquarter, allowing the facility to qualify for LEED EBOM certification – the project is unfunded and anticipated to cost about \$2 million. At the fleet warehouse, TPD anticipates the need to replace the HVAC rooftop units and replace the lighting with LEDs (City of Tacoma, 2020).

Nearly half of the City of Tacoma’s General Government non-utility vehicles (including police vehicles) are currently overdue for replacement. Vehicle replacement cycles that are too long lead to higher operating costs and increased vehicle idleness. Ideal vehicle replacement cycles aim to minimize the overall total cost of ownership by balancing capital replacement cost and operating costs. A funded replacement program stabilizes capital expenditures and provides a sustainable method to replace vehicles at their optimal replacement age. Public Works plans to work with the Office of Budget and Management to develop strategies and identify funding to reinstate the fleet replacement program. Public Works also plans to track the average age of the fleet in relation to optimal replacement age on an annual basis (City of Tacoma, 2018).

Existing Polices and Regulations

Tacoma Municipal Code and Puyallup Tribal Law

The Tacoma Police Department enforces and is subject to various City of Tacoma regulations such as Title 7 Police, Title 8 Public Safety, and Title 11 Traffic.

Enforcement officers commissioned by the Puyallup Tribe enforce various Puyallup Tribal Law regulations such as Title 4 Courts and Procedure and Title 5 Crimes and Offenses.

Level of Service

Policy PFS–4.3 of the *One Tacoma* Public Facilities and Services Element establishes an LOS standard of 288.58 square feet of law enforcement facility space per 1,000 people which is not

subject to Tacoma's concurrency standard (City of Tacoma, 2019, pp. 9-12). Based on an estimated city population of 213,300 in 2020 (OFM, 2020), the City would require 61,554 square feet of building space to meet its adopted standard. The City is currently exceeding this standard with an existing space allocation of 141,392 square feet (see Exhibit 13-4). According to *One Tacoma*, the City will consider expanding existing facilities or constructing new facilities as needed to meet projected public safety needs.

Tacoma Police Department Mission and Values

TPD's mission statements is as follows:

To create a safe and secure environment in which to live, work, and visit by working together with the community, enforcing the law in a fair and impartial manner, preserving the peace and order in our neighborhoods, and safeguarding our Constitutional guarantees.

The Department also has seven core values:

- Act with Integrity
- Respect for Our Employees and Citizens
- Service to Our Community
- Accountability for Our Actions and Results
- Team for the Common Good
- Innovate to Better Serve
- Reverence for the Law

Tacoma 2025 Goals and Performance Measures

Tacoma 2025 sets the strategy for the entire City of Tacoma and is being incorporated into every major planning process, including *One Tacoma* and the City budget. TPD is specifically identified as a "City Champion" for the health and safety focus area. The *Tacoma 2025* health and safety community priorities are to improve neighborhood safety, increase active living, and improve overall health (City of Tacoma, 2015).

TPD developed four goals and performances measures to help the City track its progress towards the vision set in *Tacoma 2025* (City of Tacoma, 2018, p. 209). Per the City's Departmental Performance Dashboard, Results253, and the most recently available data measures, TPD has achieved or is on track to achieve these goals (City of Tacoma, 2020).

1. **Diversity of Police Force:** In order to increase the diversity of the Department, the Tacoma Police Department will employ new hiring and recruitment strategies to increase the diversity of the Police Department workforce by 25% to better reflect the diversity of the community by 2025.

Progress: Approximately 23% of TPD's commissioned workforce were people of color as of March 2020.

2. **Public Trust and Community Relationships:** In order to increase public trust and community relationships, the Tacoma Police Department will increase community outreach to develop partnerships, build public trust, and promote authentic engagement with a focus on underserved communities. The Tacoma Police Department will increase its community outreach 20% by 2025.

Progress: The number of community outreach events held in 2020 exceeds the annual target by more than 400 (624 events as of September versus an annual target of 194 events).

3. **Community Feels Safer:** In order to improve safety, the Tacoma Police Department will work to increase the City of Tacoma residents' perception of safety in the community 20% by 2025.

Progress: 85% of Tacoma residents held a positive view of overall safety at the end of 2017.

4. **Positive Relationships With Youth:** In order to build meaningful relationships with youth, the Tacoma Police Department will employ strategies to expand youth outreach 25% by 2025.

Progress: 3,233 youth outreach events or activities were held during 2019.

13.2 Fire

Fire protection and emergency medical services (EMS) in the Tideflats study area are provided by the Tacoma Fire Department (TFD). The Department is organized into two bureaus with corresponding divisions (City of Tacoma, 2020):

- **The Operations Bureau** oversees the Fire Suppression, Emergency Medical Services, Special Operations, and Fire Communications Center divisions. The Bureau's primary responsibility is to provide fire, medical, hazardous materials, marine, and technical rescue services.
- **The Administration Bureau** oversees the Emergency Management, Fire Prevention, and Training divisions. The Emergency Management Program oversees the City's efforts to prepare for, mitigate against, respond to, and recover from disasters or major emergencies affecting the community. Fire Prevention staff conduct technical inspections required for hazardous and high-occupancy buildings (such as hospitals and multi-family apartment building), investigate fires, issue permits for fire protection systems, and review new construction plans for adherence to fire safety codes. The Training Division is responsible for the design, delivery, and documentation of all educational programs involving department personnel.

The Department serves the cities of Tacoma, Fife, and Fircrest as well as the unincorporated area of Pierce County protected by Pierce County Fire District 10. The service area covers 72 square miles within the city limits and contract areas, 44 miles of shoreline, and 25 square miles of saltwater (Tacoma Fire Department, 2020). TFD's Marine Division serves 32 nautical miles of saltwater shoreline, including the Narrows, Commencement Bay, the Tideflats, and Port of Tacoma.

Current Conditions

Personnel

As of January 2020, the Department employs 439.5 staff, including 391 commissioned personnel and 48.5 non-commissioned personnel (Tacoma Fire Department, 2020). Stations are staffed by 3 battalion chiefs, 16 engine companies, 5 medic companies, 4 ladder companies, and 1 safety officer. Operations personnel also cross-staff 2 fireboats, 1 hazardous materials team, and 1 technical rescue team. TFD stations are staffed daily districtwide by a minimum of 74 fire station personnel 24 hours per day (Tacoma Fire Department, 2019).

Firefighters assigned to engine, medic, and ladder companies serve as first-responders to all emergency incidents, including structure, vehicle, and brush fires. The EMS unit, headed by a medical director, is responsible for administering a two-tiered system of pre-hospital emergency medical care and transport – including Advanced Life Support (ALS) units – and first responder engine, squad, and ladder companies; paramedics provide advanced life support treatment and patient transport to an emergency medical facility. The EMS unit also helps create plans for emergency medicine physicians to respond to the scene of multi-casualty incidents and assist with patient triage, treatment, and disposition (Tacoma Fire Department, 2020). In 2019 firefighter/paramedics staffed five medic companies and three ALS engines (Tacoma Fire Department, 2019). When not responding to alarms, firefighters have a variety of other duties including basic fire code inspections (for residential, commercial, and industrial buildings), pre-fire planning, community presentations on fire prevention, disaster preparedness, and other public safety issues (Tacoma Fire Department, 2020).

Special teams respond to technical rescue, hazardous material, and marine incidents. They also respond to all emergency medical incidents and initiate medical treatment and patient rescue before paramedics arrive. All Tacoma firefighters are trained to the Hazmat Operations level, with over 20 firefighters certified to the Technical Level. The Technical Rescue Team is comprised of 24 technician level personnel and is supported by 50 personnel trained to the Technical Rescue Operations level (Tacoma Fire Department, 2020).

Within the Administration Bureau, emergency management staff coordinate departmental efforts citywide to ensure continued governmental operations during disasters and provides education and training to residents and City of Tacoma employees on disaster preparedness. This group also interfaces with external organizations, including state and federal agencies, to provide a coordinated response and obtain additional resources when necessary. Fire Prevention staff conduct technical inspections required for hazardous and high-occupancy buildings, such as hospitals and multi-family apartment buildings. Personnel within this division also investigate fires, issue permits for fire protection systems, and review new construction plans for adherence to fire safety codes. Training Division staff are responsible for training all new firefighters and conducting ongoing in-service training for all members of TFD; activities of the Training Division

are driven by the specific internal needs of TFD and the regulatory requirements of external agencies (Tacoma Fire Department, 2019; Tacoma Fire Department, 2020).

TFD also operates the Tacoma Fire Communications Center (TFC), a 911 call center providing initial dispatch and emergency incident communications for the Department and its service area, the City of Ruston, and American Medical Response private ambulance (City of Tacoma, 2020). The center is staffed with 17 commissioned personnel, all certified as emergency medical technicians and emergency medical dispatchers. TFC dispatches the closest available appropriate resources to ensure community members are receiving the highest level of care in the shortest amount of time to mitigate an incident (Tacoma Fire Department, 2019).

Calls for Service

The number of calls TFD responds to continues to increase as development occurs. TFD reports on two distinct sets of call data: incidents by initial dispatch type and incidents by the final situation found. Departmental activities are best understood by evaluating both workload (dispatched incidents) and what services were provided (final situation found). Workload data is critical for establishing appropriate staffing levels and the necessary resources to meet requests for emergency service. Final situation found data most accurately explains the frequency that various types of incidents occur within the community and guides prevention efforts. Firefighters responded to 49,595 fire and EMS-related calls districtwide in 2019, a 9.6% increase over 2015 (Exhibit 13-5).

Exhibit 13-5 Five-year Districtwide Calls by Initial Dispatch and Final Situation, 2015-2019

Initial Dispatch Type	2015	2016	2017	2018	2019
Fire Auto/Alarm	4,519	4,161	4,364	4,613	4,587
EMS	36,731	38,009	37,998	38,761	39,890
Other ¹	4,016	4,613	5,148	4,889	5,118
Total	45,266	46,783	47,510	48,263	49,595

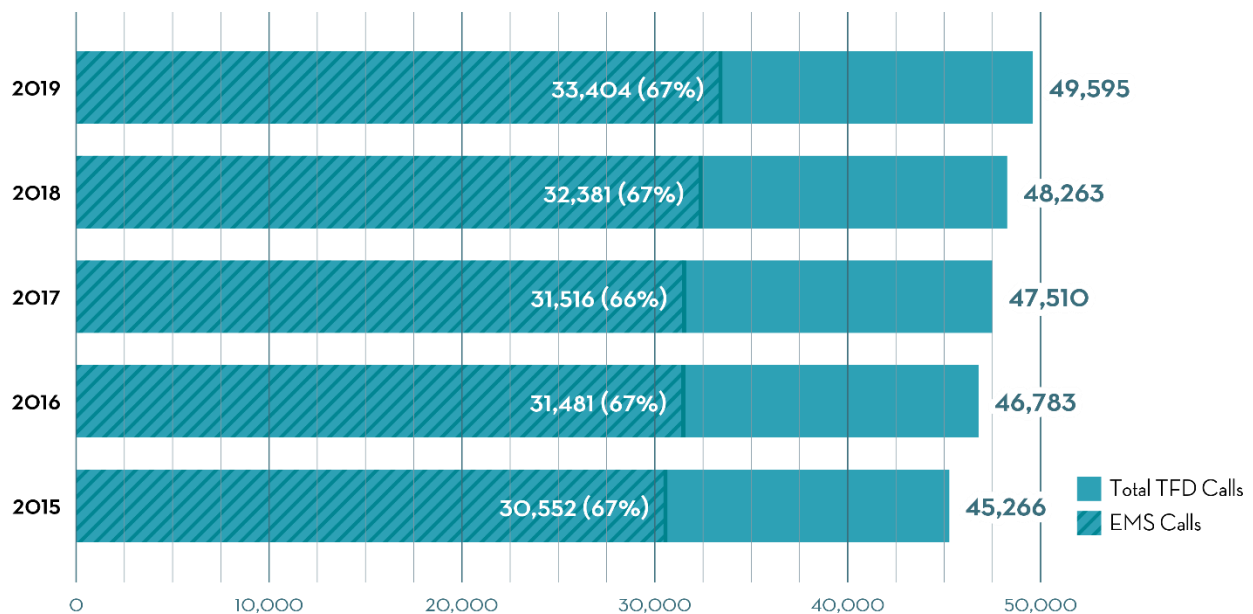
Final Situation	2015	2016	2017	2018	2019
Fire Auto/Alarm	1,306	1,214	1,298	1,476	1,433
EMS	30,552	31,481	31,516	32,381	33,404
Other ¹	13,408	14,088	14,696	14,396	14,758
Total	45,266	46,783	47,510	48,263	49,595

(1) Examples of "other" incidents include search & rescue, hazardous conditions, technical rescue, hazardous materials, and investigations only.

Sources: Tacoma Fire Department Annual Reports, 2015-2019.

Most calls each year are for EMS, whether considering initial dispatch type or the determined final situation (Exhibit 13-6). About two-thirds of calls each year were for EMS incidents (33,404 incidents or 67% in 2019 serving 36,077 patients).²⁵ The top five reasons for requesting help in 2019 were getting hurt, feeling sick, breathing problems, heart issues, and losing consciousness (Tacoma Fire Department, 2019).

Exhibit 13-6 Five-year Total TFD Calls for Service and EMS Call History (Final Situation), 2015-2019



Note: EMS calls are included in the total TFD calls for service. Information presented is based on the final situation found.

Source: Tacoma Fire Department Annual Reports, 2015-2019; BERK, 2020.

Community members also called upon TFD to extinguish 1,433 fires in 2019, an average of four times per day. Despite notoriously “rainy” Northwest weather, the majority of fires occurred outdoors (e.g., grass, brush, and trees) in the summer months; fire calls in 2019 included 1,021 outdoor fires or illegal burnings, 272 structural fires, and 157 vehicles fires (Tacoma Fire Department, 2019).²⁶ Investigators from the Fire Prevention Division were dispatched to investigate the origin and cause of 172 of the 1,433 fires in 2019 – after review, 137 of those investigations were deemed as negligence, incendiary/arson, and mechanical failure, or malfunction as the most common causes (Tacoma Fire Department, 2019).

²⁵ Some EMS incidents had multiple patients, so the patient count is greater than the total EMS incidents.

²⁶ Some fire incidents involved more than one of these type codes, so the total is greater than the dispatched by final situation found.

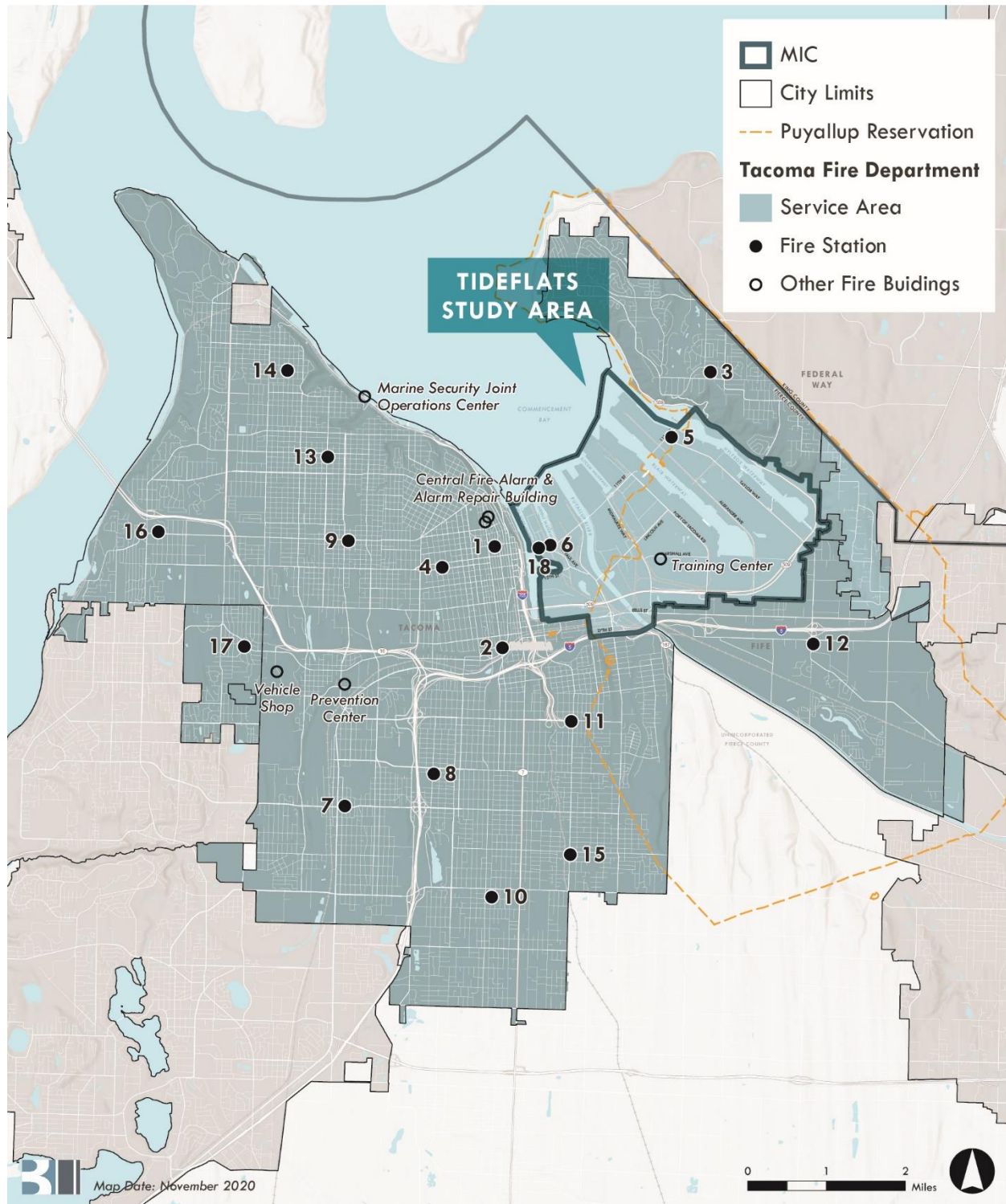
Building Inspections, Plan Reviews, and Code Enforcement

The Fire Prevention Division reviews plans for new construction for adherence to the fire and life safety codes related to their fire protection systems. Permits are issued for fire protection systems and other construction-related activities. High-risk structures or activities such as large public assemblies, the use of explosives, pyrotechnics, liquefied gas, and hazardous materials are managed through the permitting and inspecting processes. Districtwide, TFD processed 1,397 permits in 2019, of which 420 were fire protection permits, 912 were building and site permits, and 65 were land use permits (Tacoma Fire Department, 2019).

The Fire Prevention Division is also responsible for enforcing the Fire Code within the City of Tacoma (see Existing Policies and Regulations below). In 2019, firefighters conducted 7,802 fire safety inspections as part of TFD's Building Inspection Program and 1,217 code enforcement inspections. The most common code violations identified during inspection and re-inspection were related to fire extinguishers and issues with exits/exiting. Other typical violations included improper use of extension cords and electrical outlets without cover plates (Tacoma Fire Department, 2019).

Capital Facilities and Equipment

TFD's inventory of fire assets include 18 fire stations, a marine security joint operations center, an alarm repair building, a central fire alarm, a training center, a vehicle shop, a prevention center, and 36 fire apparatus (Exhibit 13-7 and Exhibit 13-8). Sixteen of the stations are owned by the City of Tacoma and two are owned by Pierce County Fire District No. 10 or the City of Fircrest – Fire Stations No. 12 and 17 located in Fife and Fircrest, respectively – as part of joint service agreements with those agencies to provide fire protection and EMS service. Fire buildings total nearly 143,000 square feet of space and several fire stations are listed on the Local and National Register of Historic Places. Fire Stations 6 and 18, future Fire Station No. 5 (under construction), and the training center are located within the Tideflats study area.

Exhibit 13-7 Tacoma Fire Department Service Area and Fire Buildings, 2020

Sources: Pierce County GIS, 2020; Tacoma Fire Department, 2020; City of Tacoma 2021-2026 Capital Facilities Plan, 2020; BERK, 2020.

Exhibit 13-8 Inventory of Existing Fire Apparatus, 2020

Description	Location	Size or Capacity (units)
Fire Ladder Trucks	Stations 1, 9, 12	3
Fire Tower Truck	Station 8	1
Fire Engines	Stations 1-5, 7-17	16
Fireboats ¹	Station 18	3
Battalion Chief Command Unit	Stations 2, 8, 9	3
Special Air Unit ²	Station 17	1
Hazardous Materials Unit ³	Station 12	1
Water Tender Unit	Fire Garage	1
Tech Rescue Support Vehicle ⁴	Station 8	1
Emergency Medical Service Vehicle	Stations 4, 8, 11, 12, 16	5
Brush Rig	Station 15	1

Total: 36 Units

(1) TFD's Marine Division fleet consists of a surface effect ship (the *Commencement*), a rapid response boat (the *Destiny*), and a 50-foot Metal Craft aluminum fireboat (the *Defiance*). The Fireboats are cross-staffed with the crew of Engine #14.

(2) Special Air Unit #42 is cross-staffed from crew members of Engine #17.

(3) HazMat Unit #44 is cross-staffed with staff from Station #12.

(4) Tech Rescue Support Vehicle is cross-staffed with crew of Engine 8 and Tower 2 at Station 8.

Source: City of Tacoma 2021-2026 Capital Facilities Plan, 2020.

Recent Projects, Planned Improvements, and Identified Future Needs

Planned and existing industrial development in the Tideflats has previously demonstrated a need for enhanced public safety services. In addition, the average age of Tacoma Fire Department's 24 facilities is 67-years and more than half of TFD's buildings need to be remodeled or replaced based on preliminary assessments by TFD and Public Works – many facilities are in need of seismic enhancements, are inefficient or obsolete, and lack capacity for future growth. Three major projects are currently under way or planned in the City of Tacoma's proposed 2021-2026 CFP to improve fire and emergency services (City of Tacoma, 2020):

- **Fire Station #5 (Tideflats):** The City of Tacoma is currently construction a new fire station (Station No. 5) at 3510 E 11th Street to provide fire response, EMS, and hazardous materials capabilities in the Port area. In the 2021-2022 biennium, the City will continue construction on Station 5 and plans to begin service provision to the Port of Tacoma and other industries in the Tideflats by the end of 2021. The project is fully funded.
- **TFD Facility Master Plan:** The TFD Facility Master Plan will develop a comprehensive long-term facilities plan to address fire and EMS service delivery and facility needs as Tacoma and the surrounding areas grow. TFD and Public Works started developing the Plan during the 2019-2020 biennium and as of July 2020, have nearly completed the information phase of the plan process. Still in its preliminary stages, the study suggests that eight stations and four other fire facilities are in poor condition, three stations are in fair condition, and four of

those are not in the best locations to provide services. Overall, more than half of TFD's buildings need to be remodeled or replaced. Next steps will aim to develop a strategy to prioritize renovation and upgrade projects to begin the long-term effort of modernizing TFD, its facilities, and its future emergency management systems. However, due to the financial impacts of the COVID-19 pandemic, this work has been put on hold.

- **Float Installation (MSOC):** A new float system at the Marine Security Operations Center on Ruston Way will also enhance maritime response capabilities for the Commencement Bay and South Puget Sound area. See the Recent Projects, Planned Improvements, and Identified Future Needs section under Police above for a more detailed discussion of this project.

The City of Tacoma is also currently considering if fire impact fees could help meet the need for additional fire protection infrastructure generated by new development. On September 11, 2018, staff from the Public Works, Fire, and Legal departments presented on impact fees to City Council. Council concurred with staff recommendations that additional work be conducted to evaluate how an impact fee program should be tailored to meet the needs of the City of Tacoma, including phase-in periods, the types of fees collected, the total cost to development, and whether or not geography is a consideration (City of Tacoma, 2020). The City recently selected a consultant for this project and intends to begin work soon.

The 2021-2026 CFP proposes a desired future project to provide for improvements to TFD's portfolio of facilities, ranging from repair and replacements, to renovations, to new facilities – the project is unfunded and anticipated to cost about \$185 million (City of Tacoma, 2020, p. 256).

Existing Polices and Regulations

Tacoma Municipal Code

All new development is required to meet City of Tacoma development regulations as well as the International Building Code and International Fire Code (IFC). Rules governing fire prevention in the State of Washington and the City of Tacoma are addressed in the IFC with state adopted amendments in [WAC Chapter 51-54A](#). In addition to the requirements detailed in the 2018 IFC, the City of Tacoma has also adopted its own local amendments that can be found in Title 3 Fire, Chapter 3.02 of the Tacoma Municipal Code. The Tacoma Fire Department enforces and is subject to various City of Tacoma regulations such as Title 3 Fire, Title 8 Public Safety, and Title 11 Traffic, Title 13 Land Use Regulatory Code.

Level of Service

Policy PFS-4.3 of the *One Tacoma* Public Facilities and Services Element establishes an LOS standard of 0.109 apparatus per 1,000 people which is not subject to Tacoma's concurrency standard (City of Tacoma, 2019, pp. 9-12). Based on an estimated service area population of

231,300 in 2020,²⁷ TFD would require a little over 25 apparatus to meet its adopted standard. The Department currently meets this standard with a total of 36 apparatus (see Exhibit 13-8).

Tacoma 2025 Goals and Performance Measures

Tacoma 2025 sets the strategy for the entire City of Tacoma and is being incorporated into every major planning process, including *One Tacoma* and the City budget. TFD is specifically identified as a “City Champion” for the health and safety focus area. The *Tacoma 2025* health and safety community priorities are to improve neighborhood safety, increase active living, and improve overall health (City of Tacoma, 2015).

TFD developed four goals and performances measures to help the City track its progress towards the vision set in *Tacoma 2025* (City of Tacoma, 2018, p. 124). Per Results253 and the most recently available data measures, the Department is on track to achieve its diverse workforce goal while additional improvements are needed to achieve the other three goals (City of Tacoma, 2020).

5. **Loss of Life and Property From Fire:** In order to increase public safety, the Tacoma Fire Department will provide community outreach education to eliminate the loss of life from fire and reduce the value of property loss 25% by 2025.
Progress: As of October 2020, 230 structural fires have occurred in 2020, a little more than 80% of the year-end target of 280 or less structural fires.
6. **Emergency Medical Service Incidents:** In order to improve the ability of firefighters to respond to true medical emergencies, the Tacoma Fire Department will reduce the number of EMS dispatches 15% by 2025.
Progress: Non-emergency medical response incidents in 2020 exceed the year-end target by over 1,600 (4,957 incidents as of November versus an annual target of 3,299 incidents).
7. **Tacoma Fire Department’s Commissioned Workforce Diversity:** In order to increase equity, the Tacoma Fire Department will employ recruitment strategies aimed to diversify the commissioned workforce of the Fire Department to reflect the (racial and gender) demographics of the community by 2025.
Progress: Approximately 26% of the Department’s commissioned workforce were people of color as of September 2020
8. **False Alarms:** In order to improve the Department’s response time to emergency incidents, the Tacoma Fire Department will reduce the number of false alarm incidents 25% by 2025.
Progress: False alarm incidents in 2020 exceed the year-end target by over 600 (1,793 incidents as of October versus an annual target of 1,175 incidents).

To reduce loss of life and property from fires, TFD plans to increase participation in education classes and strive to meet response time goals to fires, which should help reduce the loss of life

²⁷ The City of Tacoma’s estimated population is 213,300 as of April 1, 2020 (OFM, 2020). TFD also provides contracted fire and EMS protection to Fircrest, Fife, and Pierce County Fire District 10 which adds a population of approximately 18,000 (Tacoma Fire Department, 2020).

and property from fire damage. In addition, the Department plans to connect frequent users of the 911 system with alternative community resources through the TFD Cares program and provide additional EMS prevention education to the community to reduce non-emergency medical response incidents. As of January 1, 2019, a penalty of \$150 for a single-family home or duplex building and \$250 for a commercial/industrial building is charged for each response determined to be a false alarm; the Department will also educate fire alarm system owners on the proper maintenance and use of their system to reduce false alarm incidents (City of Tacoma, 2020).

Tideflats Emergency Response Plan (2016)

The Tideflats Emergency Response Plan was developed in 2016 to address unique emergency response problems faced in the study area, specifically (Tacoma Fire Department, 2016):

- A mix of land uses and operations that have the potential for serious fire or EMS emergencies.
- Historically increasing emergency response times to the Tideflats.

Several scenarios were tested in the plan to analyze response time sheds based on 2020 and 2035 conditions. None of these scenarios explicitly tested the new fire station (Station No. 5) currently under construction at 3510 E 11th Street. However, two scenarios analyzed a new station at the current training center or another suitable nearby location and found either would provide extensive coverage throughout the central Tideflats, even with the 11th Street bridge closed.

The plan therefore recommended a new fire station be built on Marshall Avenue at the existing training center or another suitable nearby location to allow full emergency response service to properties along Port of Tacoma Rd, connecting streets, and the Thea Foss area when combined with service from Station No. 1 (Tacoma Fire Department, 2016, p. 34). Station No. 5 will provide fire response, EMS, and hazardous materials capabilities in the Port area and addresses previous gaps in reliable coverage along the Blair-Hylebos Peninsula (Tacoma Fire Department, 2016, pp. 24-29). The new float system at the MSOC on Ruston Way will also enhance TFD's maritime response capabilities.

In addition to a new station, the Tideflats Emergency Response Plan also makes specific transportation infrastructure investment, staffing, and operations recommendations to improve service in the area.

13.3 Parks

A limited number of residents live within the study area (approximately 350 people or less than 0.2% of the city's total population; see Chapter 9, **Population, Employment, and Housing**). The western portion of the study area between the Thea Foss Waterway and Puyallup River is generally within $\frac{3}{4}$ mile of active recreation facilities located in Downtown or south of I-5.

Park and open space services in Tacoma, including the Tideflats study area, are provided by the City of Tacoma Public Works and Environmental Services (ES) departments and Metro Parks Tacoma (Metro Parks or MPT). For City-owned facilities, the City of Tacoma's proposed 2021-2026 CFP provides an inventory of existing facilities, forecast of future needs, proposed projects, and financing for proposed projects. The 2018 Strategic Plan (an update of the previous Green Vision 2030 plan) provides the same information for Metro Parks Tacoma, in combination with Metro Parks Tacoma's current and draft Capital Improvement Plan (CIP).

The City of Tacoma and Metro Parks Tacoma together manage developed parks and natural areas, as well as local and regional trails, the urban tree canopy, and community gardens; programs are offered for all ages at community centers, swimming pools, and other recreational facilities (City of Tacoma, 2019). There are approximately 1,480 acres of active open space and parks and 3,900 acres of passive open space (including undeveloped private property) distributed throughout the City of Tacoma (City of Tacoma, 2017; City of Tacoma, 2020, p. 93):²⁸

- Active open spaces and parks are lands intended to meet community needs for a wide range of recreational activities such as playing team sports, practicing individual physical activities (e.g., running, bicycling, or using play equipment), having a picnic, hiking, walking, and hosting events and classes.
- Passive open space includes properties that function in a healthy natural state for many public benefits including, but not limited to, stormwater management. Generally, these areas are undeveloped and covered with vegetation, and many of these areas have steep slopes. Most sites provide or have the potential to provide benefits to stormwater quantity and quality and many operate under regulations in the City's Critical Areas Preservation code. They sometimes require improvements, maintenance, and monitoring.

²⁸ Public Works is engaged in active open space policy development and provides resources for active use and public access components within parks and active open space areas. Public Works and Metro Parks collaborate on important services such as maintenance, programming, and development of active open spaces within the city. The Environmental Services Department (ES) acts as steward of City-owned passive open space and has assessed and prioritized approximately 500 acres for various improvements, maintenance, and monitoring. ES proactively restores and manages key open space areas as well as responds to complaints (City of Tacoma, 2020, p. 93).

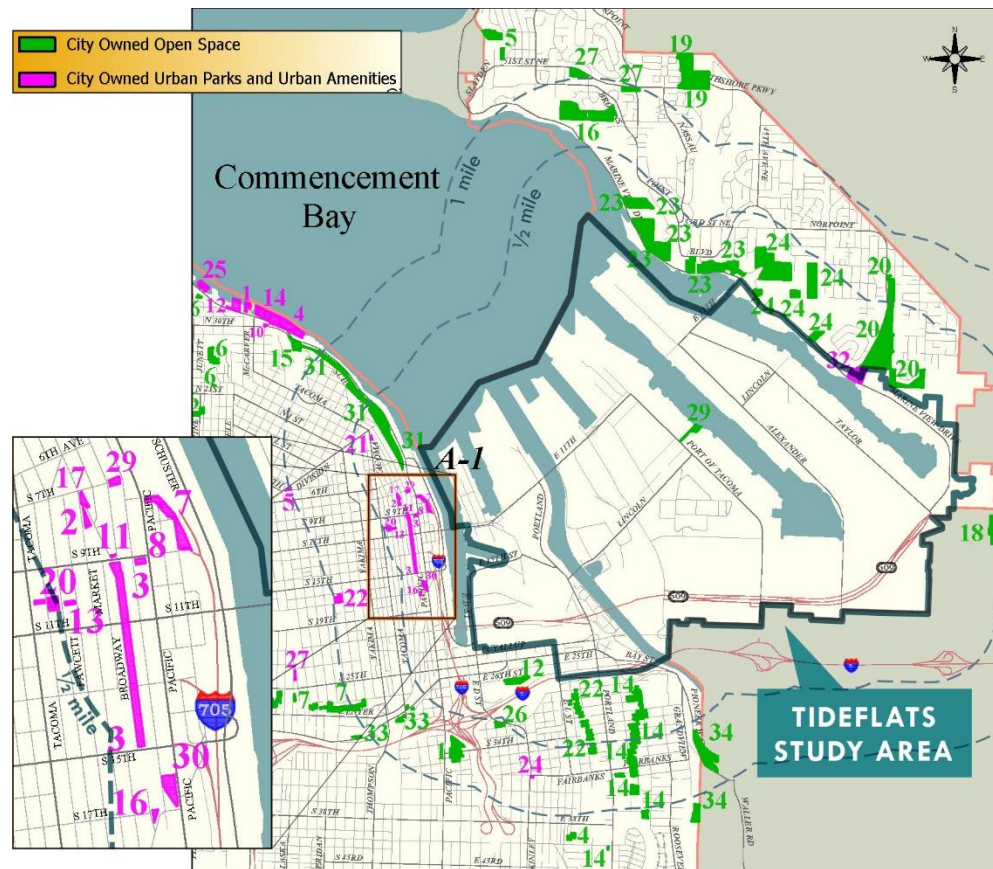
Current Conditions

Parks and Open Space

Existing City of Tacoma owned facilities throughout the city include 34 urban parks and urban amenities (totaling 704.03 acres) and 484.28 acres of open space (City of Tacoma, 2017; City of Tacoma, 2019; City of Tacoma, 2020, pp. 300-302). Exhibit 13-9 maps existing City-owned urban parks, urban amenities, and open space near the Tideflats study area. Urban park or amenity facilities totaling 7.33 acres and open space totaling 241.29 acres are within 1 mile of the Tideflats study area – one urban park (View Point Park) and one open space (qwiqwəlut “Little Marsh” formerly known as Rhone Poulenc) are within the study area.

Exhibit 13-10 maps existing Metro Parks facilities near the Tideflats study area; facilities owned partially or fully by the City of Tacoma (also shown on Exhibit 13-9) are denoted with an asterisk. No Metro Parks facilities are within the study area. Julia’s Gulch, a 60-acre site owned by the Port of Tacoma and managed by Metro Parks, borders the northeastern edge of the study area. The site remains green through a stewardship agreement with the City of Tacoma, Schnitzer Steel Industries, and Forterra. Julia’s Gulch is actively being restored to reverse the trend of natural-area decline through such actions as removing invasive species, planting diverse native plants, watering, and mulching (City of Tacoma, 2017). The northern portion of Swan Creek Park is located within 1 mile of the study area. Swan Creek Park is a 373 acre regional facility primarily owned by Metro Parks and Pierce County, though the City of Tacoma owns some parcels as shown on Exhibit 13-9. The majority of this regional park, however, is further than 1 mile south of the study area (Metro Parks Tacoma, 2020).

The Hylebos Natural Area – owned and operated by the City of Fife with the help of volunteer groups – is also located about ½ mile to the southeast of the Tideflats study area (Exhibit 13-13). Several other City of Fife facilities are within 1 mile of the study area, including the Fountain Memorial Park, Fife Swim Center, Fife Senior Center, Centennial Park, Yamamoto Park, and Frank Albert Park Way (City of Fife, 2020).

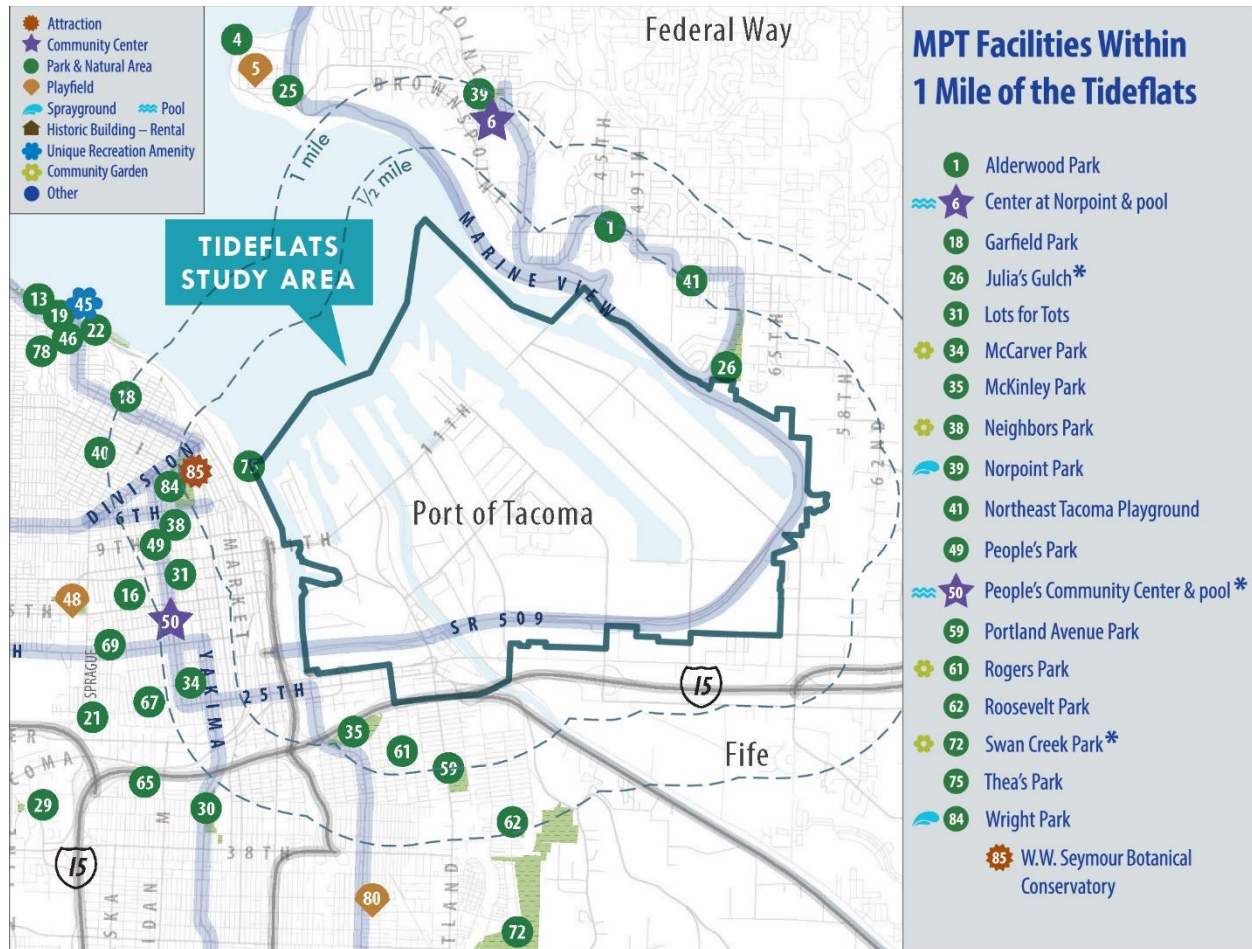
Exhibit 13-9 City of Tacoma Owned Parks and Open Space Near the Study Area, 2020

ID	Description	Distance	Size	ID	Description	Distance	Size
Urban Parks/Amenities ¹				Open Space ²			
2	Ben Gilbert Park	Within ½ mile	0.12	7	Center Street	Within 1 mile	11.91
3	Broadway Plaza	Within ½ mile		12	Dome Slope	Within ½ mile	3.34
7	Fireman's Park	Within ½ mile	1.79	14	First Creek	Within ½ mile	23.55
8	Frost Memorial Park	Within ½ mile	0.13	16	Harbor Ridge	Within 1 mile	20.60
11	Gunderson Point	Within ½ mile		18	Hylebos Creek	Within ½ mile	8.96
13	Harbor View Park	Within ½ mile	0.11	20	Julia's Gulch	Within ½ mile	41.66
16	Jefferson Ave Mini Parks	Within ½ mile	0.02	22	M Street Slope	Within ½ mile	6.77
17	Ledger Square	Within ½ mile	0.10	23	Marine View Drive	Within ½ mile	43.61
20	McCormick Park	Within ½ mile	0.56	24	Marine View Drive East	Within ½ mile	39.22
21	Norton Memorial Park	Within ½ mile	0.10	26	McKinley	Within 1 mile	0.83
22	People's Community Center	Within 1 mile	1.56	27	Northshore Parkway	Within 1 mile	4.46
24	Ray C. Roberts Memorial Park	Within 1 mile	0.14	29 Rhone Poulenc	In Study Area		1.73
29	Spanish Steps	Within ½ mile	0.10	31	Schuster Slope	Within ½ mile	22.36
30	Tollefson Plaza	Within ½ mile	0.60	33	South Tacoma Way	Within 1 mile	0.86
32 View Point Park	In Study Area		2.00	34	Swan Creek	Within 1 mile	11.43

Total: 7.33 acres**Total: 241.29 acres**

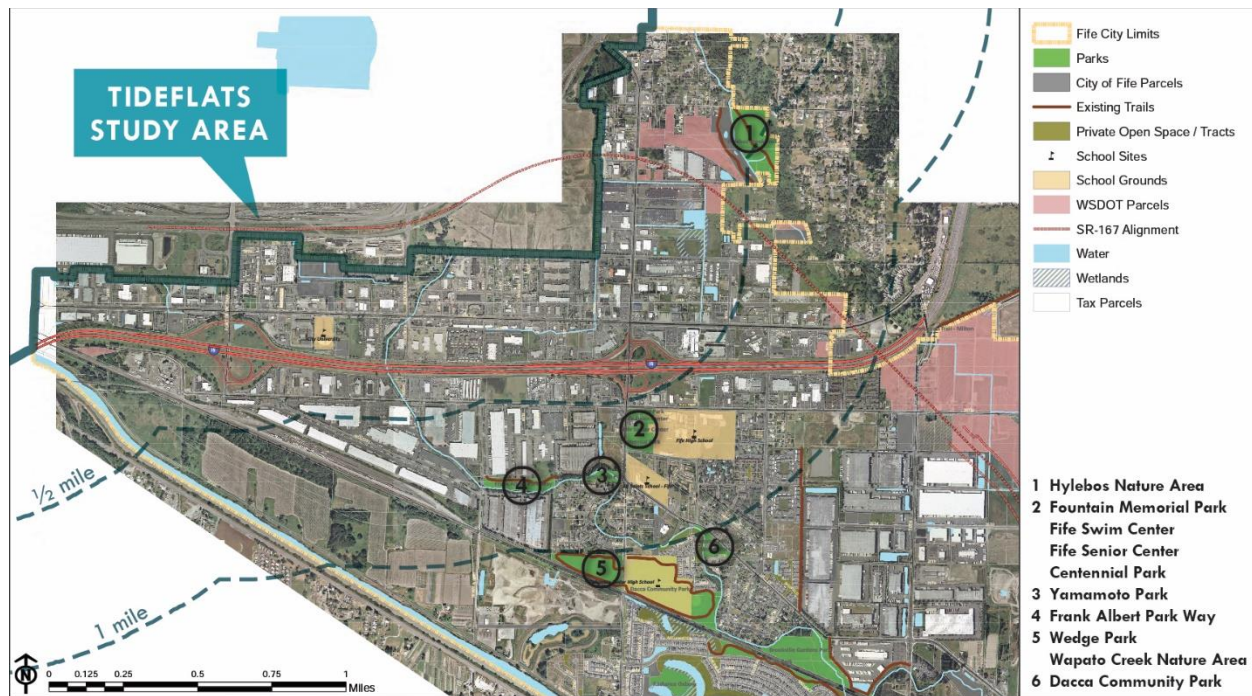
Note: The City departments with primary management responsibility for urban parks/amenities include Public Works – Real Property Services and Street Operations Divisions, and Planning and Development Services. The City departments with primary management responsibility for open space properties include Public Works – Real Property Services and Environmental Services.

Sources: City of Tacoma, 2019; City of Tacoma 2021-2026 Capital Facilities Plan, 2020; BERK, 2020.

Exhibit 13-10 Metro Parks Tacoma Facilities Near the Study Area, 2020

* Facility owned partially or fully by the City of Tacoma (see Exhibit 13-9). Julia's Gulch is owned by the Port of Tacoma and Swan Creek Park is primarily owned by Metro Parks and Pierce County, though the City of Tacoma owns some parcels as shown on Exhibit 13-9.

Source: Metro Parks Tacoma, 2020; BERK, 2020.

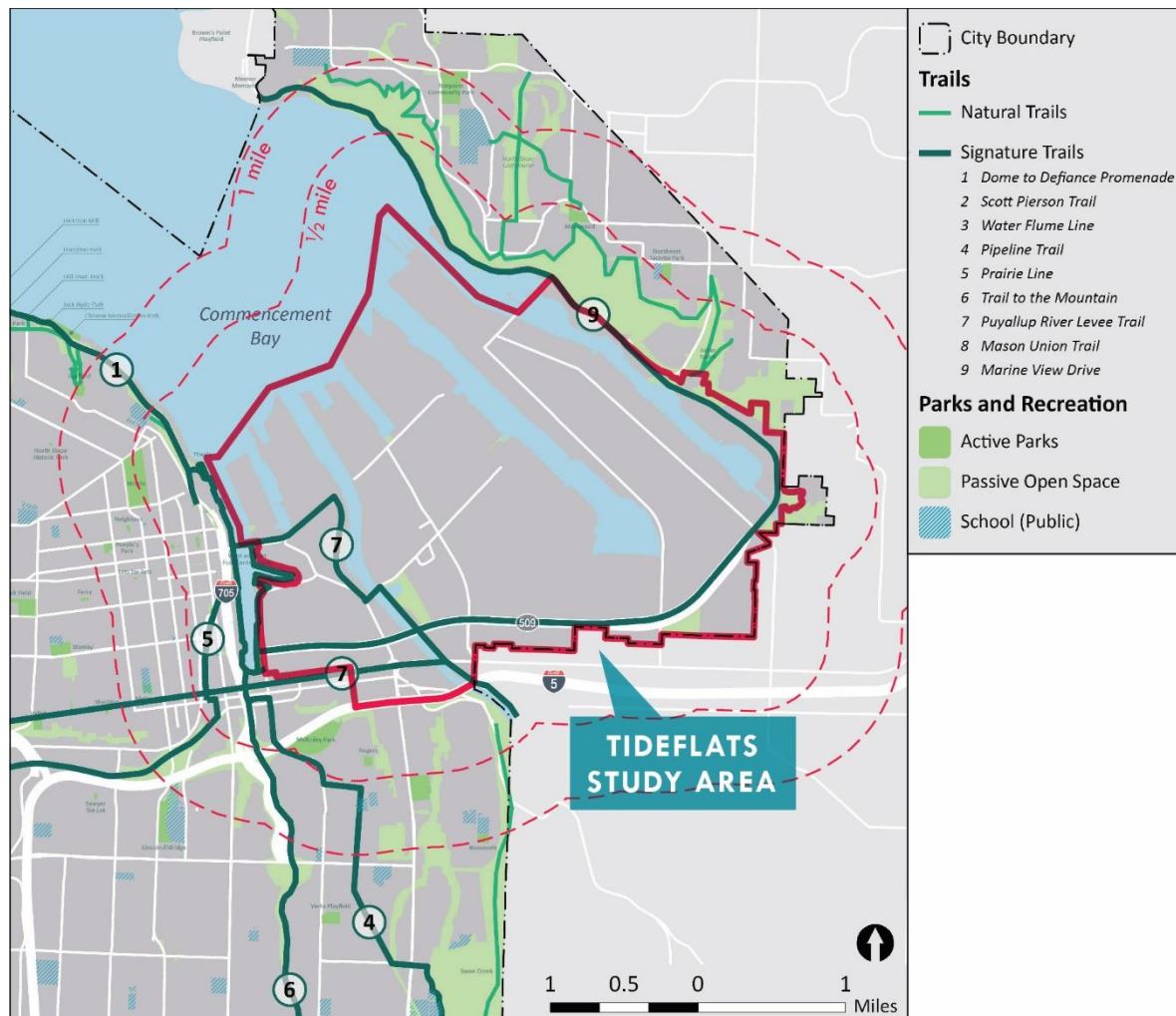
Exhibit 13-11 City of Fife Parks, Trails, and Natural Areas Near the Study Area, 2020

Source: City of Fife, 2020; BERK, 2020.

Trails

Nearly 16 miles of walking, hiking, and biking trails are located within the City of Tacoma (City of Tacoma, 2019). The City classifies its trails as signature or natural trails. The Puyallup River Levee and Marine View Drive signature trails run within and adjacent to the Tideflats study area, while the Dome to Defiance Promenade, Pipeline, Prairie Line, and Trail to the Mountain signature trails are within 1 mile of the study area (Exhibit 13-12). Several natural trails are located to the northeast of the study area near Marine View Dr.

Trails operated by the City of Fife at Hylebos Natural Area and Frank Albert Park are also near the study area (Exhibit 13-11).

Exhibit 13-12 City of Tacoma Signature and Natural Trails Near the Study Area, 2020

Source: One Tacoma Comprehensive Plan, 2019 (Figure 37); BERK, 2020.

Recent Projects, Planned Improvements, and Identified Future Needs

The City of Tacoma and Metro Parks have identified a need to maintain open space and expand parks facilities in the future. Community members have also provided input that Tacoma's parks should have greater connectivity, promote environmental stewardship, provide programming that is accessible to all community members, and provide opportunities for special events and activities that improve cultural awareness and support economic development.

Metro Parks

In 2014, voters passed a \$198 million bond (the largest bond measure in Metro Parks history) to fund improvements throughout the park district. Major projects in the 2014 bond included a new Pacific Rim Aquarium, infrastructure improvements at Point Defiance Park, and expanded citywide

access to recreation. More than \$65 million of the bond was earmarked for capital improvements at the Zoo, including (Metro Parks Tacoma, 2020):

- **Environmental Learning Center:** In 2017, the Zoo collaborated with Tacoma Public Schools' Science and Math Institute (SAMI) on an environmental learning center to serve SAMI students and staff, as well as Zoo visitors and staff. The two-story shared-use building, constructed with Tacoma School District bond funds, serves a range of classroom needs. It also replaces portable buildings used by Zoo education staff and volunteers.
- **Pacific Seas Aquarium:** The Zoo's 55-year-old North Pacific Aquarium was failing, weakened by decades of salt-water corrosion. The new Pacific Seas Aquarium is a 35,000 square foot facility that highlights Puget Sound marine life, showcases exciting new species, and inspires conservation. The aquarium opened in 2018.
- **Rocky Shores Exhibit:** Recent renovations to the Rocky Shores exhibit improved health and safety features for animals and keepers. The project was completed in 2018 and included a new sea lion exhibit, upgrades to animal life-support systems, and expanded views.
- **Polar Bear Exhibit:** The polar bear exhibit will be renovated in the near future to meet rising animal care standards and a more up-close viewing experiences. A design study is underway.

Additional capital projects recently completed, currently underway, or planned by Metro Parks are listed below (Metro Parks Tacoma, 2020). Some of these are partially or fully funded by the 2014 bond, and several are in partnership with the City of Tacoma or others.

- **Stormwater Treatment Facility:** In 2015, Metro Parks and the City of Tacoma (with a grant from the Department of Ecology) jointly developed a 5,500-square-foot stormwater treatment facility. The facility features a series of six cascading pools that channel runoff from streets and properties as far south as N 30th Street, and is a learning laboratory for local students.
- **Athletic Fields Siting:** In 2016, Metro Parks and the Tacoma School District conducted a comprehensive athletic field study that identified a community-wide shortfall of fields to meet current and future needs for youth and community sports and recreation. A subsequent feasibility analysis in 2019 further examined this need along with bringing a new soccer-specific professional sports stadium to the community. As of April 2020, this project is on hold.
- **Destination Point Defiance:** Destination Point Defiance is a long-term comprehensive planning initiative to enhance visitor experiences and honor the park's character. Dune Peninsula at Point Defiance Park and Wilson Way bridge opened in 2019 as part of Waterfront Phase 1 improvements and pedestrian safety improvements. Dune Peninsula is 11-acres of newly landscaped park property on the breakwater peninsula surrounding the Tacoma Yacht Club boat basin. Wilson Way bridge is a 605-foot long, 50-foot tall bridge that links Point Defiance Park to Ruston Way. Metro Parks intends to start another phase of park improvements identified in the Destination Point Defiance Master Plan in late 2020 through 2021, including: Triangle Area projects, improvements at Owen Beach, a parking and circulation study, additional capital improvements at the Zoo, a loop trail and climbing wall at

Liz Rocks, an updated design plan for the Japanese Garden, improvements at Fort Nisqually, and the Loop Trail project at Point Defiance.

- **Eastside Outdoor Gathering Area:** Metro Parks is working with The Trust for Public Land for the addition of a new outdoor community gathering and play area on Tacoma Public School property adjacent to the Eastside Community Center. The play area will feature climbing boulders for outdoor activity. Construction is currently underway and is scheduled to be open for public use and enjoyment in the spring of 2021.
- **Conservatory Improvements:** Phase 1 of this project includes renovation and expansion of the conservatory. The project successfully received funding through the State Heritage Grant program to support upgrades to the existing conservatory and the installation of three historically accurate building entry facades. Design work is complete and construction is expected to begin in fall of 2020.
- **Foss Waterway Parks:** This project includes the design for two park sites along the Foss Waterway, in collaboration with the Foss Waterway Development Authority, including a new boathouse facility for kayaks and rowing shells. Melanie's Park is in the final design and permitting phase with Shoreline Permits recently received (the City of Tacoma is currently working on final preparations for the construction of a storm water pipe and outfall that will be completed prior to park development) while the Waterway Park project is currently on hold. The 2014 park bond and Foss Waterway Development Authority are funding the work.
- **Gas Station Park:** This project includes a new park to provide a recreation area for the community at a defunct gas station site at 4801 S Park Ave in South Tacoma. This project includes renovations to the existing neighborhood pocket park, including children's play, fencing, access, signage and landscaping, and other improvements identified through a public engagement process. The project is currently on hold due to COVID-19 and associated impacts to funding.
- **Heidelberg Sports Village:** A partnership of the Seattle Sounders FC and Tacoma Rainiers, called The Soccer Club of Tacoma, is interested in working with Metro Parks and the City of Tacoma to bring new professional sports franchises and a stadium to the community. The partners equitably shared the cost and scope of a study to assess the feasibility of the proposed Heidelberg Sports Village concept. The Draft Feasibility Study was received in September 2020 and is being reviewed by the City. A letter of intent between project partners has been completed. Planning for this proposed project has been delayed due to COVID-19 related impacts.
- **Swan Creek Improvements:** Swan Creek Park is a 373-acre greenspace with a salmon bearing stream, wooded canyon, upland forest, paved and natural trails, a community garden, and mountain bike trails. An updated Master Plan was completed last year and design for Phase II improvements is now underway to implement enhancements. Work will include improved access, trails, parking, restrooms, picnic pavilions, signage and site furnishings, an off-leash area, and overall landscape improvements. The project is currently in the final design and permitting phase and scheduled to move into construction in late 2020.

The project is currently in the construction document phase, is scheduled to move into construction in late 2020, and construction is anticipated to finish in winter 2021.

- **Titlow Park Improvements:** Titlow Park is Tacoma's only beach park on the west side and has a rich cultural and environmental history. The BNSF Railway Foundation has donated \$25,000 to the nonprofit group that plans to restore Metro Parks' Titlow Park lagoon as a potential refuge for juvenile salmon. A Master Plan Update for Hidden Beach is nearing completion. Phase 1 demolition of the former Tacoma Outboard Association structures finished in December 2019, allowing public access to a previously inaccessible area of the park. Design of site improvements is contingent upon future funding.
- **Ruston Way Waterfront Improvements:** Metro Parks and the City of Tacoma are currently working to create a vision for the future of Tacoma's waterfront – what it looks like, what it offers, and how it can be improved. Equity, access, and the need for infrastructure improvements are driving the process.

Metro Parks identified other sub-categories of projects in its 2-year and 6-year 2019-2024 CIP as part of the 2019-2020 biennial budget (Metro Parks Tacoma, 2018). While many of these projects were completed, are in progress, or are being carried forward, the draft 2021-22 budget projects \$10 million less to fund operations in the coming biennium as a result of COVID-19. The draft 2021-2022 budget and 2021-2026 CIP incorporate measures to account for this financial uncertainty. The drafts also prioritize projects based on changing community needs and an updated set of Metro Parks Board priorities, including a greater focus on equity and a 10 minute walk standard (Metro Parks Tacoma, October 2020; Metro Parks Tacoma, November 2020).

City of Tacoma

The City of Tacoma also plans for park projects in its CFP; additional projects recently completed, currently under way, or planned in the proposed 2021-2026 CFP include (City of Tacoma, 2020):

- **Inventory Update:** The City of Tacoma recently updated its inventory of active and passive open space to improve accuracy and completeness as part of the Open Space Program transition.
- **Passive Open Space Restoration Plan Implementation:** Environmental Services (ES) continues to implement the 20-year Passive Open Space Restoration Plan established in 2016. In October 2017, ES established a partnership with EarthCorps to administer a volunteer program to facilitate and encourage community stewardship on ES passive open spaces. Currently, the program has 11 habitat stewards actively restoring 8 passive open space areas (including Julia's Gulch).
- **Fireman's Park Improvements:** Improvements will open the park to the street and provide a safer and more attractive environment for park users. The project will rehabilitate the park with an open concept plan (making the park more visible from the street) and will include timber removal, regrading, landscaping, lighting, and other park amenities. The project is fully funded.

- **Melanie Jan LaPlant Dressel (Central) Park:** Improvements and renovations at Central Park of the Foss Waterway will be managed by Metro Parks. The project is identified as part of the 2023-2026 spending plan and mostly unfunded.
- **Prairie Line Trail – Art Park:** This project would construct an Art Park adjacent to the trail between Pacific Avenue and S 15th Street along the United Way property and would complement and enhance the downtown Prairie Line Trail. The project is identified as part of the 2023-2026 spending plan and mostly unfunded.

Gas Station Park and Waterway Park are also included in the City's proposed 2021-2026 CFP (City of Tacoma, 2020). These projects are in partnership with Metro Parks and are described above under Metro Park's planned projects. Public Works intends to design and renovate Gas Station Park in partnership with Metro Parks and the surrounding community – the project is fully funded in the proposed 2021-2026 CFP but is currently on hold due to COVID-19 and associated impacts to funding. Waterway Park (part of the Foss Waterway Parks description above) includes planning, design, permitting, remediation, and construction of the future Waterway Park and rowing center on the Foss Waterway. The project is tied to the Foss Master Plan, an element of the City's Shoreline Master Plan in *One Tacoma*. The project is identified as part of the 2023-2026 spending plan and mostly unfunded, though funding is likely available from the Foss Waterway Development Authority and Metro Parks for match with grant and private funding potential.

Over the next 20 years, the City of Tacoma also aims to enroll more passive open space properties in restoration efforts. More resources may be required to facilitate these efforts. The Environmental Services passive open space program is funded at approximately \$690,000 annually, but it is anticipated that approximately \$1 million a year on average would be needed to meet the 2036 goal of all acres in restoration. The Public Works Active Open Space Program is funded solely through Street Vacation revenues, as required by RCW. Annual funding depends upon market fluctuations and increases/decreases in Street Vacation applications.

Existing Policies and Regulations

Level of Service

Policy PFS-4.3 of the *One Tacoma* Public Facilities and Services Element establishes the following LOS standards for parks which are not subject to Tacoma's concurrency standard (City of Tacoma, 2019, pp. 9-12):

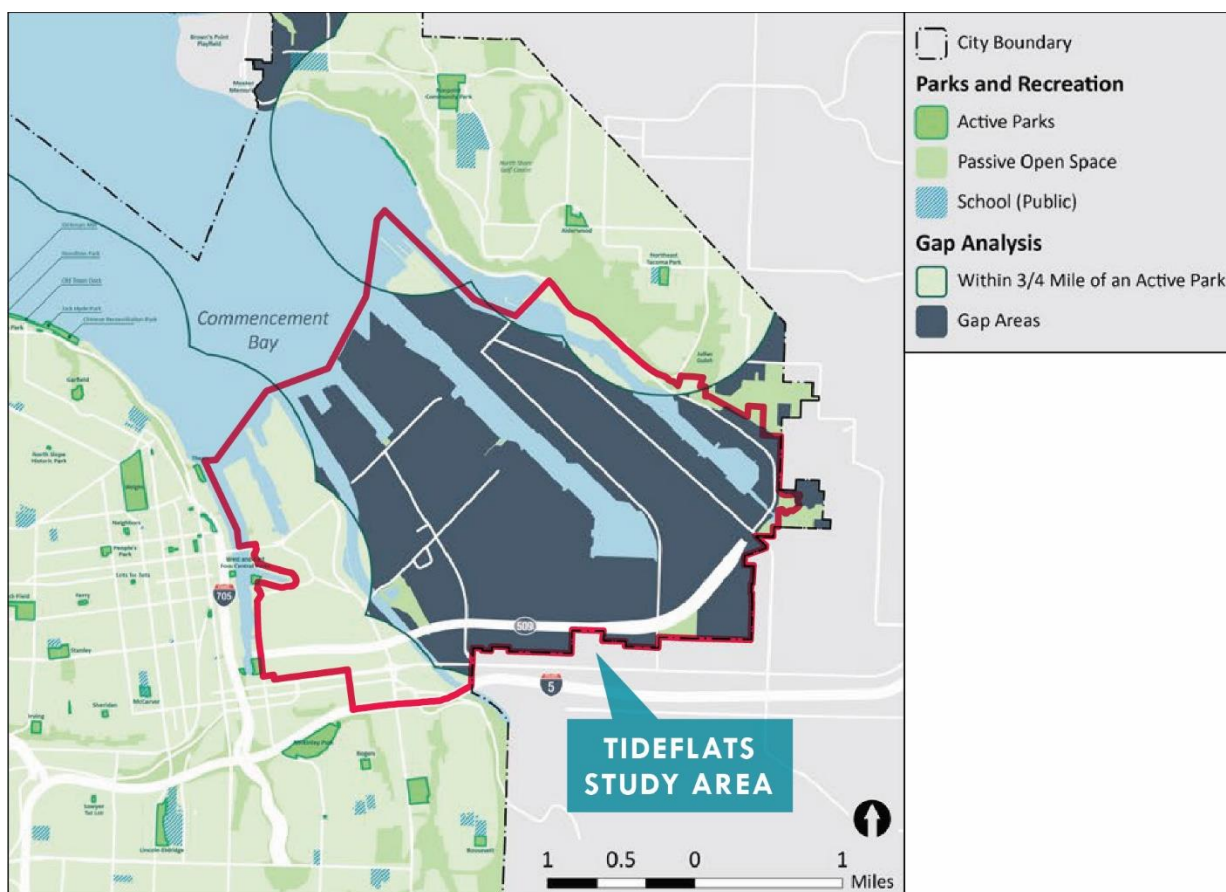
- Local Parks: 3 acres per 1,000 people, and within $\frac{3}{4}$ mile of all residents
- Regional Parks: 7 acres per 1,000 people
- Open Space/Wildlife Habitat: 2 acres per 1,000 people

Based on an estimated service area population of 213,300 in 2020 (OFM, 2020), the City of Tacoma would require 639.9 acres of local parks, 1,493.1 acres of regional parks, and 426.6

acres of open space/wildlife habitat to meet its adopted standards. The City is currently exceeding [TBD] these standard with ____ acres of local parks, ____ acres of regional parks, and ____ acres of open space/wildlife habitat.

Most of the Tideflats study area is not within $\frac{3}{4}$ mile of a local park (Exhibit 13-13). However, a limited number of residents live within the study area (approximately 350 people or less than 0.2% of the city's total population; see Chapter 9, Population, Employment, and Housing). The western portion of the study area between the Thea Foss Waterway and Puyallup River is generally within $\frac{3}{4}$ mile of active recreation facilities located in Downtown or south of I-5.

Exhibit 13-13 City of Tacoma Park and Recreation Service Area Gaps, 2020



Source: One Tacoma Comprehensive Plan, 2019 (Figure 40); BERK, 2020.

Metro Parks Tacoma 2018 Strategic Plan

Metro Parks' mission is "Creating healthy opportunities to play, learn and grow." The Department also has eight values: innovation, excellence, equity, inclusiveness, sustainability, accountability, safety, and fun (Metro Parks Tacoma, 2018). These values are echoed in the Board's draft 2021 -

2022 budget priorities: racial equity, access and inclusion, health and wellness, conservation, partnerships, and engagement (Metro Parks Tacoma, October 2020).

As part of the 2018 Strategic Plan, Metro Parks developed a set of internal and external-focused performance measures (Metro Parks Tacoma, 2018):

- Attain workforce diversity in gender and ethnic composition that are within 5% of the District community by 2023.
- Achieve 90% 10-minute walk LOS coverage by the year 2023.
- Achieve 100% completion of all biennial goals outlined in the Mission Led Comprehensive Program Plan in the 2017/18, 2019/2020, & 2021/22 biennia.
- Accomplish 100% of all actions annually identified in the MPT Environmental Sustainability Plan.
- Grow the average “non-tax” or earned revenue component of the overall MPT operational budget by 0.5% per year.
- Maintain at least 35% of classes run in 2018 above 75%, 40% in 2019, and 40% in 2020.

City of Tacoma Shoreline Master Program (2019) and Public Access Alternatives Plan (2010)

The City of Tacoma’s Shoreline Master Program (SMP) establishes two goals related to public access and recreation within shorelines areas in the city (City of Tacoma, 2019, pp. 45-46):

- Public Access Goal: To increase the ability of the general public to reach, touch, and enjoy the water's edge, to travel on the waters of the state, and/or to view the water and the shoreline from adjacent locations, provided that private rights, the public safety, and shoreline ecological functions and processes are protected consistent with the U.S. and State constitutions, state case law, and state statutes.
- Recreation Goal: To provide opportunities, spaces, and appropriate facilities for diverse forms of water-oriented recreation that takes advantage of the unique waterfront setting.

Specific objectives call for establishing a linear system of public access along the Tacoma shoreline starting with high-density intensive-use urban activity on the Thea Foss Waterway, and for encouraging cooperation with other public agencies, non-profit groups, and private landowners to increase and diversify recreation opportunities.

The City’s Public Access Alternatives Plan (PAAL) is a stand-alone implementation plan associated with the SMP that further articulates the vision for public access to the shoreline and recreation. Several existing public access areas are within the study area (City of Tacoma, 2010, pp. 17-21):

- Existing viewpoint at the Port of Tacoma Observation Tower.
- Existing public marinas, private marinas, and hand boat launches on the northern shore of the Hylebos Waterway and eastern shore of the Thea Foss Waterway (including at Waterway Park).

- Existing habitat observation points on the southern shore of the Blair Waterway (the Lincoln Ave public street end) and northern shore of the Puyallup River (near the wetlands by the Lincoln Ave bridge).

The PAAL identifies other potential projects on the Thea Foss Waterway, on Marine View Drive, and on Port Industrial shorelines in areas that will not interfere with port operations or cause public safety concerns. These projects include a pedestrian walkway on the Thea Foss Waterway, motorized and non-motorized boat launches, additional habitat observation points, improved public access/viewing signage, and new view points (City of Tacoma, 2010, pp. 25-29).

Tacoma 2025 Goals and Performance Measures

Tacoma 2025 sets the strategy for the entire City of Tacoma and is being incorporated into every major planning process, including *One Tacoma* and the City budget. Metro Parks is specifically identified as a “Key Partner” for the health and safety, arts and cultural vitality, and built and natural environment focus areas. Public Works is also identified as a “City Champion” for the built and natural environment focus area. The community priorities in *Tacoma 2025* for these three focus areas are (City of Tacoma, 2015):

- Health and safety: improve neighborhood safety, increase active living, and improve overall health.
- Arts and cultural vitality community: increase participation in arts and culture, embrace Tacoma’s diversity of people, places, and cultures, and leverage and strengthen Tacoma’s arts and cultural assets.
- Built and natural environment: increase transportation options, sustain and improve Tacoma’s natural environment, grow and enhance the vitality of Tacoma’s neighborhoods, and improve and maintain Tacoma’s streets.

One of the six goals and performances measures developed by the City of Tacoma’s Public Works Department to help the City track its progress towards the vision set in *Tacoma 2025* indirectly supports City-owned park facilities (City of Tacoma, 2018, p. 209):

1. **Safe Routes To Schools Program:** To enhance health and safety in Tacoma, the Public Works Department will implement a Safe Routes to Schools Program that will improve walking and biking infrastructure at all Tacoma Public Schools to reduce school-age children involved in pedestrian and bicycle collisions 30% by 2025.

Progress: There were 17 school-age (1-18 years old) pedestrian and bicycle collisions in 2019 (down from 34 in 2018). Four elementary schools in Tacoma have received funding through the Safe Routes to School program.

Per the City’s Departmental Performance Dashboard, Results253, and the most recently available data measures, Public Works has achieved or is on track to achieve these goals (City of Tacoma, 2020). The Department is also currently tracking metrics to increase the number of family bicycle

workshops or events, increase the number of “Walk and Roll to School Day” events, and complete comprehensive walking and biking audits at several schools in 2020.

13.4 Key Findings and Implications for Plan

Police and Fire

Police and fire services for the Tideflats study area are provided by the City of Tacoma. The study area is located within TPD’s District 1-4 in Sector 1, which includes the Sector 1 Substation (Central), Northeast Substation, and Harrison Range (Exhibit 13-4). For the 2019-2020 biennium, TPD has 406.3 authorized FTE employees, including 207.3 patrol service officers, 19 homicide or special assault officers, 5 homeless outreach team members, and several administrative or support service specialists (City of Tacoma, 2018). Enforcement officers commissioned by the Puyallup Tribe may also enforce Puyallup Tribal Law in the portion of the Tideflats study area overlapping the Puyallup Reservation. Fire Stations 6 and 18, future Fire Station No. 5 (under construction), and the training center are located within the study area (Exhibit 13-7). As of January 2020, TFD employs 439.5 staff, including 391 commissioned personnel and 48.5 non-commissioned personnel (Tacoma Fire Department, 2020). TFD stations are staffed daily districtwide by a minimum of 74 fire station personnel 24 hours per day (Tacoma Fire Department, 2019).

Call load for both providers continues to increase as development occurs. The number of Group A offenses has remained relatively stable over the last five years (2015-2019) while the number of Group B arrests has increased (Exhibit 13-2). About two-thirds of TFD’s calls each year are for EMS incidents (33,404 incidents or 67% in 2019) whether considering initial dispatch type or the determined final situation (Exhibit 13-6).

Both departments are currently meeting LOS standards established in Policy PFS–4.3 of the *One Tacoma Public Facilities and Services Element* (City of Tacoma, 2019, pp. 9-12):

- **Police:** 288.58 square feet of law enforcement facility space per 1,000 people.
TPD is currently exceeding this standard based on an estimated 2020 city population of 213,300 and an existing space allocation of 141,392 square feet (Exhibit 13-4).²⁹
- **Fire:** 0.109 apparatus per 1,000.
TFD is currently exceeding this standard based on an estimated 2020 service area population of 231,300 and 36 existing apparatus (Exhibit 13-8).³⁰

²⁹ See Exhibit 13-4 for an inventory of existing space. OFM, 2020.

³⁰ The City of Tacoma’s estimated population is 213,300 as of April 1, 2020 (OFM, 2020). TFD also provides contracted fire and EMS protection to Fircrest, Fife, and Pierce County Fire District 10 which adds a population of approximately 18,000 (Tacoma Fire Department, 2020).

Regular planning for future capital facility and staffing needs will likely minimize impacts and meet future demand. The City of Tacoma is currently making initial improvements to Harrison Range and calls for an additional \$575,000 of maintenance and upgrades between 2023-2026, though funds are unconfirmed (City of Tacoma, 2020). Fire Station No. 5 is currently under construction at 3510 E 11th Street and will provide additional fire response, EMS, and hazardous materials capabilities in the Port area. In the 2021-2022 biennium, the City will continue construction on Station 5 and plans to begin service provision to the Port of Tacoma and other industries in the Tideflats by the end of 2021. A new float system under construction at the Marine Security Operations Center (outside the study area) will also allow TPD and TFD to moor vessels at the center and enhance maritime response capabilities for the Commencement Bay and south Puget Sound area. The City of Tacoma is also currently considering if fire impact fees could help meet the need for additional fire protection infrastructure generated by new development.

Parks

Based on an estimated service area population of 213,300 in 2020 (OFM, 2020), the City of Tacoma **is currently meeting citywide acreage LOS standards [TBD]** established in Policy PFS-4.3 of the *One Tacoma* Public Facilities and Services Element (City of Tacoma, 2019, pp. 9-12):

Most of the Tideflats study area is not within $\frac{3}{4}$ mile of a local park (Exhibit 13-13). However, a limited number of residents live within the study area (approximately 350 people or less than 0.2% of the city's total population; see Chapter 9, Population, Employment, and Housing). The western portion of the study area between the Thea Foss Waterway and Puyallup River is generally within $\frac{3}{4}$ mile of active recreation facilities located in Downtown or south of I-5.

The City of Tacoma and Metro Parks have identified a need to maintain open space and expand parks facilities in the future. In 2014, voters passed a \$198 million bond (the largest bond measure in Metro Parks history) to fund improvements throughout the Metro Parks district. Several major projects from this bond have already been completed or are currently under construction (Metro Parks Tacoma, 2020). Metro Parks and the City of Tacoma have several other capital projects currently underway or planned for in their most recent CFPs and budgets. However, near-term projects are likely to be delayed or modified because of projected budget shortfalls as a result of COVID-19. Metro Parks projects \$10 million less to fund operations in the 2021-22 biennium and is currently adjusting its planned efforts based on this financial uncertainty and changing community needs (Metro Parks Tacoma, October 2020; Metro Parks Tacoma, November 2020). Regular planning for future capital facility and staffing needs will aim to minimize impacts and meet changing demand.

14 UTILITIES

The section describes the existing conditions for water, wastewater, electricity, natural gas, and telecommunications utilities within the study area (stormwater and associated utilities are discussed in a separate chapter of this baseline report). It includes a discussion of existing policies, plans, and regulations; current conditions; and key findings and implications for the Subarea Plan (the Plan).

14.1 Existing Policies, Plans, and Regulations

Utilities in the study area (water, wastewater, electricity, natural gas, and telecommunications) are regulated at the local level and are described below.

Water

Tacoma Water is a division of Tacoma Public Utilities (TPU) and works in coordination with the Economic Development Board, jurisdictional planning departments, and developers to review capacity to meet demand for upcoming projects and projected growth. Tacoma Water's capital projects, goals, and policies are also informed by long range planning efforts by the city as well as neighboring jurisdictions, such as King County, Pierce County, and the Puget Sound Regional Council (Tacoma Water 2018b).

New developments and redevelopments are typically required to comply with the following measures that ensure available water capacity prior to permit issuance:

- **Certificates of Water Availability.** Residential new construction or remodels, and industrial, commercial, or multi-family residential developments are required to apply for a Certificate of Water Availability from TPU. This process helps ensure that sufficient water is available for use and fire protection (TPU 2020c).
- **Tacoma Municipal Code (TMC), Chapter 12.10.** This chapter establishes regulations for water utility services, such as: applications for new service; conditions for termination of service; service, installation, and development fees; and fire hydrant use. All Tacoma Water customers are required to comply with Chapter 12.10 of the TMC as a condition of water service.

Wastewater

The City of Tacoma Public Works Department manages wastewater within the study area. New developments and redevelopments are typically required to comply with the following guidance, policies, and regulations:

- **Side Sewer Availability Manual.** The City requires that the construction of private plumbing and side sewer work be completed in accordance with the *Side Sewer Availability Manual*. The manual outlines how to determine sewer availability and sewer extension requirements, criteria for construction and inspection of gravity side sewer connections, design requirements for low-pressure pump systems, design requirements for pretreatment devices, and maintenance responsibilities and easement agreements. These requirements aim to reduce the potential for inflow and infiltration into the City's public sewers and to ensure that owners receive a well-functioning, long lasting side sewer (City of Tacoma 2016a and 2020b).
- **Special Approved Discharges to Wastewater System.** Any activities requiring additional discharges to the wastewater system beyond those allowed by a permit may require sampling as part of the approval to ensure that discharges meet water quality requirements (City of Tacoma 2020b). Special discharges tend to last less than 1 year and are typically associated with remediation or construction dewatering projects.
- **Industrial Wastewater Discharge Permits and Pretreatment Program.** As part of the City's program to identify industries with discharges that may be subject to additional requirements, non-domestic users are required to provide information necessary to determine if discharges are significant. The objective of this program is to identify discharges subject to pretreatment standards and other compliance requirements (City of Tacoma 2020c).
- **TMC Chapter 12.08, Wastewater and Surface Water Management- Regulation and Rates.** Policies in this chapter allow the City to comply with all applicable state and federal laws including, but not limited to, the Clean Water Act, General Pretreatment Regulations, 40 Code of Federal Regulations (CFR) Part 403, with the objectives, in part, to prevent the introduction of inadequately treated pollutants into receiving waters, to prevent the introduction of pollutants that would keep the treatment system from working adequately, and to protect employees and the general public.

Electricity

Tacoma Power is a division of TPU and issues the *Integrated Resource Plan* (Tacoma Power 2017) and the *Long-Range Financial Plan* (Tacoma Power 2019), and contributes to the City of Tacoma's *Capital Facilities Program* (City of Tacoma Power 2019a), which address topics related to growth and replacement or renewal in its service area. Tacoma Power also participates in regional planning processes and rule-making processes such as the Northwest Public Power Council and the Federal Energy Regulatory Commission (City of Tacoma 2019a). New developments and redevelopments typically require permitting and compliance with the City's Electrical Code:

- **Electrical Permit.** The City requires electrical permits for the installation, alteration, or maintenance of electrical equipment (exceptions available under TMC 12.06A.210). The Tacoma Power *Electric Service Handbook* is a guidance document for acquiring electrical services and provides general specifications for new electrical services (Tacoma Power 2020a). Residential and construction standards are available on Tacoma Public Utility's *Electrical Construction Standards* webpage (TPU 2020e).
- **TMC, Chapter 12.06A.** The Tacoma Electrical Code contains provisions necessary for safety compliance. Other codes that may apply include the National Electrical Code (NEC), Washington Administrative Code (WAC) 296-46B, Revised Code of Washington (RCW) 19.28, National Electric Utility Safety Code (NESC), Tacoma Power Customer Services (TPCSP), and other standards for the installation of electrical equipment.
- **Tacoma Power Customer Service Policies.** The Public Utility Board has adopted Customer Service Policies in the interest of consistency, safety, efficiency, and economy in the distribution of electricity. The purpose of the policies is to help customers obtain electrical service and to guide Tacoma Power employees in providing that service. The policies are subject to revision by the Public Utility Board to achieve these objectives and purposes. Customer Service Policies can be found at Tacoma Power (2018).

Natural Gas

- **Pipeline Safety Program.** A number of federal and state agencies are responsible for and involved in the regulation and oversight of pipelines in the United States. The Washington Utilities and Transportation Commission (UTC) is the primary agency responsible for the regulatory oversight of natural gas pipelines in Washington State. The UTC Pipeline Safety Program provides standards for natural gas pipeline operations and inspects natural gas pipelines operating in Washington in accordance with federal standards. Puget Sound Energy (PSE) is subject to full compliance with the applicable provisions of Title 49, CFR Part 192, which address federal safety standards related to the transportation of natural gas.
- **Federal Energy Regulatory Commission (FERC).** FERC regulates Liquefied Natural Gas (LNG) pipelines and storage and facility construction and ensures the safe operation and reliability of proposed and operating LNG terminals. FERC also has oversight in the establishment of rates for services (FERC 2020).
- **Puget Sound Energy (PSE) Integrated Resource Plan.** PSE operates Washington's largest natural gas distribution system and is the only supplier to the study area. It is currently in the process of updating its *Integrated Resource Plan*, which uses supply and demand forecasts to plan for future resource needs (PSE 2020).

Telecommunications

Telecommunications facilities (cable lines, electrical wires, fiber, and optical fibers) exist throughout the City of Tacoma and the study area. Projects involving telecommunications facilities

are regulated on a case-by-case basis and require coordination between the City and service providers to ensure that land use planning is compatible with service capacity, design, and equipment. TMC Title 16 for Cable Systems, Open Video Systems, Telecommunications Systems, and Private Communications Systems outlines policies and regulations for licensing, systems within the public right-of-way, and establishment and operation of franchises.

Policies, Plans and Regulations Pertaining to all Utilities

One Tacoma Comprehensive Plan

The City of Tacoma's One Tacoma: Comprehensive Plan provides goals and policies related to the needs and priorities for public facilities and improvements (City of Tacoma 2019b). These goals and policies provide a framework for addressing the need for new and upgraded facilities in an efficient and cost-effective manner. In particular, and related to potential future development within the study area, the following policy from the Public Facilities and Services (PFS) Element establishes criteria for prioritizing capital improvement needs (City of Tacoma 2019b):

***Policy PFS–4.10.** Consistent with the other policies within this section and the Comprehensive Plan, prioritize capital improvements that meet one or more of the following criteria:*

- a. Addresses a public health or safety concern*
 - b. Is needed to correct existing public facility and services deficiencies or replace key facilities that are currently in use and are at risk of failing*
 - c. Aligns with Tacoma 2025*
 - d. Is required or mandated by law*
 - e. Has a high level of public support*
 - f. Is financially responsible, for instance by leveraging grant funding or other non-City funding sources, reducing operating costs, avoiding future costs, or by having a sustainable impact on the operating budget*
 - g. Reduces greenhouse gas emissions or supports the adaptation to climate change*
- Projects that meet one or more of criteria (a) through (g) will be further reviewed to determine the extent to which it supports the following:*
- h. The project improves the equitable access to public facilities and services*
 - i. The project is located within a designated center and is intended to stimulate or respond to growth and development within the designated centers*
 - j. The project is located on a corridor serving a center or within a designated 20-minute neighborhood.*

Port of Tacoma Strategic Plan

The Port of Tacoma's current Strategic Plan was adopted in 2012 and updated in 2014 (Port of Tacoma 2020), prior to the formation of The Northwest Seaport Alliance— a maritime cargo partnership between the Port of Tacoma and the Port of Seattle. When the Northwest Seaport Alliance was formed in August 2015, it established clear leadership for the marine cargo business shared by the two ports. The Port of Tacoma is now in the process of updating the Strategic Plan to help the Port review, re-evaluate, and refine the vision for the future. Updates to the Strategic Plan should be considered when evaluating utility needs.

The 2014 plan had several objectives that would potentially impact the need for utilities. For example, three goals in the plan were to: (1) Redevelop the General Central Peninsula and other terminal complexes to increase container throughput and respond to container industry changes; (2) Develop and implement a Strategic Asset Management Program; and (3) Facilitate collaboration among South Blair terminals to increase container throughput and respond to container industry changes. All of these proposals could impact utility demand. In addition, the NW Ports Clean Air Strategy mentions that electrification at the Port of Tacoma will impact utility demands.

City of Tacoma Environmental Action Plan

The 2016 Environmental Action Plan (City of Tacoma. 2016b) was adopted by Tacoma City Council (Resolution 39427) in efforts to respond to climate change and for the City to become more environmentally sustainable. The plan aims to reduce greenhouse gas (GHG) emissions and water pollution, in addition to setting goals for access to healthy foods, open space management and many other goals. Specific to the utilities described in this section, it set targets to achieve cost-effective electricity conservation savings, reduce electricity and water use in City facilities by 10%, fund cost-effective low-income residential conservation spending, increase solar power by 26%, and increase water conservation. Thirteen actions were identified, with efforts being led by TPU, the City of Tacoma Planning and Development Service, Government Relations, the Office of Environmental Policy and Sustainability, or Public Works, among other local agencies or departments. Actions that may impact utilities include the following (City of Tacoma 2016b):

***B1.** Achieve I-937, the Washington State Energy Independence Act, energy conservation targets which require utilities to achieve all cost-effective energy conservation measures.*

***B.2.** Develop a pilot commercial program focused on reducing utility costs through improving building operations and maintenance.*

***B.3.** Continue to develop water conservation incentives, rebates, and education for residential, commercial and industrial customers.*

***B4.** Hire a green building advocate for the city's Permit Office to identify incentives, remove barriers, and encourage green building practices.*

***B5.** Retain funding for low-income energy efficiency programs.*

- B6. Support efforts at the state and local level to incentivize conservation in rental properties.*
- B7. Work with regional partners to increase cost effective energy efficiency standards in the State Energy Code. Participate actively to revise the State Building Code to incorporate performance that targets net-zero energy by 2030.*
- B8. Develop community-owned solar projects and support distributed generation.*
- B9. Promote transparency, investment and competition of energy and water performance by requiring commercial benchmarking and disclosure through EPA's Energy Star utility tracking system. Increase awareness of the system and provide technical assistance to building owners and managers to better track and monitor building energy use.*
- B10. Upgrade all streetlights to LED where cost effective and use best practices when possible to reduce light pollution.*
- B11. Track and report city buildings' utility performance and Energy Star scores. Develop a Resource Conservation Management Plan and general government policy to guide energy efficiency investments, operations, and behaviors in city facilities.*
- B12. Meet federal Better Building Challenge goal (10% reduction in 5 years) by implementing energy efficiency in city buildings where cost effective.*
- B13. Ensure all existing occupied LEED New Construction buildings comply with LEED Existing Building Operations and Maintenance guidelines.*

Puyallup Tribal Code

The study area also includes lands located within the Puyallup Tribe of Indians reservation and Tribal-owned parcels. The Puyallup Tribe operates and administers a set of laws and regulations collectively referred to as the Puyallup Tribal Codes (PTC). The PTC includes a Fisheries Management Code (Chapter 12.04) and the Revised Shellfish Code (Chapter 12.12) that contain provisions to protect, manage, and enforce regulations governing Tribal fishing and harvesting activities. In addition, the Tribe is involved in formal and informal consultation with state and federal agencies under many of the laws and regulations listed previously. The Tribe also provides review and input on local decisions made under the State Environmental Policy Act (SEPA) or Growth Management Act (GMA).

14.2 Current Conditions

Water

Water service is provided to the study area by Tacoma Water, a division of TPU (TPU 2020a). The largest contributor of water is the Green River watershed. Other sources include seven wells

located at the North Fork of the Green River, local wells, and the Green River Municipal Watershed (TPU 2020b).

The water infrastructure system consists of 1,260 miles of distribution mains, 150 miles of large transmission main, 25 pump stations, 14 reservoirs, five standpipes, and 32 wells (City of Tacoma 2019a). TPU uses an average of 55 million gallons per day for all of its service areas, and has an available supply of 110 million gallons per day. The current level of service standard is 442 gallons per day per equivalent residential unit. TPU is forecasted to have sufficient water capacity through 2060, based on a projected 1.5% annualized population growth rate. Water utility resources within the study area are depicted on Exhibit 7-8 of Chapter 7, Climate Change Vulnerability Assessment.

No specific water infrastructure deficiencies or planned projects have been identified within the study area. Tacoma Water has appropriated funding through 2026 for projects related to general improvements, Regional Water Supply System cost-share eligible projects, water distribution, water quality, and water supply/transmission/storage (City of Tacoma 2019a). Specific site needs for infrastructure upgrades are assessed on a project-by-project basis.

Wastewater

Wastewater service is provided by the City of Tacoma's Department of Environmental Services. The wastewater sources include water from sinks, showers, and toilets, carried from residences and businesses (City of Tacoma 2020a). The wastewater infrastructure system consists of 700 miles of main and sewer flow pipes and two wastewater treatments plants (City of Tacoma, 2020a); approximately 12 pump stations are located within the study area (City of Tacoma 2020b). Billions of gallons of wastewater are treated per year before its release into Commencement Bay (City of Tacoma 2020a). The Central and North End Wastewater Treatment Plants provide service to Tacoma and other surrounding areas; each plant is regulated under separate National Pollutant Discharge Elimination System (NPDES) permits. Tacoma's Western Slopes is serviced by the Pierce County Chambers Creek Facility (City of Tacoma 2019a). Wastewater treatment in the study area is provided by the CTP, operated by the City of Tacoma Department of Environmental Services. The CTP is approximately 1.5 miles up the Puyallup River. It is the City's largest plant with a permitted maximum month treatment capacity of 60 million gallons per day (MGD). (Note: Maximum monthly flow is based on an average of the total daily plant flow throughout an entire month.) The plant has a permitted peak hydraulic capacity of 150 MGD and a secondary treatment capacity of 60 MGD. It services most wastewater flows from the Tacoma area, including the industrialized study area; northeast, central, and south Tacoma; as well as Fircrest, Fife, Milton, and some bordering areas in Pierce County and Federal Way (City of Tacoma 2019a). Sewer and water resources within the study area are depicted on Exhibit 7-8 of Chapter 7, Climate Change Vulnerability Assessment.

The level of service standard is 200 gallons per capita per day (GPCD); the City has a peak hydraulic treatment capacity of 179.9 MGD. This standard is subject to state and City

concurrency standards. Capacity in the City's system for collecting and treating wastewater is a function of both the quantity of flow generated by the City's customers and the amount of inflow and infiltration of surface water runoff and groundwater that enters the wastewater collection system through cracks in pipes or other similar defects. The existing infrastructure system can meet projected demand beyond the 2019–2024 period, but is expected to require expanded capacity to meet projected growth prior to 2040 (City of Tacoma 2019a). Increased capacity would require upgrading existing facilities, building new facilities, and expanding existing collection systems. No guarantee of capacity can currently be made for every new development; determinations on capacity are made on a case-by-case basis, with some requiring collection systems to be provided by the project applicant.

The City has recently completed several projects to improve the existing wastewater infrastructure, including upgrades for both the Central and North End Wastewater Treatment Plants, and numerous improvements and rehabilitations to the 700-mile network of underground collection system pipes. Other smaller projects were also completed as part of Local Improvement Districts and/or Arterial Street Improvements. The City of Tacoma has also appropriated funding through 2024 for improvements to the Central and North End Treatment Plants, Pump Station projects, and wastewater collection system projects. The City is developing a comprehensive sewer plan as part of its strategy to address the City's near and future needs (City of Tacoma 2019a). No specific wastewater infrastructure deficiencies or planned projects have been identified within the study area. Specific site needs for infrastructure upgrades are assessed on a project-by-project basis.

Solid Waste

The City of Tacoma Environmental Services Department is a utility that collects surface water fees from residences and businesses in Tacoma. It also manages the waste water program and the solid waste collection facility.

Electricity

Tacoma Power has been publicly owned since 1893 and is a division of TPU, which is governed by a five-member Tacoma Public Utility Board. Tacoma Power is the service provider to an area totaling approximately 180 square miles and includes Tacoma, Fircrest, University Place, and Fife, as well as parts of Steilacoom, Lakewood, Joint Base Lewis-McChord, and unincorporated Pierce County. About one-half of power provided is sourced from the Bonneville Power Administration (BPA); most of the remainder is sourced from four hydroelectric projects located at the Cowlitz River, Nisqually River, Wynoochee River, and the Cushman Hydroelectric, and a smaller amount is sourced from hydroelectric projects in central Washington. Hydropower makes up approximately 85% of the power source, with lesser amounts from nuclear, wind, biomass, solar, and others (TPU 2020d).

Tacoma Power's infrastructure system consists of 2,374 miles of transmission and distribution lines, four main/transmission substations, 48 distribution substations, 12 dedication distribution substations, 23 BPA customer substations, and eight generations switchyards (TPU 2020d). Transmission constraints have been identified that will require the expansion of distribution substations and replacement of aging facilities. The timing of the needed upgrades varies from the immediate future to the next 20 years. Power utility resources within the study area are depicted on Exhibit 7-9 of Chapter 7, Climate Change Vulnerability Assessment.

Most Tacoma Power standards that apply to customers, including information on electrical service and permit requirements, can be found on the Tacoma Power website (Tacoma Power 2020b).

Level of Service Standard

The Tacoma Power level of service standard for electrical outages is an average annual system outage duration of 75 minutes or less and an average annual system outage frequency of 0.95 or less. The 2019 Capital Facilities Program for Tacoma Power has appropriated funds through 2024 for general plant, power generation, power management, transmission, and distribution projects, and utility technology services (City of Tacoma 2019a).

The Port of Tacoma, a collaborator of the Northwest Ports Clean Air Strategy, aims to reduce seaport-related air emissions. A part of the strategy to meeting this goal includes increasing the use of electricity to replace the use of heavy fuel oil to power ocean vessels at berth. This is expected to have an impact on the electrical distribution system's capacity within the study area; Tacoma Power and the Port of Tacoma are in the early planning stages to expand electrical facilities to accommodate shore-to-ship power connections (Tacoma Power 2020).

Natural Gas

PSE serves over 800,000 customers with natural gas in six counties (PSE 2020). PSE receives natural gas from various regions of the U.S. and Canada. Natural gas lines are located throughout the streets, public properties, and private properties located within the study area. PSE's system includes a network of high-pressure natural gas mains, district regulators that reduce natural gas pressures, mains, service lines, valves, and meters, all of which are located underground, except for the meters.

PSE is currently constructing a new LNG facility within the study area. It will provide a clean and cost-effective gas supply resource for PSE's natural gas customers, including those within the study area, and a cleaner fuel alternative for maritime vessels. The project is expected to be completed and fully operational in 2021.

Petroleum

There are two petroleum pipelines in the Tideflats area – the Olympic Pipeline and the McChord Pipeline. Olympic Pipeline is owned and operated by BP; it runs 400 miles from Blaine, Washington to Portland, Oregon. The actual pipeline consists of multiple pipes in a variety of sizes that transport process petroleum products. The McChord Pipeline is owned and operated by a Par Pacific (formerly known as U.S. Oil and Refining). McChord Pipeline is a single, smaller diameter pipe connecting Par Pacific's Tideflats operations to Joint Base Lewis-McChord (14 miles). It transports only JP-8 jet fuel. No pipeline in the Tideflats area moves crude oil.

Telecommunications

Telecommunications infrastructure and services in the study area are provided by multiple companies, such as Comcast, Rainier Connect, CenturyLink, and others. Service to individual properties is provided on a project-by-project basis by the service provider.

14.3 Key Findings and Implications for the Plan

The following topics related to utilities should be considered in the development of the Tacoma Tideflats Subarea Plan:

- Utility infrastructure needs are generally evaluated on a site-specific basis as individual projects are developed and permits are issued. All new proposals will need to be evaluated for compliance with the goals and policies within the One Tacoma: Comprehensive Plan, Public Facilities and Services Element, including impacts on existing levels of service.
- Additional coordination with utility service providers will be needed to ensure that infrastructure currently exists for planned development, or that upgrades needed to support the development alternatives are not prohibitive. In some cases, working with the providers to upgrade services prior to development may be a way to facilitate the City's goals for growth within the Tacoma Tideflats area.
- Future corridor improvement projects should coordinate with utilities to identify joint opportunities. Even if there is not a demand for buried communications infrastructure, there may be benefits in laying conduit as part of a 'Dig Once' strategy.
- Updates to the Port of Tacoma Strategic Plan should be considered when evaluating utility needs within the Tacoma Tideflats area.

15 ACRONYMS

µg/m³ = micrograms per cubic meter

ACTs = abandoned commercial tanks

ADA = Americans with Disabilities Act

ARPA = Archaeological Resources Protection Act

ASA = Abandoned Shipwreck Act

ASARCO = American Smelting and Refining Company

AWC = Auto Warehousing Company

BiOp = Biological Opinion

BMPs = best management practices

BNSF = Burlington Northern Santa Fe

BPA = Bonneville Power Administration

CAP = Climate Action Plan

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

cfs = cubic feet per second

CH₄ = methane

CHE = Cargo-handling equipment

CO = carbon monoxide

CO₂e = CO₂ equivalents

COD = chemical oxygen demand

Corps = U.S. Army Corps of Engineers

CWA = Clean Water Act

DAHP = Department of Archaeology and Historic Preservation

DNR = Washington State Department of Natural Resources

DOD = Department of Defense

DOT = Department of Transportation

DPM = diesel particulate matter

EAP= Environmental Action Plan

EB1 = East Blair One Terminal

Ecology = Washington State Department of Ecology

EFH = Essential Fish Habitat

EPA = U.S. Environmental Protection Agency

ESA = Endangered Species Act

EST = East Sitcum Terminal

F = Fahrenheit

FCZD = Pierce County Flood Control Zone District

FEMA = Federal Emergency Management Agency

FERC = Federal Energy Regulatory Commission

FGTS = Freight and Goods Classification System

FIRM = Flood Insurance Rate Map

FMC = Fife Municipal Code

FMSIB = Freight Mobility Strategic Investment Board

Foss Watershed = the Thea Foss Waterway Watershed

FWM = Fishing Wars Memorial

GCP = General Central Peninsula

GHG = greenhouse gas

GMA = Washington State's Growth Management Act

GPCD = gallons per capita per day

HFCs = hydrofluorocarbons

HPA = Hydraulic Project Approval

I = Interstate

ILA = Interlocal Agreement

ISGP = Industrial Stormwater General Permit

ITS = Intelligent Transportation Systems

JBLM = Joint Base Lewis-McChord

JTC = Joint Transportation Committee

LED = light-emitting diode lighting

LEED = Leadership in Energy and Environmental Design

LID = Low Impact Development

LNG = Liquefied Natural Gas

LUSTs = leaking underground storage tanks

Management Plan = Pierce County Rivers Flood Hazard Management Plan

Mg CO₂e = mega grams of carbon dioxide equivalents

MGD = million gallons per day

MIC = Manufacturing/Industrial Center

Mitigation Plan = Pierce County Hazard Mitigation Plan

MMT = million gross metric tons

MMT CO₂e = million metric tons of carbon dioxide equivalents

MS4s = Municipal Separate Storm Sewer Systems

MSA = Magnuson-Stevens Fishery Conservation and Management Act

MSATs = mobile source air toxics

MTCA = Model Toxics Control Act

N₂O = nitrous oxide

NAAQS = National Ambient Air Quality Standards

NADB = National Archaeological Database

NAGPRA = Native American Graves Protection and Repatriation Act

NAICS = North American Industry Classification System

NE = Northeast

NEC = National Electrical Code

NESC = National Electric Utility Safety Code

NFIP = National Flood Insurance Program

NHPA = National Historic Preservation Act

NIM = North Intermodal Yard

NMFS = National Marine Fisheries Service

NO₂ = nitrogen dioxide

NOAA = National Ocean and Atmospheric Administration

NO_x = oxides of nitrogen

NPDES = National Pollutant Discharge Elimination System

NPL = National Priorities List

NRCS = Natural Resources Conservation Service

NRDA = Natural Resource Damage Assessment

NRHP = National Register of Historic Places

NWPCAS = Northwest Ports Clean Air Strategy

NWSA = Northwest Seaport Alliance

NWSA = Northwest Seaport Alliance

OGVs = Ocean-going vessels

ONE = Ocean Network Express

OSHA = Occupational Safety and Health Administration

PAHs = polycyclic aromatic hydrocarbons

PCC = Pierce County Charter

PCT = Pierce County Terminal

PFCs = perfluorocarbons

PFS = Public Facilities and Services

PHS = Priority Habitats and Species

PLIA = Washington state Pollution Liability Insurance Agency

PM = particulate matter

PM_x = particulate matter of a given diameter size in microns

PPP = Power Projection Platform

PSCAA = Puget Sound Clean Air Agency

PSE = Puget Sound Energy

PSRC = Puget Sound Regional Council

PTC = Puyallup Tribal Codes

Puyallup Tribe = Puyallup Tribe of Indians

RCRA = Resource Conservation and Recovery Act

RCW = Revised Code of Washington

ROG = reactive organic gases

RSLR = Relative sea level rise

SBCC = Washington State Building Code Council

SEPA = State Environmental Policy Act

SF₆ = sulfur hexafluoride

SHPO = State Historic Preservation Offices

SIM = South Intermodal Yard

SIP = State Implementation Plan

SMA = Washington State Shoreline Management Act

SMGM = Stormwater Management Guidance Manual

SMP = Tacoma Shoreline Master Program

SMPs = Shoreline Master Programs

SO₂ = sulfur dioxide

SR = State Route

STRAHNET = Strategic Highway Network

TAPs = Toxic Air Pollutants

TCPs = Traditional Cultural Properties

TDLE = Tacoma Dome Link Extension

TEU = Twenty-foot equivalent unit

the Plan = Subarea Plan

THPO = Tribal Historic Preservation Offices

TMC = Tacoma Municipal Code

TMP = Transportation Master Plan

TOTE = Totem Ocean Trailer Express

TPCSP = Tacoma Power Customer Services

TPU = Tacoma Public Utilities

TPY = tons per year

USC = United States Code

UFMP = Urban Forest Management Plan

UP = Union Pacific

USFWS = U.S. Fish and Wildlife Service

USGS = U.S. Geological Survey

USTs = underground storage tanks

UTC = Utilities and Transportation Commission

VOCs = volatile organic compounds

WAC = Washington Administrative Code

WDFW = Washington Department of Fish and Wildlife

WHR = Washington Heritage Register

WISAARD = Washington Information System for Architectural and Archaeological Records Database

WSDOT = Washington Department of Transportation

WST = West Sitcum Terminal

WUT = Washington United Terminals

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