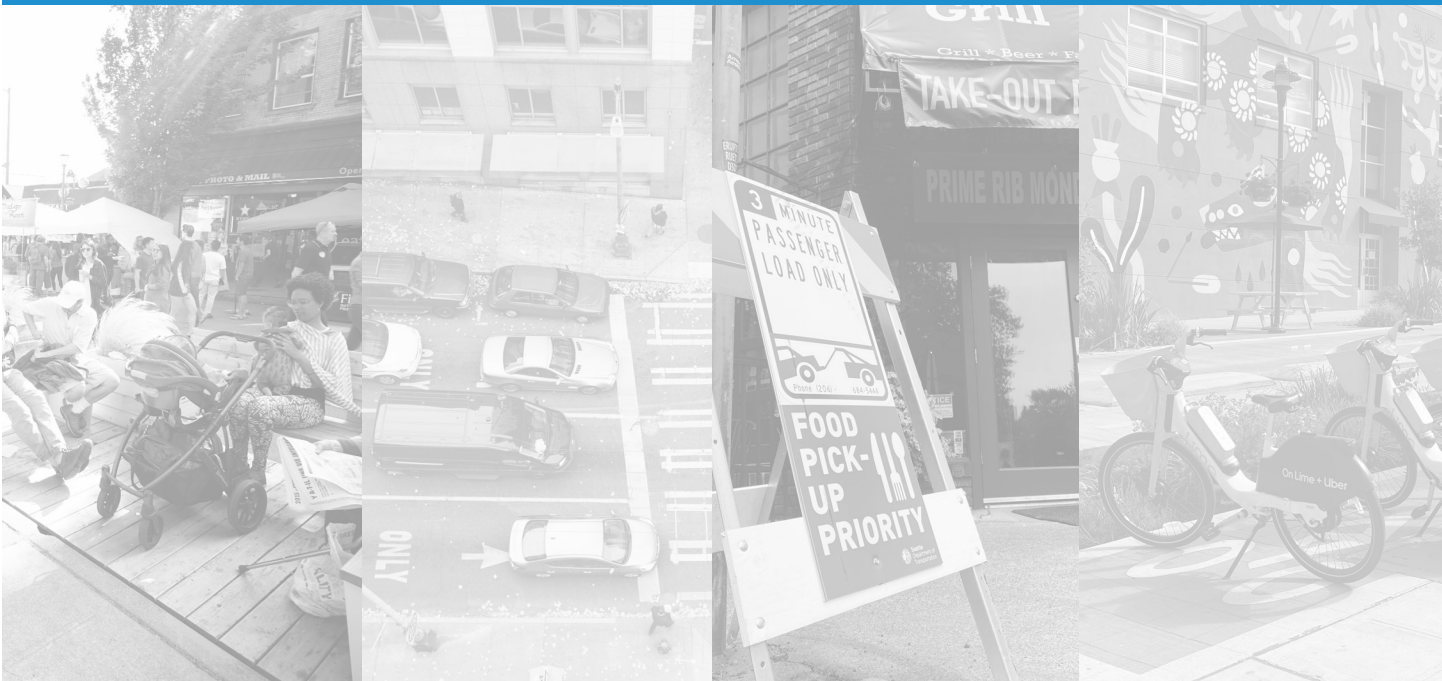




# Freight and Urban Goods Movement Element



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# INTRODUCTION

Seattle’s diverse economic and trade relations are important elements of the city’s history and cultural identity. Washington is the most trade dependent state in the nation, with Seattle at the center of it all. From health services, construction, maritime, manufacturing, and logistics, to professional services, life science, technology, creative occupations, and the green economy—our local industries are interconnected beyond our region to the rest of Washington and to national and global economies.

Our city is also a major import and export hub for regionally and internationally focused industrial sectors that generate significant volumes of freight and goods movement, such as retail and consumer goods, agricultural products, and e-commerce. Across Seattle’s industries, transportation has impacts well beyond city-lines. Goods may come from farms, through manufacturing and industrial centers (MICs), deep-water ports or regional logistics hubs.

Nearly every product made or purchased in Seattle reaches its final destination by some combination of truck, ship, plane, train, or pipeline. An extensive network of freight infrastructure and industry coordination connects cargo and urban goods to people, businesses and two manufacturing and industrial centers via an intricate framework of airports, seaports, railyards, distribution centers, local truck routes, regional pipelines, and highways and railways.

Seattle is home to the Port of Seattle, one of the Pacific Northwest’s leading economic engines. From fishermen and longshore workers to hay growers, and from shops in Pike Place Market to corporate giants like Microsoft and Boeing, the Port touches nearly every aspect of our economy. Maritime, industrial, freight, shipping, supply chain and logistics sectors depend on reliable access to a safe and functional freight network to connect MICs to each other, and to our regional and state freeway systems.

Maintaining and improving the freight network keeps goods and services moving smoothly and also helps keep valuable industry jobs within our city limits. Planning for freight and urban goods movement drives our economy and local industries, and supports the people who work in these industries, whether providing access to employment, well-lit places for truck drivers to park overnight, or maintained streets that enhance work environments for people transporting cargo or urban goods.



## HOW FREIGHT AND URBAN GOODS ADVANCES THE STP

The Seattle Transportation Plan (STP) presents a 20-year vision for transportation in Seattle. The Freight and Urban Goods Element provides information specific to the planning, design, construction, maintenance, and operation of the transportation network.

The STP and the Freight and Urban Goods Movement Element builds on and supersedes the 2016 Freight Master Plan (FMP). All transportation modes, vehicle types, and facilities used in goods movement are considered in the Freight Element, with a focus on truck transport and portions of the transportation network used to access maritime, manufacturing, and industrial centers (MICs) and connections to the regional freight system.

The Freight and Urban Goods Movement Element considers how goods and services are transported alongside various impacts freight movement can have on equity, community health, climate change, economy, traffic patterns, and public safety. It establishes a framework to help guide freight mobility investments that can help increase safety, including freight-related interactions with other travelers, and improve equitable access to resources, programs, and secure infrastructure for freight industry employees. Improving equity also requires addressing the known adverse impacts of freight industry outputs that continue to be detrimental to the adjacent Seattle neighborhoods.

An important consideration of the Freight and Urban Goods Movement Element includes the people employed by trade industries. This includes supporting the human element of freight and considering the relationship between our transportation infrastructure and the working conditions for service providers. This important work is aligned with our citywide goals to eliminate historical racial and socioeconomic disparities in and around industrial lands.

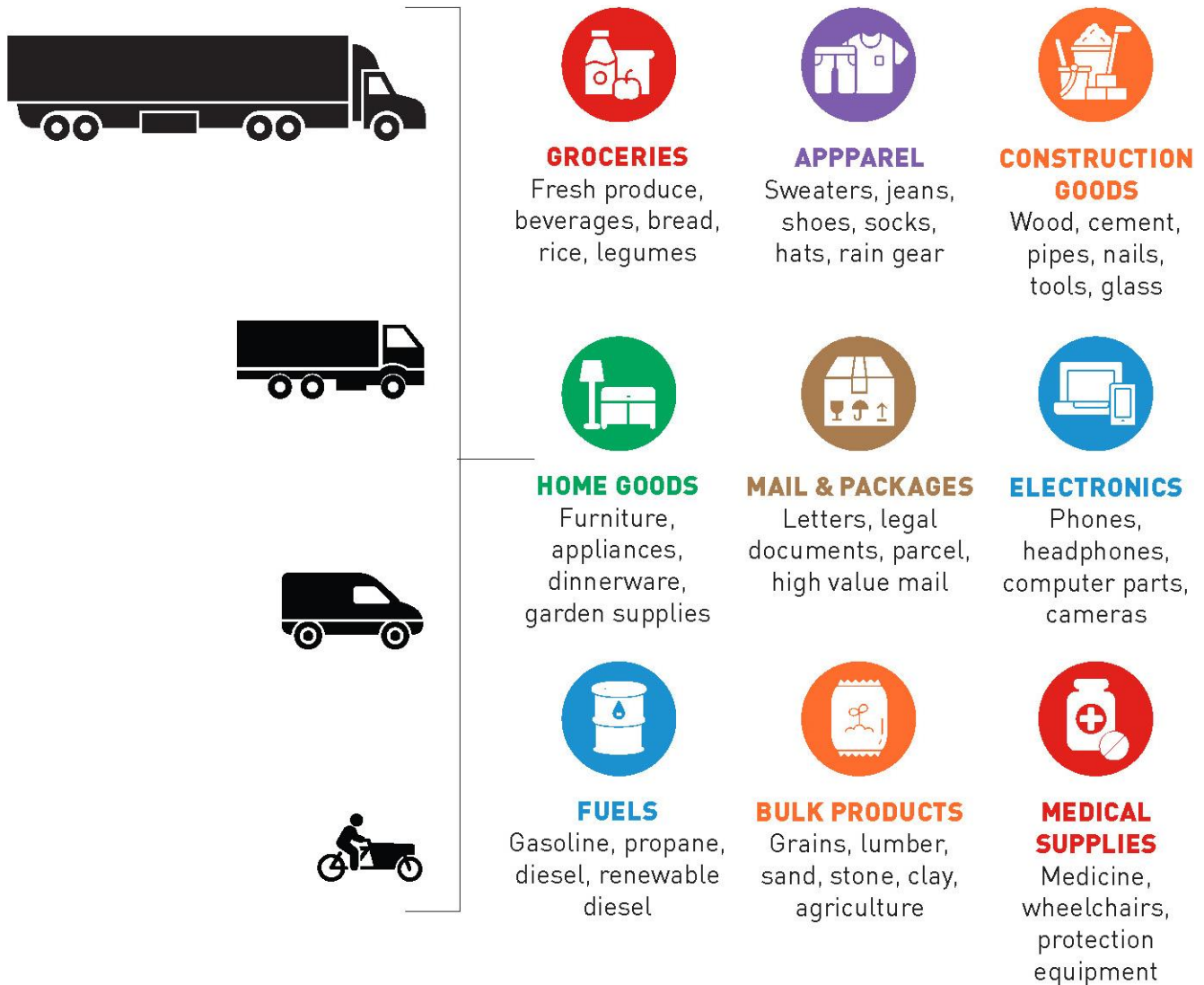


*A truck at the port carries cargo*

## What is Freight?

Freight refers to a variety of commercial goods transported from one location to another. This includes bulk quantities of agricultural products or raw materials like grain or lumber, often moved in ships, barges, or cargo containers. Specialized container tanks carry fuels, from coal to diesel, propane to liquid hydrogen, and many other contents, even milk. Freight also encompasses consumer goods delivered to stores or homes, like groceries, apparel, electronics, home goods, and delivered meals. These items are typically transported in box trucks, delivery vans, and increasingly, personal vehicles. Individuals, government agencies, businesses, schools, manufacturers, and others rely on timely freight delivery, supporting the region's economic vitality and enhancing people's lives.

Figure 1: What is Freight?





## Supporting Growth and Economic Vitality

As Seattle continues to grow, our transportation system must evolve in tandem with our changing landscape. Despite the pandemic, Seattle grew while many other big cities saw population decline. In 2022, Seattle was the fastest-growing big city in the United States according to the Census Bureau<sup>1</sup>. Over the next two decades, Seattle's population is projected to grow to 1 million. Accommodating the daily needs of people living here today and over the next couple of decades will be critical to our quality of life. The city is also expected to add about 158,000 new jobs in the same time period.

More residents and more jobs will require the delivery of more goods and services. Freight movement in Washington is projected to grow by 42% by 2050<sup>2</sup>, alongside significant growth in residential delivery trips due to post-pandemic consumer preferences and our growing regional population. Planning to support projected demand can help keep Seattle a thriving, prosperous, and resilient city well into the future. It's more critical than ever to support these vital trips that keep the cogs of our economy turning.

Our comprehensive plan, One Seattle, guides how and where growth will occur to accommodate the growing number of people who live, work and travel here. No matter where people live or work, providing safe and equitable transportation will always be critical to connect people and goods where they need to go. To achieve our shared goals as One Seattle, we must strategically plan for a range of appropriate transportation options and supportive infrastructure that fits the needs of our unique and varied communities— whether a dense downtown grid, a quiet residential neighborhood, or a bustling manufacturing and industrial center. By planning for Freight and Urban Goods Movement, we can support our growing city in a variety of ways.

### **Economic Benefits of Freight and Urban Goods Movement**

Cargo and urban goods movement is inextricably linked to our maritime, trucking, rail, and manufacturing industries. Many businesses and other industries rely on freight to ship goods from their origin and deliver them to final destinations—solving the first-and-last mile challenges. At the broadest level, freight—the transport of cargo and urban goods—is what fuels our economy. With its strategic location in the Puget Sound, Seattle plays a key role in regional and global trade and transportation. The city's port terminals, railyards and drayage and maritime facilities serve as major intermodal gateways handling a diverse range of goods and commodities from around the world. Immense economic contributions of trade industries are demonstrated by:

- Number, quality, quantity and character of family-wage employment and training opportunities
- Regional, state, and local partnerships to improve goods movement and reduce the industry's carbon footprint
- Myriad business opportunities that create and support jobs and livelihoods for people, generate revenue, and activate the city

### **Our Interconnected Economy**

Transportation doesn't stop where SDOT's assets end. Our public right of way and the network of streets that we manage in support of our trade industries connects to vast networks of

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<sup>1</sup> Growth in the Nation's Largest Counties Rebounds in 2022 ([census.gov](https://www.census.gov))

<sup>2</sup> 2017 Baseline. [Regional Transportation Plan | Puget Sound Regional Council \(psrc.org\)](https://www.psrc.org).

transportation outside of SDOT’s authority, including Port, maritime, state highway, and rail operations.

Seattle's maritime industry and related infrastructure connects to the Puget Sound region and international markets. This connectivity enhances trade opportunities, supports commercial business innovation, investment and development while driving the resilience, efficiency, and competitiveness of our maritime industry. The Port of Seattle, one of the busiest seaports on the West Coast, serves as a vital hub for containerized cargo, bulk commodities, and other freight, contributing significantly to the city's economic vitality.

Maritime and industrial-related operations, maintenance, security, and logistics industries generate significant employment opportunities, especially in the MICs, creating jobs and bolstering the local workforce, including but not limited to:

- Commercial fishing and seafood packaging and handling
- Vessel maintenance and shipbuilding
- Skilled trades and construction
- Clean energy research and development
- Passenger or cargo screening and handling
- Maritime and logistics technology
- Off-shore wind development
- Workforce development

For example, Seattle’s industrial areas are home to Tutta Bella, an industrial kitchen; Glowforge, a laser printing company; First Mode, a clean-energy company working on decarbonizing heavy industry; and Maritime Blue, a non-profit supporting maritime industries and related activities that promote a sustainable future.

### **Maritime, Manufacturing, Transportation and Warehousing**

Unfolding over several decades, the city’s global identity as a Maritime and Manufacturing hub has shifted to a global tech innovator hosting two of the world’s largest tech companies. Yet, the Maritime and Manufacturing industries continue to play a vital role in Seattle’s economy and remain an integral part of its identity.

Today, the Maritime industry in Seattle continues to be characterized by shipbuilding, fishing, recreation, tourism, passenger transportation, domestic and international maritime logistics, and shipping. Manufacturing is characterized by food and beverage, textiles and apparel, wood product and paper, chemical and plastics, aerospace, machinery, and metal product, and other manufacturing. Transportation and Warehousing includes air transportation, truck transportation, transit, ground, scenic, and sightseeing transportation, pipeline transportation, postal service and couriers, support activities for transportation, and warehousing and storage.

In 2021, the Maritime, Manufacturing, and Transportation and Warehousing industries in Seattle directly supported a combined total of 46,800 jobs, \$6.2 billion in wages, and \$20 billion in estimated direct business revenues. In King County in 2022, these three industries directly supported a combined total of 189,500 jobs, \$21.9 billion in employee wages, and \$86.9 billion in estimated business revenues.<sup>3</sup>

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<sup>3</sup> City of Seattle, Office of Economic Development, “Maritime, Manufacturing, and Transportation & Warehousing Strategic Analysis,” November 2023

In 2015, the ports of Seattle and Tacoma formed The Northwest Seaport Alliance (NWSA) to unify their marine cargo facilities and business. Together, they are among the busiest ports in the United States.

*Table 1: Busiest Ports in the United States by TEUs, 2022*

Rank	Port	TEUs
1	Port of Los Angeles	9,911,156
2	Port of New York and New Jersey	9,493,664
3	Port of Long Beach	9,133,657
4	Georgia Ports (Savannah)	5,892,131
5	Port Houston	3,974,901
6	Port of Virginia (Norfolk)	3,695,156
7	Northwest Seaport Alliance / Port of Seattle and Port of Tacoma	3,384,018
8	South Carolina Ports (Charleston)	2,792,313
9	Port of Oakland	2,337,607
10	Jaxport (Jacksonville)	1,298,132

The majority of container terminals are located within the Duwamish Manufacturing and Industrial Center (MIC), one of two MICs in the City of Seattle. About 100,000 jobs are located in these industrial areas—around 15% of total employment in the City and 4.6% of total employment the metropolitan area (Seattle-Tacoma-Bellevue metropolitan statistical area)<sup>4</sup>. A network of marine terminals, railroads, rail spurs, roadways and airports help to facilitate all the industrial activity in the MICs.

Notably, up to 4 out of 5 truck trips in metropolitan areas are generated by deliveries of goods and services in the regional and local distribution system. Regional businesses depend on efficient and reliable regional deliveries, and residents need products from retailers and service providers that originate from a truck. Truck transportation demand can be anticipated to increase with population and employment growth, as well as from changes in technology and consumer preferences.<sup>5</sup>

BNSF, the largest Class 1 railroad operating in the state of Washington, has 1,332 miles of track statewide. In 2016, the railroads handled 502,000 carloadings originating from and 890,000 carloadings terminating in the state.<sup>6</sup>

<sup>4</sup> City of Seattle, Industrial Maritime Strategy Report, 2021; BLS, Seattle Economic Summary, Oct 2023

<sup>5</sup> 2017 WSDOT Freight System Plan

<sup>6</sup> BNSF Fact Sheet, Washington State, 2016

## Supply Chains

A supply chain comprises a sophisticated network encompassing individuals and facilities engaged in the intricate processes of manufacturing, distribution, and retail. This complex interplay involves the seamless integration of people, information, and transportation, meticulously coordinating the journey of goods or services from production hubs to their final destinations. The critical variable of speed to market assumes paramount importance, influencing strategic decisions regarding the transportation mode—whether by truck, rail, ship, or air—at various stages of the supply chain. A deeper comprehension of supply chains can be gleaned by examining the multitude of steps and extensive distances involved in bringing food from the farm to the consumer's table.

Illustrated in **Figure 2**, this intricate graphic illustrates the nearly 2,000 miles covered in delivering the components that contribute to the creation of a pint of beer and a plate of fish and chips served at a local pub. The vulnerability of this intricate system becomes evident when disruptions occur within the supply chain. As delineated in **Figure 2**, such disruptions manifest in increased costs, affecting items like beer and fish and chips, as well as essential groceries such as milk, bread, and eggs at local stores. Whether caused by traffic hindering truck deliveries, businesses being unavailable to accept shipments, or truck drivers facing parking challenges due to limited curb space or loading docks—the resulting repercussions are inevitably transferred to the consumer. These bottlenecks can translate into heightened costs of living and conducting business within the city, driven by augmented expenses in gas and time that can reverberate through the supply chain, and ultimately impact the end consumer.

Figure 2: Seattle Supply Chain



## RELATIONSHIP TO STP GOALS

Freight plays an important role in meeting STP goals for safety, equity, sustainability, mobility & economic vitality, livability, and maintenance and modernization.



SAFETY

**Prioritize safety for travelers in Seattle, with no serious injury or fatal crashes.** Major Truck Streets are primary routes to connect major freight traffic generators, including heavy haul routes. This designation informs roadway designs that support unique truck movement needs, like turning radii and lane widths, traffic management decisions, and pavement condition. Safety improvements where travelers intersect freight movement, personnel work in streets, and railroad crossings can reduce serious or fatal injuries.



EQUITY

**Co-create with community and implement restorative practices to address transportation-related inequities.** Equity in freight investments can improve the health of communities impacted by goods movement. Infrastructure that supports freight workers, many of whom are BIPOC, can also be way of investing in equity. Capital investments in areas adjacent to industrial lands have the potential to address historic and emergent environmental, public health, and shoreline access concerns. Reducing intermodal impacts on communities through industry partnership supports the needs of workers.



SUSTAINABILITY

**Respond to climate change through innovation and a lens of climate justice.** Green innovations in rail and port operations can support climate goals. This could include integrating coastal remediation policy and practice into industrial area maintenance and new freight facility construction, or grade separating rail facilities to reduce vehicle idling. Decarbonization of truck fleets will require alternative fuels and electrification. Funding and performing roadway maintenance can help maintain environmental compliance.



MOBILITY & ECONOMIC VITALITY

**Provide reliable and affordable travel options that help people and goods get where they need to go.** Investments in MICs and along designated freight routes can support safe, efficient, and reliable movement of goods and services. Freight mobility is supported by wayfinding, commercial vehicle load zones, employee personal vehicle and truck parking, and more. Improved data enables better response to industry changes and consistency with state and regional freight plans. In partnership with the freight community, we'll endeavor to preserve, protect, and enhance critical truck routes



LIVABILITY

**Reimagine our streets as inviting places to linger and play.** Developing an urban goods delivery strategy that includes on- and off-street tactics and capital investment in the freight network can support economic growth. Updates to commercial vehicle load zone permit processes, hours, and enforcement will provide more reliable curb access. Addressing constraints in the freight network, including increased train traffic, bridges, potholes, drainage, and blocked grade crossings, can smooth flows.



MAINTENANCE & MODERNIZATION

**Improve city transportation infrastructure and ready it for the future.** Integration of innovative policy and practices can improve maintenance and safe, efficient operation of the freight network, including heavy haul program projects and nonarterial roads in industrial and commercial areas. Asset management helps to strategically optimize maintenance investments, while coordination of freight and transit infrastructure investments can encourage safe coexistence of all modes. Transportation Systems Management and Operations (TSMO), intelligent transportation systems (ITS)/advanced traffic management systems (ATMS) can help improve traffic flow, especially for freight, and at the same time better manage the need for capital expenditures.

# DELIVERING THE KEY MOVES

Part I, Chapter 3 of the Seattle Transportation Plan (STP) includes a collection of key moves, or strategies that describe the priority actions we've identified as critical to achieve our STP goals:

- Safety (S)
- Equity (TJ)
- Sustainability (CA)
- Mobility & Economic Vitality (PG)
- Livability (PP)
- Maintenance & Modernization (MM)

Each of the functional elements serve a distinct and important role in making our key moves happen. This section highlights the most relevant key move actions for this element.

**Table 2** is intended to illustrate which of the key moves the Freight and Urban Goods Movement Element will help us to accomplish.

- Element actions with a reference, such as "[Supports Key Move TJ1](#)," link directly back to the corresponding Part I Key Move that it supports. See Chapter 3.
- Element actions with a reference, such as "[Supports TEF 32.1](#)," link directly back to the corresponding Transportation Equity Framework (TEF) tactic(s) the action advances. A comprehensive list of supported TEF tactics is included at the end of each element.

Several actions are repeated across all STP functional elements because they are important commitments that should be present in all of our work. For example, all elements include:

*Incorporate Vision Zero and Safe System approaches into every project and program, including proactive safety improvements for citywide implementation.*  
*(Supports Safety Key Move S2a)*

*Feature community voices in planning documents.* *(Supports Equity Key Move TJ1b)*

**Part I, Chapter 4 Implementation Strategy of the STP provides additional information on how we'll deliver our shared vision, goals, and key moves.**

Table 2: Freight and Urban Goods Movement: Delivering the Key Moves

		STP Goals Supported					
		Safety	Equity	Sustainability	Mobility & Economic Vitality	Livability	Maintenance & Modernization
<b>Freight and Urban Goods Movement: Delivering the Key Moves</b>							
<b>SAFETY KEY MOVES</b>							
<b>Concentrate safety investments where fatal and serious injury collisions occur most or are at a higher risk of occurring (S2)</b>							
F1	Incorporate Vision Zero and Safe System approaches into every project and program, including proactive safety improvements for citywide implementation. <a href="#">(Supports Key Move S2a)</a>	✓	✓	✓	✓	✓	✓
F2	Prioritize safety improvements at locations that are on the high-injury network, have high levels of travel stress, or identified through the Seattle Bicycle Pedestrian Safety Analysis. <a href="#">(Supports Key Move S2b)</a>	✓					✓
F3	Accelerate implementation of research-backed improvements that are proven to make streets safer for everyone, including but not limited to leading pedestrian intervals (LPIs) at signals, arterial traffic calming, and road diets. Use SDOT truck and heavy vehicle design guidance and develop new designs for truck-compatible traffic calming measures that allow safe truck movements and integrate other travel options. <a href="#">(Supports Key Move S2c)</a>	✓	✓				
F4	Make people walking, biking, and rolling more visible by improving sight lines at intersections through treatments such as curb bulbs, intersection daylighting, and refuge islands, with a focus on High Injury Corridors. <a href="#">(Supports Key Move S2d)</a>	✓	✓				
F5	Pilot and evaluate new and emerging safety treatments in locations where proven interventions are infeasible or do not address identified issues. <a href="#">(Supports Key Move S2f)</a>	✓					✓
<b>Make all journeys safer from departure to destination, especially for people traveling outside the protection of a vehicle (S3)</b>							
F6	Provide dedicated places for people to walk, bike, or roll safely separated from vehicles by using context appropriate treatments such as protected bike lanes or “complete street” corridors, especially on major truck routes. Where a freight route shares a street with a bicycle route, facilities for trucks and bicycles should be clearly separated and comply with width and materials standards, consistent with Streets Illustrated. As we explore appropriate treatments, we’ll note the unique character of activities in MICs. <a href="#">(Supports Key Move S3b)</a>	✓	✓	✓	✓	✓	
F7	Enhance both real and perceived safety for riders at transit stops and station areas through investments in design features such as lighting and shelters, as well as frequent and reliable services that limit late-night wait times, including in MICs and industrial employment centers. Advocate for programs that support physical, mental, and emotional safety of transit riders. <a href="#">(Supports Key Moves S3e)</a>	✓	✓	✓	✓		
F8	Support programmatic activities and partnerships to reduce the size and weight of vehicles used for personal trips, transit, and urban goods movement. Heavier vehicles are a key factor in pedestrian fatalities. <a href="#">(Supports Key Move S3f)</a>	✓	✓	✓	✓		
F9	Coordinate with freight, passenger rail, and light rail partners on safety improvements at rail crossings. Fund and develop a rail program that outlines	✓					

		STP Goals Supported					
		Safety	Equity	Sustainability	Mobility & Economic Vitality	Livability	Maintenance & Modernization
<b>Freight and Urban Goods Movement: Delivering the Key Moves</b>							
initiatives to improve safe interactions between various travel options and trains at rail crossings. <a href="#">(Supports Key Move S3g)</a>							
F10	Expand safety education for all travelers. Develop education programs for freight and rail that include information on at-grade rail-crossing safety from Operation Lifesaver and better educates pedestrians and bicyclists about safety considerations of trucks, like blind spots, turning paths, and longer stopping distances. <a href="#">(Supports Key Move S3h)</a>	✓	✓	✓	✓		
<b>EQUITY KEY MOVES</b>							
<b>Center the voices of communities of color and underrepresented groups in planning and decision-making process (TJ1)</b>							
F11	Implement the Transportation Equity Framework (TEF) to grow transparency, accountability, and shared power when making transportation decisions with community members, including freight, rail, maritime business, and employee voices. <a href="#">(Supports Key Move TJ1a)</a>		✓				
F12	Feature community voices in planning documents, including employees of the freight, rail, maritime industries and businesses. <a href="#">(Supports Key Move TJ1b)</a>		✓				
F13	Continue to build and maintain relationships with vulnerable communities and underrepresented groups. This may include employees of MICs and industrial employment centers, as well as communities impacted by freight and goods movement activities. <a href="#">(Supports Key Move TJ1c and TEF 29.1, 41.6)</a>		✓				
F14	Meet early and often to provide opportunities to influence projects during the initial phases of the development process. <a href="#">(Supports Key Move TJ1d and TEF 3.4)</a>		✓				
F15	Normalize the practice of making decisions about policies and right-of-way allocations with input from vulnerable communities. <a href="#">(Supports Key Move TJ1f and TEF 19.1, 25.4)</a>		✓				
F16	Support the transportation-related needs of local businesses owned by vulnerable communities and their commuting employees. Provide accessible and culturally relevant information about SDOT services. <a href="#">(Supports Key Move TJ1h and TEF 17.1, 21.2, 16.1)</a>		✓		✓		✓
F17	Compensate community partners for their valuable work to connect and communicate with their networks and uplift community-driven initiatives. <a href="#">(Supports Key Move TJ1i and TEF 1.1, 13.4, 31.4, 37.1)</a>		✓				
<b>Address inequities in the transportation system by prioritizing investments for impacted communities (TJ2)</b>							
F18	Prioritize transportation investments that benefit people and local businesses who currently and historically experience high transportation burdens and those at high risk of displacement. <a href="#">(Supports Key Move TJ2a)</a>	✓	✓				✓
F19	Prioritize investments that will enhance safe, reliable access to employment centers and MICs for BIPOC, low-income and displaced workers, such as increased or late-night transit services or well-lit overnight parking for truck drivers. <a href="#">(Supports Key Move TJ2b)</a>	✓	✓		✓		✓



Freight and Urban Goods Movement: Delivering the Key Moves		STP Goals Supported					
		Safety	Equity	Sustainability	Mobility & Economic Vitality	Livability	Maintenance & Modernization
F20	Engage regularly with local businesses owned by our vulnerable communities to hear their concerns around transportation project impacts and displacement, and co-create transportation, public space, and permitting solutions. This should include the drayage truck driving community, many of whom are BIPOC and/or immigrants. <a href="#">(Supports Key Move TJ2d and TEF 14.3, 15.2)</a>		✓			✓	✓
F21	Develop policies to prevent transportation projects, both past and present, from causing future displacement and mitigate impacts that can't be avoided. <a href="#">(Supports Key Move TJ2g)</a>		✓				
F22	Conduct and implement racial equity assessments at the program level. <a href="#">(Supports Key Move TJ2j)</a>		✓				
<b>SUSTAINABILITY KEY MOVES</b>							
<b>Improve neighborhood air quality and health outcomes by promoting clean, sustainable travel options (CA1)</b>							
F23	Operate the transportation system (e.g., signals, markings, signage, and right-of-way allocation) to encourage sustainable travel choices (walking, biking, taking transit, and for moving goods). In MICs and on major truck streets, consider prioritizing goods movement on a case-by-case basis. <a href="#">(Supports Key Move CA1g)</a>	✓	✓	✓	✓	✓	✓
<b>Green city streets with landscaping and street trees to better handle changing climate (CA2)</b>							
F24	Encourage the maintenance and installation of green infrastructure, including —such as street trees, rain gardens, landscaping, natural drainage systems, bioswales, and pervious materials—as other improvements occur in the right-of-way in MICS and industrial areas). <a href="#">(Supports Key Move CA2a and TEF 56.4)</a>			✓		✓	✓
F25	Install green stormwater infrastructure on streets that already and will continue to flood frequently. <a href="#">(Supports Key Move CA2e)</a>	✓		✓	✓		✓
<b>Foster neighborhood vitality and improved community health (CA3)</b>							
F26	Work with local businesses in future low-emission neighborhoods to address delivery and access needs. Develop a low- and zero-emission loading program that prioritizes climate friendly vehicles and incentivizes freight companies to transition to right-sized, electric vehicle alternatives. <a href="#">(Supports Key Move CA3b)</a>			✓		✓	
F27	Design for people-first streets to make sustainable travel choices the default and easy choice for neighborhood trips and to increase neighborhood business district activity. This can improve capacity and access to the curb to support businesses. <a href="#">(Supports Key Move CA3d)</a>			✓	✓	✓	
F28	Incentivize use of non-fossil fuel-powered mobility options for transit, personal and urban goods delivery vehicles. Develop and launch a commercial cargo e-bike program and e-cargo bike lending libraries. <a href="#">(Supports Key Move CA3e)</a>			✓	✓		
F29	Encourage neighborhood delivery hubs in partnership with local businesses to create central drop-off/pick-up locations for goods and services used by multiple providers, retailers, and consumers. <a href="#">(Supports Key Move CA3f)</a>			✓			
<b>Support the transition from fossil fuel to electric vehicles for personal, commercial, and delivery trips (CA4)</b>							

		STP Goals Supported					
		Safety	Equity	Sustainability	Mobility & Economic Vitality	Livability	Maintenance & Modernization
<b>Freight and Urban Goods Movement: Delivering the Key Moves</b>							
F30	Support electrification of freight vehicles through programs that install charging infrastructure, offer focused incentives, and manage reliance on large vehicles. (Supports Key Move CA4f)			✓			
F31	Support comprehensive decarbonization strategies that include clean energy fuels and innovative technologies. Collaborate with the Port of Seattle and the Northwest Seaport Alliance on ways to support their goal of phasing out all emissions from all seaport activities, including drayage trucks. (Supports Key Move CA4g)		✓	✓			
<b>Advance mobility management strategies to encourage walking, biking, and transit trips (CA5)</b>							
F32	Explore equitable demand management tools that could influence travel choices and create revenues to invest in sustainable transportation options, freight movement, and innovation. (Supports Key Move CA5c)		✓	✓			✓
<b>MOBILITY &amp; ECONOMIC VITALITY KEY MOVES</b>							
<b>Support access to jobs, freight movement, and growth in residential deliveries (PG4)</b>							
F33	Develop an urban goods movement and delivery planning program.	✓	✓	✓	✓	✓	
F34	Design the street network for safe and predictable movement of trucks, such as tractor trailers or drayage trucks, garbage trucks, box trucks and cargo vans. Use SDOT truck and heavy vehicle design guidance and develop new designs for truck-compatible traffic calming measures that allow for safe truck movements and integrate with other travel options. (Supports Key Move PG4a)	✓	✓	✓	✓	✓	
F35	Provide for critical access needs (mail and goods deliveries, solid waste pick-up, etc.) on-street when they cannot be accommodated off-street. (Supports Key Move PG4b)				✓		
F36	Explore implementation of dedicated freight (truck-only) lanes and freight-and-bus (FAB) lanes, pending successful results of a pilot project, to improve freight mobility on Seattle streets with high truck volumes. (Supports Key Move PG4c)		✓	✓	✓		
F37	Prioritize improvements in the freight network and safety improvements to freight vehicles to accommodate their interactions with other functions of the street and curb, particularly with people who are walking, biking, and rolling. Improvements should maintain truck mobility and support the needs of truck drivers to operate their trucks safely, accounting for blind spots and large turning paths. (Supports Key Move PG4d)	✓	✓	✓	✓	✓	
F38	In coordination with freight and rail partners, address the unique mobility and access needs of industrial freight in manufacturing and industrial centers through planning, design, infrastructure investments, and operations activities that support efficient and reliable goods movement. (Supports Key Move PG4e)	✓	✓	✓	✓	✓	✓
F39	Collaborate with private sector partners on pilots and programs that accelerate the shift of freight trips to more sustainable low- and zero emissions vehicles, such as electric cargo bikes, to replace a portion of last-mile deliveries made by larger vans and trucks in densely developed areas. (Supports Key Move PG4f)		✓	✓	✓		
F40	Pilot and expand use of technologies that can improve predictability and accessibility for vehicle loading/unloading activities. Digital curb	✓			✓		✓

		STP Goals Supported					
		Safety	Equity	Sustainability	Mobility & Economic Vitality	Livability	Maintenance & Modernization
<b>Freight and Urban Goods Movement: Delivering the Key Moves</b>							
management can make it easier for commercial vehicles to access the curb and eliminate inefficiencies, like circling the block looking for available loading zones, double-parking, or parking in a center-turn lane. (Supports Key Move PG4g)							
F41	Explore programs and incentives that encourage rightsizing of freight vehicles for an urban environment. (Supports Key Move PG4h)			✓	✓	✓	✓
F42	Work with other agencies and private partners to provide real-time information to minimize travel time and optimize access for commuters and freight and urban goods vehicles. (Supports Key Move PG4i)			✓	✓		✓
F43	Preserve and enhance access to employment and mobility for freight and goods movement —especially east-west connections—between MICs accessing ports, working waterfronts, intermodal facilities and other key destinations. (Supports Key Move PG4k)				✓		✓
<b>Manage curbspace to reflect city goals and priorities (PG5)</b>							
F44	Recognize that the curb supports all essential functions of the right-of-way (mobility, access for people, access for commerce, activation, greening, and storage) and develop decision frameworks to prioritize these functions based on local area and system needs. (Supports Key Move PG5a)				✓		✓
F45	Prioritize uses of the curb to address demands stemming from changes to more sustainable and efficient personal travel options and the evolving landscape of goods and service delivery over use as private car storage. (Supports Key Move PG5b)				✓		
F46	Increase the number of commercial vehicle loading zones to decrease the time freight and delivery drivers spend searching for parking. (Supports Key Move PG5g)		✓	✓	✓	✓	
<b>LIVABILITY KEY MOVES</b>							
<b>Reallocate street space to prioritize, creating enjoyable places that also facilitate goods delivery and mobility (PP1)</b>							
F47	Design streets and public spaces with consideration of goods, delivery and emergency access needs, while adjacent businesses prosper from an activated public realm. (Supports Key Move PP1c)	✓	✓		✓	✓	
F48	Update the City of Seattle Standard Plans for Municipal Construction to reflect freight network changes and updates to Streets Illustrated. (Supports Key Move PP1d)	✓	✓	✓	✓	✓	✓
<b>MAINTENANCE &amp; MODERNIZATION KEY MOVES</b>							
<b>Maintain our streets, sidewalks, and bridges and incorporate planned safety and network improvements with maintenance work (MM1)</b>							
F49	Maintain our transportation infrastructure, including streets, sidewalks, and bridges serving the most users and on the high-injury network. (Supports Key Move MM1a)	✓	✓	✓	✓	✓	✓
F50	Strategically manage the life cycle of our transportation assets in accordance with our Transportation Asset Management Plan to achieve				✓		✓

Freight and Urban Goods Movement: Delivering the Key Moves		STP Goals Supported					
		Safety	Equity	Sustainability	Mobility & Economic Vitality	Livability	Maintenance & Modernization
the best performance results for the preservation, improvement, and operation of infrastructure assets. <a href="#">(Supports Key Move MM1b)</a>							
F51	Reduce the maintenance backlog by being proactive, leveraging technology to monitor asset conditions, and using data and lifecycle analyses to help when it's time for upgrades. <a href="#">(Supports Key Move MM1c)</a>				✓		✓
F52	Conduct proactive bridge and roadway structure maintenance, preservation, and replacement activities to increase the resiliency of vulnerable bridges and other vital connections. <a href="#">(Supports Key Move MM1d)</a>	✓			✓		✓
F53	Collect feedback on asset conditions as part of community engagement on transportation system planning, design, and co-creation. <a href="#">(Supports Key Move MM1e)</a>		✓				✓
F54	Conduct asset maintenance in accordance with the priority investment and emergency response route networks, especially when investment supports walking, biking, transit, and freight. <a href="#">(Supports Key Move MM1f and TEF 45.6)</a>		✓				✓
F55	Modernize city streets by incorporating planned safety and network improvements into maintenance and replacement activities to not only improve the condition of transportation infrastructure and equipment, but also reduce dependence on driving, promote sustainable travel options, and support economic vitality. <a href="#">(Supports Key Move MM1g and TEF 19.3)</a>	✓	✓	✓	✓	✓	✓

Reduce neighborhood disparities in the quality of streets, sidewalks, public spaces, and bridges (MM2)							
F56	Conduct a racial equity assessment of the maintenance needs of existing assets in neighborhoods that score high on the city's Race and Social Equity Index. <a href="#">(Supports Key Move MM2a and TEF 19.3)</a>	✓	✓				✓
F57	Equitably distribute resources for maintenance and improvements in neighborhoods and industrial areas that have been historically or are currently underserved. <a href="#">(Supports MM2b and TEF 19.4)</a>		✓		✓		✓
Ready city streets for new travel options and emerging trends and technologies (MM3)							
F58	Collect, monitor, and use data to inform changes to the transportation system. <a href="#">(Supports Key Move MM3a)</a>				✓		✓
F59	Proactively work with public, private, and academic sector partners, such as the University of Washington's Urban Freight Lab, to collaboratively develop freight and urban goods mobility solutions for the future. <a href="#">(Supports Key Move MM3c)</a>				✓		✓
F60	Coordinate with relevant partner agencies on projects of regional and statewide significance within the City of Seattle, such as the I-5 Master Plan, Lid I-5, or high-speed rail corridors. <a href="#">(Supports Key Moves MM3d)</a>				✓		✓
F61	Develop and maintain up-to-date asset data, including digital inventories of physical assets like heavy-haul pavement, truck parking (including overnight), rail crossing maintenance, curb returns, potholes, storm		✓		✓		✓

		STP Goals Supported					
		Safety	Equity	Sustainability	Mobility & Economic Vitality	Livability	Maintenance & Modernization
<b>Freight and Urban Goods Movement: Delivering the Key Moves</b> drainage, curb space, load zones, access to loading docks, and other commercial truck facilities. <a href="#">(Supports Key Move MM3f)</a>							
F62	Research and develop policies to manage the evolution toward connected and autonomous vehicles (CAVs) and their potential applications for freight and urban goods movement, recognizing that government and industry must partner to deliver benefits safely. <a href="#">(Supports Key Move MM3h)</a>	✓	✓		✓	✓	✓

# SETTING THE CONTEXT

Seattle is a dynamic and ever-evolving city. We’ve seen dramatic changes in the types of travel options available for people to choose from, as well as when and where people want to travel. Additionally, there are increasing demands on the role streets play to support social, environmental, and economic health. We can’t fully predict changing conditions (such as a global pandemic) that could disrupt the transportation system and all the functions it serves. As such, we’ll need to remain agile and continually adapt and respond to the evolving transportation needs of the city’s residents, businesses, and visitors.

The STP provides a framework for how the Seattle Department of Transportation (SDOT) will navigate a changing transportation landscape over the next 20 years. This section describes the context we’re operating in today, including significant opportunities, emerging trends, and challenges. It also includes a summary of major community engagement themes we heard that relate to freight and urban goods. They were used to shape the actions we’ll take to achieve our shared transportation vision. SDOT will continue to engage and co-create with community members as transportation system needs, preferences, and circumstances continue to evolve in the years to come.



*Port of Seattle, terminals and cargo containers*

## OPPORTUNITIES, EMERGING TRENDS, AND CHALLENGES

Living in one of the nation’s leading trade gateways, Seattle residents experience these opportunities and challenges firsthand. Freight and urban goods movements are a key component of our local, regional, national, and international supply chains. A single disruption can reverberate all the way to the

Seattle consumer. The health and fitness of the freight system is important to Seattle's economic wellbeing. Moreover, advancing freight mobility goals is essential to improving traffic safety and curbing emissions.

### *Opportunities and Emerging Trends*

**Strong growth in freight demand and flows.** The Environmental Protection Agency (EPA) noted that, in 2015 alone, the U.S. logistics industry moved more than 49.5 million tons of goods, worth nearly \$52.7 billion, every day, and more than 56 tons of freight per person per year. The agency projects that in 2025, the shipment of U.S. goods will grow another 23.5%; and a total of 45% by 2040.<sup>7</sup>

More recently, from 2020 to 2022, with the closure of the West Seattle High-Rise Bridge, the importance of freight was demonstrated by dedicating the low-bridge to freight, transit, and emergency vehicles. Keeping these modes moving is vital to the city and region.

**Resilient freight operations during the COVID-19 pandemic.** Despite the pandemic and the supply chain backup it caused, the MICs' activities did not slow down. Industrial workers could not work from home. In the BINMIC, the fishing seasons and maritime activities continued on in full force.

**Shift in shopping trends during the COVID-19 pandemic.** The pandemic accelerated the shift in consumer spending from brick-and-mortar to e-commerce, which resulted in significant growth in local parcel delivery and the construction of e-commerce warehouses.

**Densification of warehousing.** In places with less and less space, multi-level warehousing has played a role in helping freight movement. These opportunities have the potential to improve the use of the MICs.

**Last-mile neighborhood delivery hubs.** There is increasing interest and testing of last-mile neighborhood delivery hubs that serve as a delivery point for trucks, which offload parcels onto electric-assist cargo trikes for local delivery to residences or businesses or to short-term storage in parcel lockers. These solutions can reduce local truck trips and emissions in commercial and residential areas.

**Focus on employee safety and wellbeing.** The health and safety of the people working in the supply chain impacts the health, safety, and equity experienced by our communities. The impact of the goods and services movement on climate change is enormous, and there are many creative opportunities to mitigate impacts.

### *Challenges*

**Deferred Maintenance.** The transportation network serving commercial and industrial land uses, especially non-arterial streets in MICs, have significant deferred maintenance needs. These streets serve as critical access to various manufacturing and commercial activities and see higher heavy vehicle use. Traditionally, these streets have not been prioritized for maintenance efforts and have some of the lowest pavement condition ratings in Seattle. Additionally, only a portion of the Port partnership funding for the Heavy Haul Network has been spent in the past 8 years.

**COVID-19 pandemic impacts.** The pandemic unveiled weaknesses in supply chains as demand shifted from services to consumer goods. Supply chain shocks resulted in long-term changes to how and where goods are produced. High-density distribution centers, now an aging concept, are being reimaged as

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<sup>7</sup> [Why Freight Matters to Supply Chain Sustainability | US EPA](#)

micro-distribution hubs, in line with emerging trends. Federal and state public health restrictions caused significant changes in commuting patterns, which led to a steep drop in traffic congestion on city streets. Traffic volumes partially rebounded in 2022.

**Supply chain instability.** Ongoing workforce shortages, trade disruptions, changes in freight delivery patterns, and other shocks have roiled otherwise stable supply chains, placing pressure on Seattle’s multimodal freight system. Respondents to a WSDOT Freight System Plan (FSP)<sup>8</sup> survey indicated that supply chain disruptions were a critically important freight-related challenge being faced. Additionally, manufacturers consulted during the development of the FSP expressed ongoing concern about supply chain instability.

**Limits on new technologies and infrastructure.** Development and integration of new technologies, such as alternative fuels and drone delivery deployment, may be limited by legislative restriction and infrastructure requirements; inadequate and aging electrical distribution infrastructure; and the ability to fund, design and construct alternative fueling stations to meet demand.

**Network impacts.** Network access reductions are a concern for freight movement and supply chain resilience. For example, from March 23, 2020, to September 17, 2022, the West Seattle High-Rise Bridge was closed for repairs and comprehensive testing. To respond to the potential access constraints for critical Harbor Island maritime freight, freight supportive, and national defense industries, the City dedicated the Spokane Street Swing Bridge—the low bridge—to freight, transit, and emergency vehicles.

Additional challenges to the network include limited funding for bridge maintenance and replacement. These include but are not limited to 1<sup>st</sup> and 4<sup>th</sup> Ave S corridors, the bridge over Argo; and potential closure of S Holgate St.

**Climate impacts on industrial and Port facilities.** Much of Seattle’s industrial lands rest upon real estate reclaimed from the Duwamish River wetlands. National Oceanic and Atmospheric Administration (NOAA) climate change models indicate that reclaimed lowlands are at greatest risk of climate change related weather impacts, such as rising sea levels and seismic events<sup>9</sup>.

**Overnight parking for drayage trucks.** Overnight parking in the MICs is limited. This results in drivers parking their cabs on local residential streets. Overnight truck parking opportunities in the MICs should be explored.

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<sup>8</sup> [Freight System Plan | WSDOT \(wa.gov\)](#)

<sup>9</sup> [Climate Change: Global Sea Level | NOAA Climate.gov](#)



**Freight generated air quality impacts on residents.** Existing and projected goods movement volumes are direct contributors to poor air quality in and around MICs and adjacent mixed-use neighborhoods in Seattle. The negative impacts of the transportation sector in general, and freight movement in particular, are known to contribute over 50% of nitrogen oxides (NOx) emissions, over 30% of volatile organic compound (VOC) emissions, and over 20% of particulate matter (PM) to the emissions inventory in the U.S.<sup>10</sup>



*An electric delivery van and driver delivering goods to a resident*

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<sup>10</sup> Why Freight Matters to Supply Chain Sustainability | US EPA

## COMMUNITY ENGAGEMENT

In 2022 and 2023, we conducted extensive public outreach as part of the STP development process. During the public comment period, we collected feedback specific to freight, urban goods movement, and freight infrastructure. Upon review of the comments, several general themes emerged:

- **Separate people walking and biking from freight vehicles.** Bike lanes, trails, and associated crossings need to be separated or clearly differentiated from freight to allow for safer and easier mobility around the city. Suggestions include grade separation, complete corridors, and treatments, such as landscaping or fencing.
- **Support electric vehicle (EV) transition.** There is general support for the transition to EVs. The shift should consider expanded use of smaller EV freight vehicles in dense urban areas for small scale deliveries.
- **Designate freight routes.** Freight route designations were supported to better accommodate truck movements and enhance safety. Ideas to clear lanes for the freight system to better serve the public were also mentioned.
- **Shared transit lanes.** Numerous comments supported the incorporation of freight and transit in the same lane. However, it is important to consider concerns raised, such as volume management, impact on transit performance, and time constraints—i.e., create time of day restrictions to ensure travel time benefits are achieved.

Other suggestions included:

- **Improve data collection and analysis.** This may help to remove biases and uncover causal relation behind crashes, serious injuries and near misses to inform safety enhancements in street design and traffic operations.
- **Mobility hubs.** Facilitate last-mile delivery trips with smaller vehicles.
- **Improved planning efforts and guidance.** Develop direction to address design treatments at intersections and at-grade rail crossings, truck congestion, truck and freight employee parking, delivery methods in residential and urban areas, and short-haul truck trips between intermodal facilities (port and drayage).
- **Address maintenance backlogs.** Advance the backlog of projects associated with pavement and rail grade crossing maintenance within the freight network.



# FREIGHT AND URBAN GOODS IN SEATTLE

SDOT plays a role in the freight and goods movement network by operating city streets in a manner that supports safe, efficient, and reliable travel for freight vehicles and other travelers. We work with our partners to design and build capital improvements, maintain capital assets (pavements, signals, signs, markings, etc.), fund system investments, and collaborate with agency, business, and industry stakeholders. Freight includes goods that travel to or from railyards, seaports, airports, regional warehousing, and end-user destinations (e.g., businesses and residences). We also consider the land use context of freight movement—freight issues in MICs are dramatically different than in downtown, urban centers, and other parts of the city—to support the efficient movement of the different types of freight.

While our freight and goods movement network extends far beyond the streets that we manage, SDOT managed streets and curbspaces support connections to rail, air and Port networks, as well as intersections with other travelers that may be walking, rolling, biking, driving or taking transit. Primary modes in the freight network include:

- **Ground.** Often identified as truck transport, there are many types and sizes of ground freight encompassed in large bulk freight and last-mile freight. Increasingly, electric bicycles (e-bikes) are gaining in use for last-mile transport and delivery of smaller parcels.
- **Rail.** Freight rail moves goods regionally and nationally, while in-town industry rail service provides connections between local Seattle businesses and the larger, nationwide rail network.
- **Air.** Air freight carriers transport goods that are time-sensitive or have high value per unit.
- **Ports.** Typically, large cargo ships bring in a flow of national and regional imports.

To further define freight, it is important to also understand what it provides:

- **Services.** Includes waste collection; city, residential, and business utility installation and maintenance; emergency services; health providers; general construction; and more.
- **Delivery.** Includes business-to-business (B2B) goods related to manufacturing, construction, industrial supply, and warehousing typically delivered by rail or heavy trucks, as well as retail, office, food and grocery, and residential goods and parcels delivered by light trucks, parcel vans, and e-bikes.

The Freight and Urban Goods Element focuses primarily on urban truck movement to support Seattle’s increasing demand for delivery of goods and services in a safe and reliable manner. While railroad, marine, air freight, and more play critical roles in our freight system, because the roadway network is within the city’s purview, we focus on how trucks provide access to these other modes.

## PARTNERSHIPS

Given the number of freight modes, the Seattle freight network has many interested parties. These include local business and industry and local, regional, state, and federal agencies. The Port of Seattle is the government agency that oversees the seaport and the airport (SEA). The Northwest Seaport Alliance is a marine cargo operating partnership between the Port of Seattle and the Port of Tacoma.

Other important agencies include the Federal Highway Administration (FHWA), the Federal Railroad Administration (FRA), the Washington State Department of Transportation (WSDOT), and the Puget Sound Regional Council (PSRC), all of whom fund investments (e.g., award grants) to improve the freight network. Due to their size and costs, many freight capital projects are delivered through agency and industry partnerships.

## MANUFACTURING/INDUSTRIAL CENTERS

Seattle has two of the Puget Sound Regional Council's (PSRC) <sup>10</sup> designated regional manufacturing/industrial centers (MICs): Ballard/Interbay Northend (BINMIC) and Duwamish MIC<sup>11</sup>. Most industrial land in Seattle is located within the MICs and are identified in Seattle's Comprehensive Plan. MICs ensure adequate accessible industrial land is available to promote a diversified employment base and sustain Seattle's contribution to regional living-wage job growth. Maritime and manufacturing activities are supported by our industrial lands and have long contributed to the city's identity, supporting family-wage jobs, and economic diversity.

Activities on industrial lands make significant revenue contributions to the local and regional economy, due in large part to the volume of products manufactured or received in Seattle and exported domestically within the U.S. and worldwide. According to the Seattle Industrial Lands Mayor's Recommendation (2007), the industrial sector accounted for \$5 billion in taxable sales which translates to about a third of the City's total retail sales tax revenue. Industrial Businesses also generated 32% of the City's total B&O tax revenue. Around 116,000 people, or 15% of all jobs in Seattle, are employed in the maritime, transportation, and manufacturing sectors.

A network of marine terminals, railroads, roadways, and airports serve the MICs, creating a need to designate, protect, and plan for a variety of needs—oftentimes overlapping with other demands on city streets.

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<sup>11</sup> <https://www.psrc.org/our-work/centers>

## FREIGHT NETWORK ASSETS

Seattle's freight infrastructure is key to maintaining economic and locational competitive advantage. Keeping goods moving efficiently is not just a lynchpin of Seattle's economy, but also for the region, Washington state, and other parts of the country. Our waterway, rail, air, and roadway infrastructure supports freight logistics and shipping. As noted in the introduction, this element focuses on goods movement by truck, as that is the mode the city has the most ability to influence. However, our ability to provide reliable truck travel to and from the region's port facilities, airports, and intermodal terminals is critical to the city's livability and economic health. Key freight network assets are discussed in this section and include:

- Seattle's freight roadway network
- Waterways and the Port of Seattle
- Airports
- Railroads
- Intermodal and transload facilities

### *Seattle's Freight Roadway Network*

Nearly all the streets under the city's jurisdiction are used by trucks, whether designated for freight or not. Specific freight network designations are based on truck volumes and connections to key freight traffic generators and other land uses. The city also operates moveable bridges that support efficient freight movement across our waterways.

### **Freight Street Classifications**

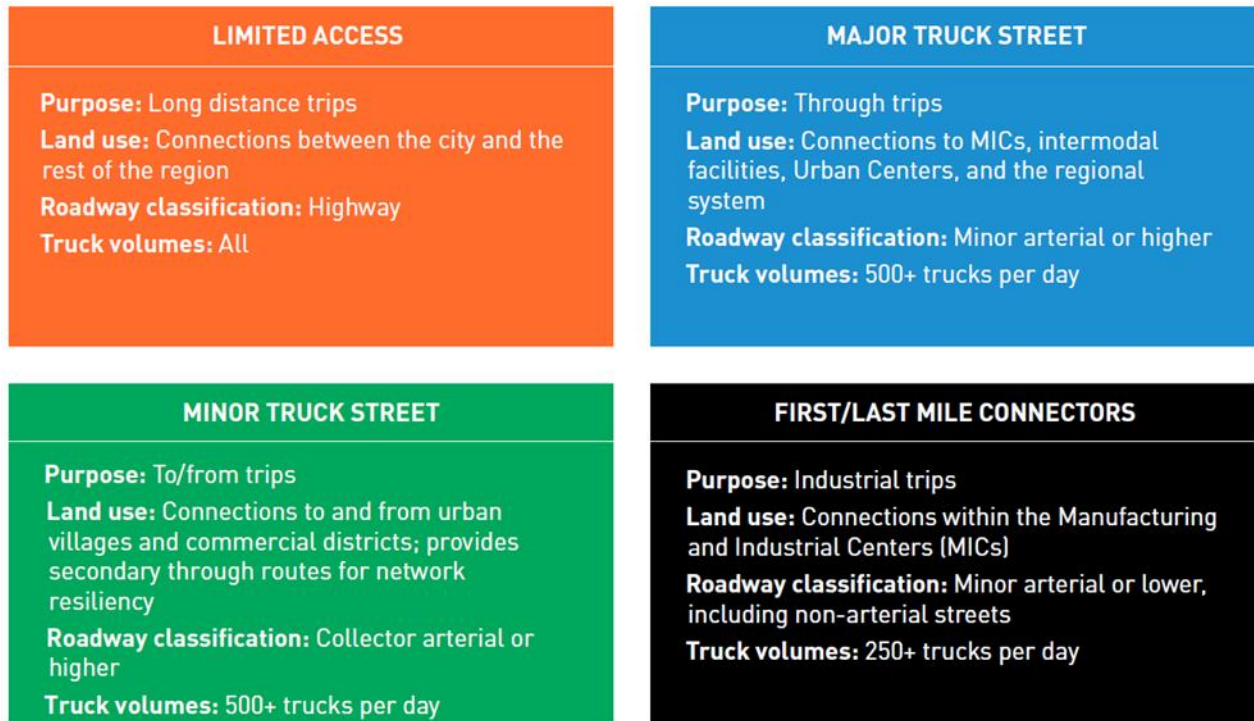
Freight street classifications highlight key elements of the street network serving freight vehicles. They cover functional classification, truck volumes, street types, design guidance, spatial characteristics, and more and are considered when designing streets or determining how to operate the system. Seattle's Freight Master Plan (FMP; 2016) identified a Freight Network Classification that includes four designations based on truck volumes, land use connections, network connectivity, and roadway classifications.

The freight network designations indicate key routes that trucks use to access the Port, key freight designations, and the regional highway system. Limited access facilities are connected to major truck streets and, to a lesser degree, by minor truck streets.

First-/last-mile connectors are primarily accessed by major and minor truck streets and are located within the MICs. Trucks are permitted to operate on most streets in Seattle, whether or not they are designated as part of the freight network.

**Figure 3** presents the freight network designations.

Figure 3: Freight Network Designations



## The Freight Network

The freight network map is depicted in **Figure 4**. In general, limited access facilities are accessed by major truck streets and, to a lesser degree, by minor truck streets. First-/last-mile connectors are primarily accessed by major and minor truck streets and are located in MICs.

## Over-Legal and Heavy Haul Networks

Seattle has specific routes that provide for oversized and overweight trucks, referred to as “over-legal.” Permits are required to operate over-legal vehicles on designated streets. Over-legal routes accommodate trucks with larger loads that require a 20-foot by 20-foot envelope, though specific segments may not handle both excess width and height dimensions. The Heavy Haul Network (HHN) is located in the Duwamish MIC. The network is intended to provide key routes for commercial trucks moving heavy, divisible loads. These trucks usually make short trips from the Port to transload facilities. The HHN helps manage freight flow around the ports and improve movement of large commercial trucks hauling heavy divisible cargo. We do this to support freight businesses in carrying out their work and to help keep them competitive.

**Figure 5** presents the Freight Network with the Heavy Haul Network and over-legal routes.

## Downtown Traffic Control Zone

The movement of large trucks is restricted within the core of the city. Vehicles 30 feet or longer may operate by permit on weekdays between 9 AM and 3 PM, and without a permit from 7 PM to 6 AM. Curfews are in effect during weekday peak traffic periods.

Figure 4: Freight Network Map

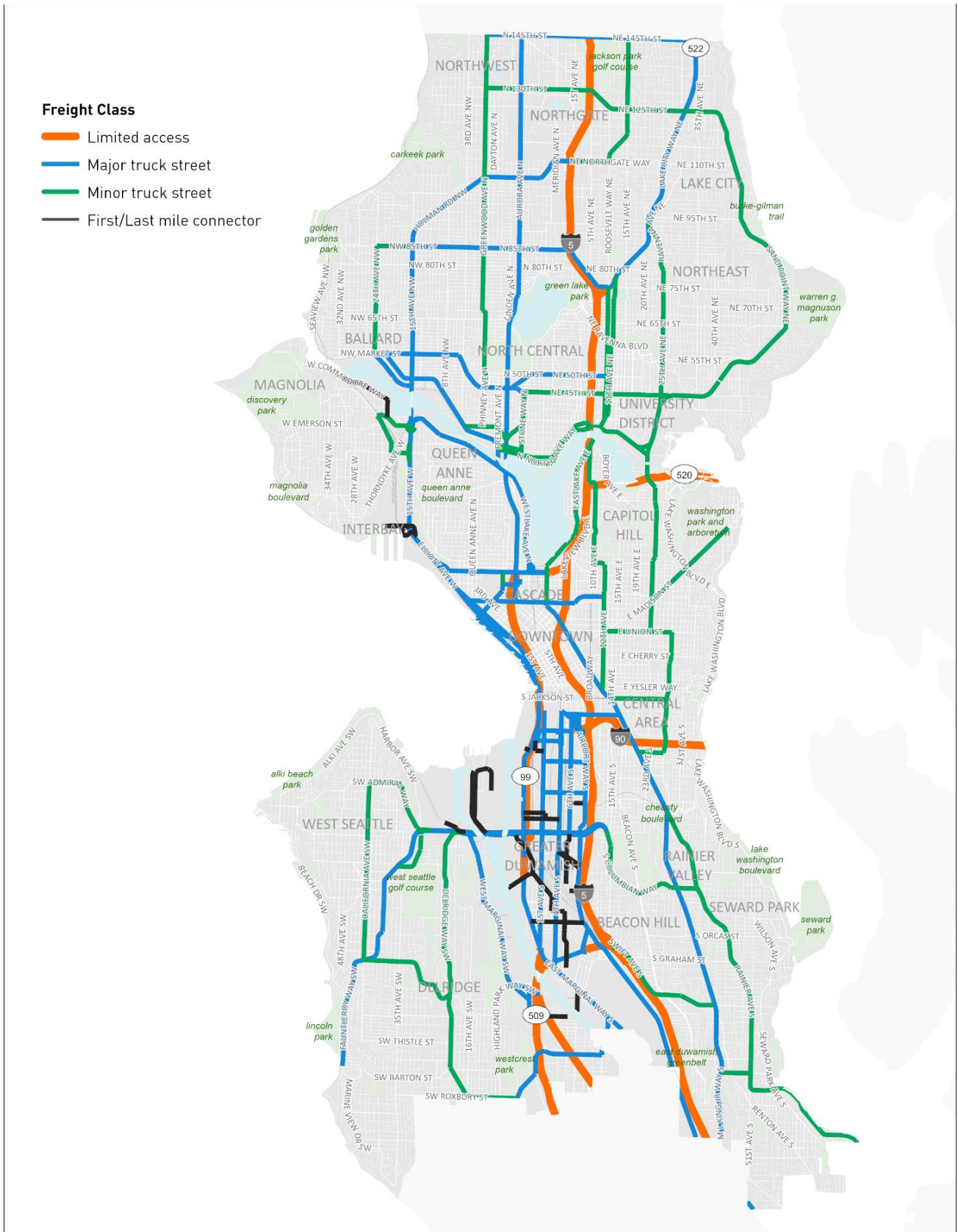
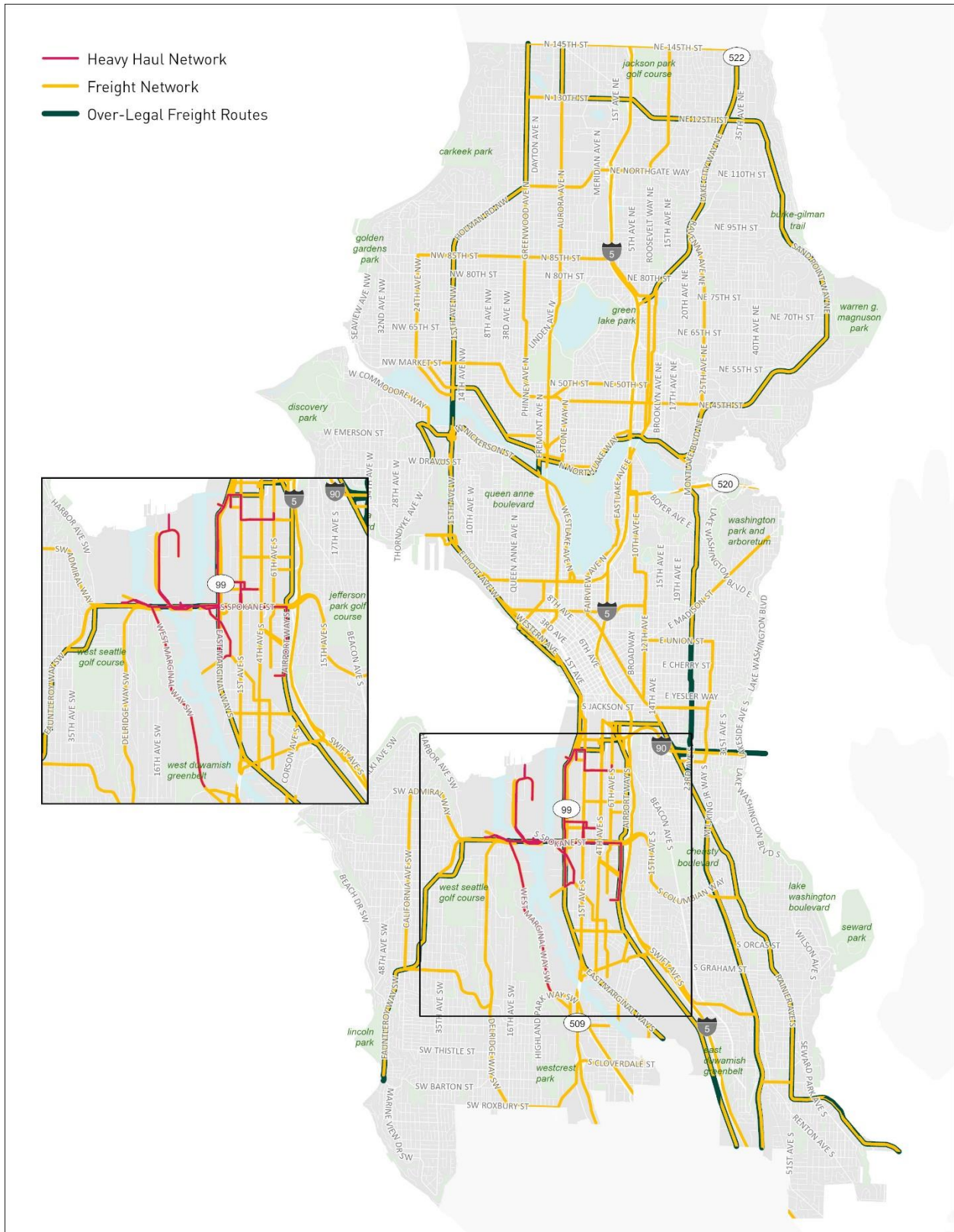




Figure 5: Freight Network Overlaid with Heavy Haul Network and Over-Legal Routes





## *Waterways and the Port of Seattle*

Water transport has continuously been the largest carrier of freight, as virtually any material can be moved by water. The Port of Seattle (Port) consists of numerous facilities throughout the city that are located on Puget Sound and other navigable waterways, such as the Lake Washington Ship Canal. Facilities include container terminals, general-purpose marine/cargo terminals, commercial and recreational moorage, industrial and commercial properties, a grain terminal, and cruise ship terminals.

The Northwest Seaport Alliance (NWSA) is a marine cargo operating partnership of the Port of Seattle and the Port of Tacoma and operates the container terminals in the city. The Port of Seattle also operates Fishermen’s Terminal and the Maritime Industrial Center along the Lake Washington Ship Canal. The Port is responsible for ensuring that cargo efficiently moves through the network to its next destination.

The import and export of these goods create individual jobs and economic development for the region. Private maritime businesses also play a major role along our waterways.

Figure 6 depicts the locations of Seattle’s maritime assets. These include numerous Port of Seattle facilities, Fisherman’s Terminal, the Ballard Locks, and various shipyards.

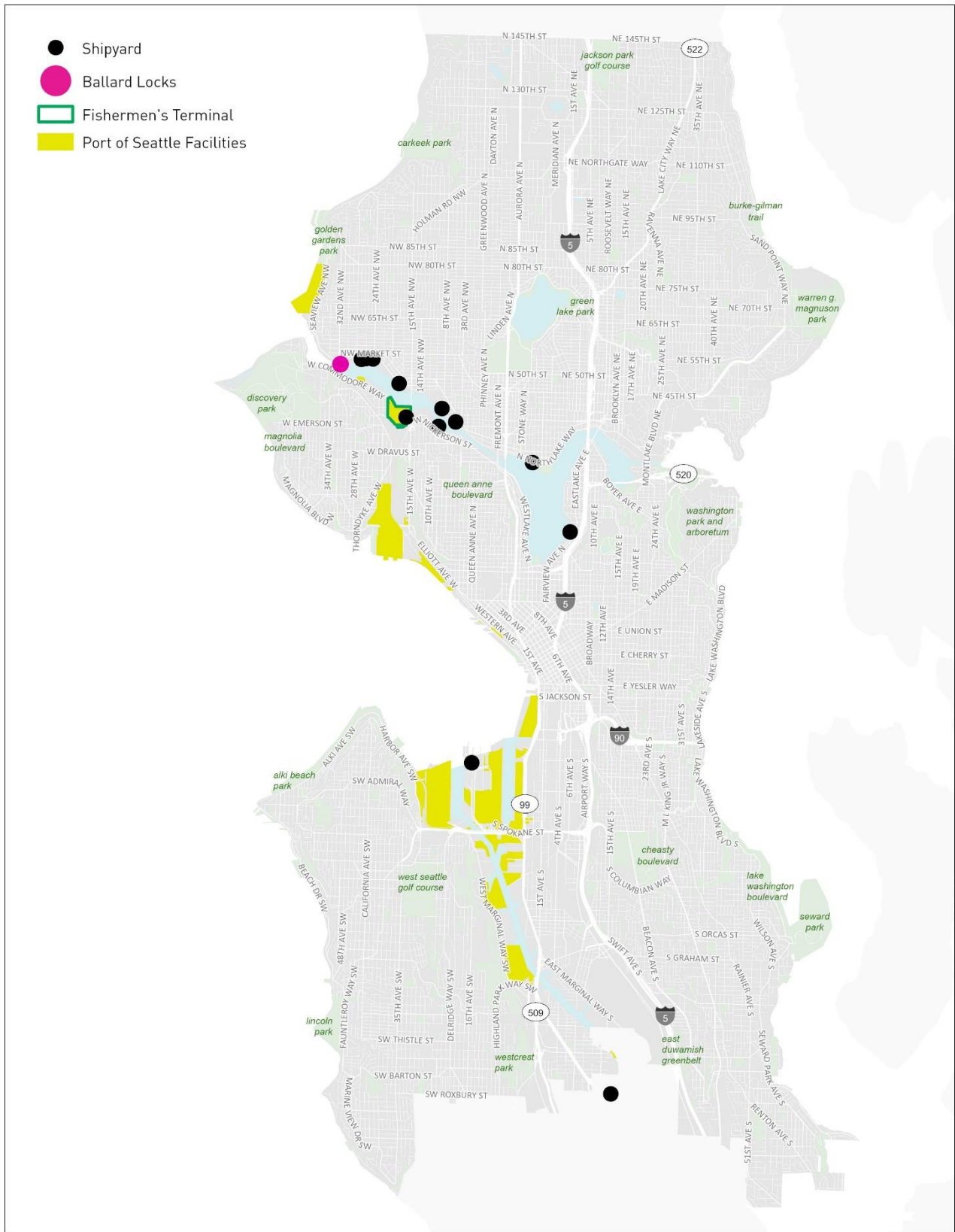
## *Railroads*

Two Class I railroads (annual revenues of more than \$500 million) and a single Class III railroad (annual revenues less than \$40 million) operate in Seattle—BNSF Railway, Union Pacific Railroad (UPRR), and Ballard Terminal Railroad (BDTL). Ballard Terminal Railroad provides a handful of industry customers access to rail and connection with BNSF.

Union Pacific is the second-largest railroad in the U.S., and Seattle is the terminus of its west coast operations. UPRR Seattle rail traffic is primarily industrial service, focused on moving goods for local customers to the transcontinental rail system.

BNSF is the largest railroad in the U.S., running trains through Seattle north to British Columbia, south to San Diego and east to Minneapolis. BNSF leases track and time to Amtrak passenger rail and Sound Transit Sounder commuter trains here in Seattle. Rail transport is most competitive with long-distance trucking and barge transport.

Figure 6: Seattle's Maritime Assets



### *Intermodal and Transload Facilities*

Intermodal freight transport involves the transportation of freight in an intermodal container or vehicle, transferring shipments from one transportation mode to another as the shipment moves from origin to destination, without any handling of the freight itself when changing modes. Freight moves from port to truck, port to rail, port to port, port to air, rail to rail, truck to rail, rail to truck, and every combination in between. Intermodal facilities work cooperatively in anticipation of freight arrivals and departures, as well as up- or downstream of supply chain issues, and to alleviate industry pinch-points.

Transload facilities repack goods between 40' standard ocean-going containers and 53' rail industry containers, which increases efficiency of goods movement between sea and rail modes. The type and capacity of an intermodal facility can vary depending on the nature and type of intermodal connector (e.g., rail, maritime, air, and highway).

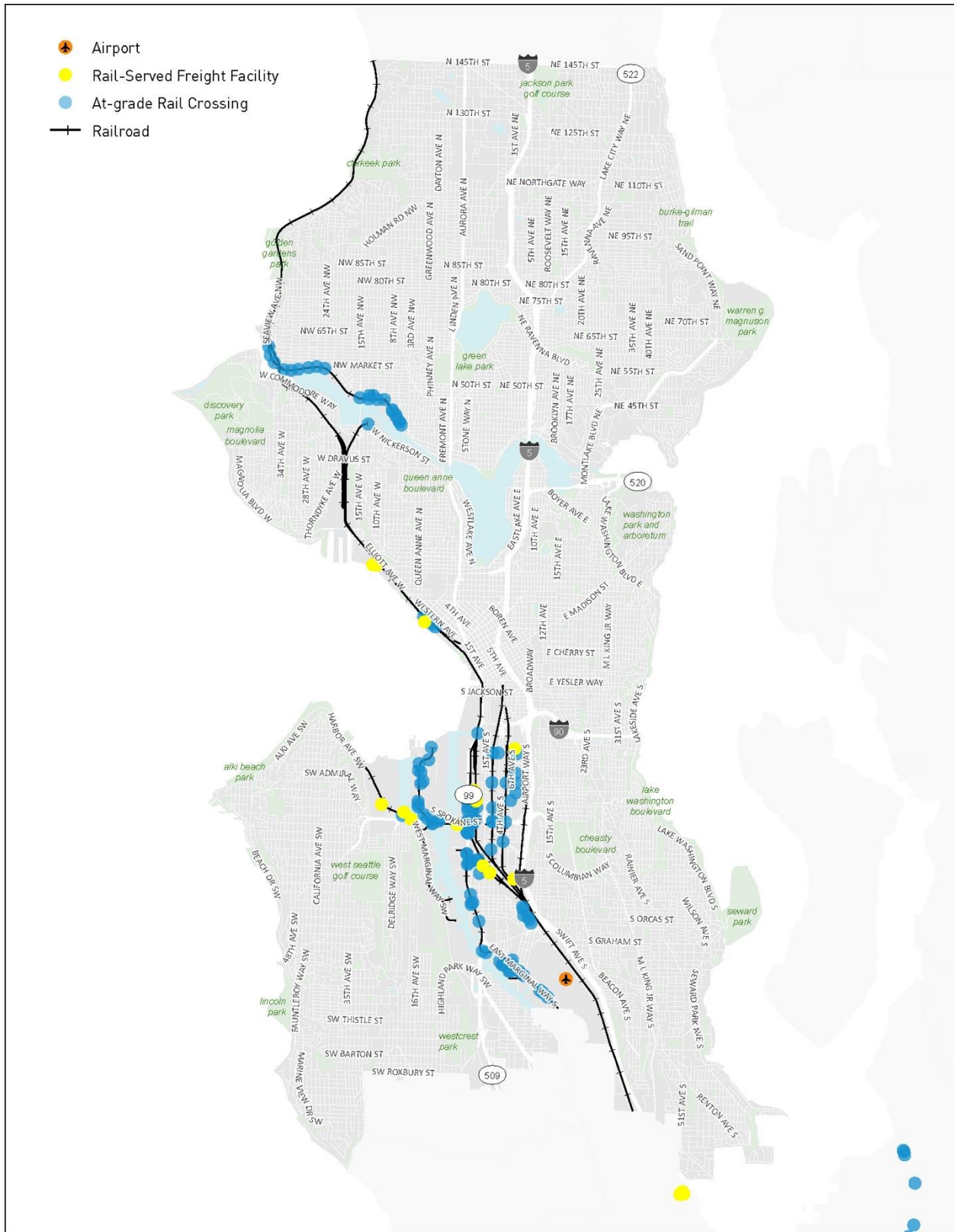
Intermodal facilities are key to railroad operations. It is here that trains are made and disassembled; cargo headed to and from the Port of Seattle and Port-affiliated facilities make their way north, south, and east from these yards. The Argo Yard is UPRR's sole hub in Seattle, while BNSF has numerous facilities—Stacy Yard, Balmer/Interbay Yard, and South Seattle—supporting freight movement.

### *Airports*

The King County International Airport (KCIA, or Boeing Field) is the only airport within the city's boundary. The Boeing Company has been a central part of both KCIA's operations and the regional economy, and its presence attracts a significant number of auxiliary manufacturing businesses.

Figure 7 shows Seattle's rail, intermodal, and airport facilities. Most of these assets are located in the Ballard/Interbay and Duwamish manufacturing/industrial centers and along waterways.

Figure 7: Seattle's Rail, Intermodal, and Airport Facilities



## SPATIAL REQUIREMENTS AND OPERATIONAL CONSIDERATIONS

When designing and operating the transportation system to support freight and goods movement, there are a number of spatial needs and operating conditions that must be considered. Our urban operating environment is complex and requires close coordination with industry partners, community, and other interested parties. To support the work outlined in this Element while balancing the spatial requirements and operational needs of freight and urban goods movement, alongside the needs of other travelers, SDOT will seek to:

**Provide for the safe and predictable movement of goods.** SDOT’s work includes designing the network to support the safe and predictable movement of trucks and delivery and services vehicles. Our truck and heavy vehicle design guidance allows for safe truck movements and integrates with other travel options. Truck collisions are generally concentrated on freeways and arterials serving the BINMIC and Duwamish MIC, requiring extra focus. At a broader level, we should consider that MICs sit on environmentally sensitive land with greater exposure to various hazards—tsunami, subsidence, earthquake, sea level rise. We can prepare for our freight networks’ resiliency in partnership with industry partners and our local, regional, and state agencies.

**Provide for loading and access.** Adequate on-street commercial vehicle loading zones, other curbside spaces, and alleys for loading and unloading of goods is a major consideration for freight. Since anyone with a business license can obtain a Commercial Vehicle Load Zone permit regardless of vehicle size, this increases competition for already limited parking spaces that can accommodate trucks. Most downtown buildings lack off-street loading bays, which increases pressure on streets and alleys. The ability to move goods the “final 50 feet” to their destination is a major challenge, requiring that we manage use of curbspace and alleys, while also influencing building design for off-street accommodations.

**Advance at-grade rail crossing safety to align with safety goals.** We can support improved safety by developing new designs for urban roundabouts to separate turning movements from pedestrians and bike facilities, alongside other truck-compatible traffic calming measures.

**Develop and preserve a secure freight network that supports a thriving and diverse economy for Seattle and the region.** We will continue to work with partners to educate stakeholders (including the public at-large) about the importance of freight mobility to the local and regional economies. A well-maintained freight network is necessary to support and grow freight dependent family-wage jobs.

**Reliably connect manufacturing/industrial centers and business districts within Seattle and the region.** Access between Seattle’s MICs, port facilities, and the regional highway system is important to maintain and improve. Most interstate and state highways in the Seattle area are at or near capacity during peak periods. This delays not only local traffic and truck mobility, but longer-distance through-trips as well. I-5, and to a lesser degree, SR 99, are congested during peak periods. Working with the Port of Seattle, the Northwest Seaport Alliance, business and industry organizations, and intermodal partners, we can support efficient access to core intermodal facilities. We’ll also explore the use of truck-only lanes and freight and bus (FAB) lanes to improve freight mobility on streets with high truck volumes.

**Support efforts to increase safety for freight operators and their employees.** Many people are employed in the freight and logistics industries. We can work with industry partners to support health and safety to meet basic human needs for freight employees along the freight network, for example coordinating on truck parking areas (staging), access to restrooms, food, and fuel, or other provisions to support well-being of freight industry workers and their ability to meet federal hours-of-service (HOS) requirement or daily work limits.<sup>12</sup>

**Involve interested parties in the planning and design process to help build an efficient and effective network.** SDOT coordinates and supports the Seattle Freight Advisory Board and regularly engages freight operators and other interested parties. Many ethnicities and over 20 distinct languages are represented in the freight community. By engaging with and connecting to these diverse communities on a regular basis, we can improve the planning and design of freight-related investments and interventions that improve freight mobility and meet community needs.

**Develop funding strategies across multiple partners.** Freight network investments cannot be accomplished without strong partnerships and regional coordination. We will continue to coordinate funding strategies across industry stakeholders and partner agencies to raise investment for large and complex freight projects.

**Identify and address communities and families specifically affected by freight and related industries.** Engaging and co-creating solutions with communities, freight operators, and related industries—from logistics warehousing to the delivery of goods and services—can help mitigate negative impacts from freight and goods movement. By working with this diverse set of communities, we can work to resolve or reduce negative externalities of freight related to air quality, emissions, safety, and congestion. (Supports TEF 20.5) We will also explore effective policies for delivery to the home and small commercial areas. We'll partner with the freight community to continue supporting living wages for families dependent on freight jobs.

**Reduce the environmental footprint of the freight fleet.** SDOT advocates for the use of alternative fuel trucks and advancing electric options throughout the city (supports TEF 36.2), in the broader effort to reduce greenhouse gas (GHG) emissions produced by freight. Anti-idling policies and other best practices play an important role. We'll continue to support the development of clean delivery and localized goods production to minimize travel, alongside the “greening” of infrastructure on freight routes and in the MICs. (Supports TEF 56.4 and 56.5). Additionally, developing subarea plans can promote coordinated land use and transportation decision-making for industrial areas and locations with heavy truck volumes. Subarea plans can enable better identification of specific solutions tailored to the local context.

To support this work, we will explore increasing the application for permitted uses and reduce unpermitted uses and seek to tie allowable uses to responsible partnership with existing environmental requirements for stormwater discharges, dust control, and other requirements. These actions aim to

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<sup>12</sup> WA State Freight System Plan and Appendices 2022



assist in managing industrial operating permits and reporting non-compliance in the MIC's and communities experiencing disproportionate exposure to pollution.

**Eliminate maintenance backlog at public at-grade rail crossings.** We can support this work by working to streamline the railroad applicant permit process, pursuing an “adverse abandonment” process for inactive rail removal, and completing triennial grade crossing inspection and reporting requirements. We will continue to actively pursue and maintain railroad partner relationship and work to apply safety modifications necessary at locations identified in the Washington State Rail Plan. We’ll also seek to eliminate redundant rail crossings in residential communities, such as Georgetown.

**Develop and advance an active planning cycle for freight project design and grant funding.** SDOT routinely maintains awareness of Federal Railroad Administration (FRA), FHWA, Federal Transit Administration (FTA), and other federal grants available to address freight improvements. To support this work, we develop strategies to regularly pursue grants that align project delivery timelines with federal funding opportunities. We will seek to advance entire corridor improvements that can be constructed in partnership with public and private-sector stakeholders, and coordinate funding strategies across multiple stakeholders to raise investment for complex freight projects.

### *Inputs for Project Development*

Develop a standard to measure right-of-way tradeoffs for design along freight corridors to use during project development.

- Evaluate outcomes from existing measures and policies, which could include travel time and reliability, to establish right-of-way allocation measures and goals on the freight network.
- Integrate the operational measures and goals into the complete streets process for project development to streamline right-of-way tradeoff decision-making alongside other multi-modal operational measures and goals where designated corridors overlap.

**Table 3** presents how spatial and operating needs vary by freight network street type, street function, and several other major characteristics that require guidance to provide safe and efficient access for trucks. This table serves as a starting place for a more detailed toolbox for freight and truck facilities.

Table 3. Spatial and Network Guidance for the Freight Network by Street Type

		Factors				
		Land Use Context	Curbside Loading Needs & Parking Design	Time-of-Day Delivery Feasibility	Physical Roadway Design	Safety Treatments
<b>Description</b>		Business type and commercial activity	Parking and loading designs	Times when businesses can send/receive deliveries	Roadway design features	Types/application of road safety, traffic calming, or at-grade crossing improvements
<b>Roadway Network Factors</b>		Land use determines truck activity levels	Truck size and loading requirement affects space needs; service vehicle parking considerations	Impacts commercial loading or truck access hours	Appropriate lane widths, turn radii, driveway aprons	Truck streets require special consideration for safety measures
<b>Roles &amp; Responsibility</b>		City of Seattle property owners	SDOT, private owners	Private entities, Port of Seattle	SDOT, WSDOT, FHWA	SDOT, WSDOT, FHWA, BNSF, UPRR, BDTL, FRA
<b>Major Truck Streets</b>	<b>Through Connector</b>	Primary connectors to and from MICs, intermodal facilities, regional freeways	Requires special considerations to accommodate truck loading given higher traffic, transit, and other activity on these corridors	N/A	Maintain standard travel lanes and turn radii. Consider Freight-only lanes and Freight-and-bus (FAB) lanes in key network segments	Provide truck-compatible traffic calming features
	<b>Servicing Destinations</b>	High-activity commercial generators, limited residential	Requires high number of commercial loading spaces that can accommodate large trucks	N/A	Provide standard turn radii	Minimize use of median barriers
<b>Minor Truck Streets</b>	<b>Through Connector</b>	Connecting to/from major truck streets, urban commercial districts	Requires assessment to determine appropriate parking	N/A	Maintain standard travel lanes and turn radii	Coordinate traffic calming and safety treatments on streets with higher truck volumes
	<b>Servicing Destinations</b>	Low-activity commercial generators, some residential neighborhoods	Requires minimum of commercial loading spaces that can accommodate smaller single-unit delivery vehicles	N/A	Provide designs that accommodate smaller trucks	Apply safety treatments that can accommodate smaller single-unit delivery
<b>Limited Access</b>	<b>Industrial Trips</b>	MICs	N/A	N/A	Maintain standard lane widths and highway design standards	Prioritize truck safety treatments
	<b>Regional Trips</b>	N/A	N/A	N/A	Maintain standard lane widths and highway design standards	Prioritize freeway truck safety treatments

## THE FREIGHT TOOLBOX

The freight toolbox offers strategies to address freight mobility and safety needs, while also incorporating new tools as best practices evolve. The toolbox provides a menu of options that may be used alone or in combination with others to address freight system issues including:

### *Maintenance and Preservation*

Maintenance and preservation include pavement and bridge investments, such as repaving roads and bridges in poor condition, paving unpaved roads and shoulders, and seismic upgrades of existing infrastructure. It also includes regular street cleaning and removal of overgrown shrubbery and foliage to maintain a clear pathway. These projects are especially important on routes with high truck volumes, including the Heavy Haul Network. Information from the city's pavement management database is used to determine paving needs, which helps preserve infrastructure investments and improve conditions for all roadway users.

### *Intelligent Transportation System (ITS) Applications*

ITS provides for communications with the city's central Transportation Operations Center (TOC) and allows the TOC to provide real-time intervention to adapt signal timing to traffic conditions. This communication provides real-time traveler information on bottlenecks and current travel time to truck drivers and dispatchers. ITS projects offer decision-making tools for both system users and managers to improve mobility and operations.

ITS applications include a variety of technologies to improve travel across the city and address safety and mobility needs, including:

- Closed-circuit television (CCTV) traffic cameras
- Dynamic message signs
- Portable changeable message signs
- Traveler's information website and apps
- Traffic signals, including detection, signal priority, and pedestrian count-down signals
- Rail crossing closures and bridge openings
- New and emerging technologies

Implementation of ITS applications may require private and public collaboration to ensure that benefits are fully realized. Intersection signal operations also fall under ITS applications. They can include a range of signal timing improvements on truck corridors, such as signal priority or adjusting signal timing to facilitate heavy truck movements. These signal improvement strategies can significantly improve truck mobility and access.

### *Wayfinding*

Something as simple as clear and legible wayfinding improves overall safety by indicating which streets are best suited for trucks. Wayfinding for trucks may include signs striping, roadway markings, physical barriers, and diverters on city streets, at intermodal facilities, and on state highways to improve route decisions and reduce illegal movements. These are quick, low-cost strategies to help truck drivers identify truck routes and avoid routes with height and weight restrictions. Signs and maps, such as the South Seattle Truck Routes map, must be clear, intuitive, and standardized.

## Geometric Improvements

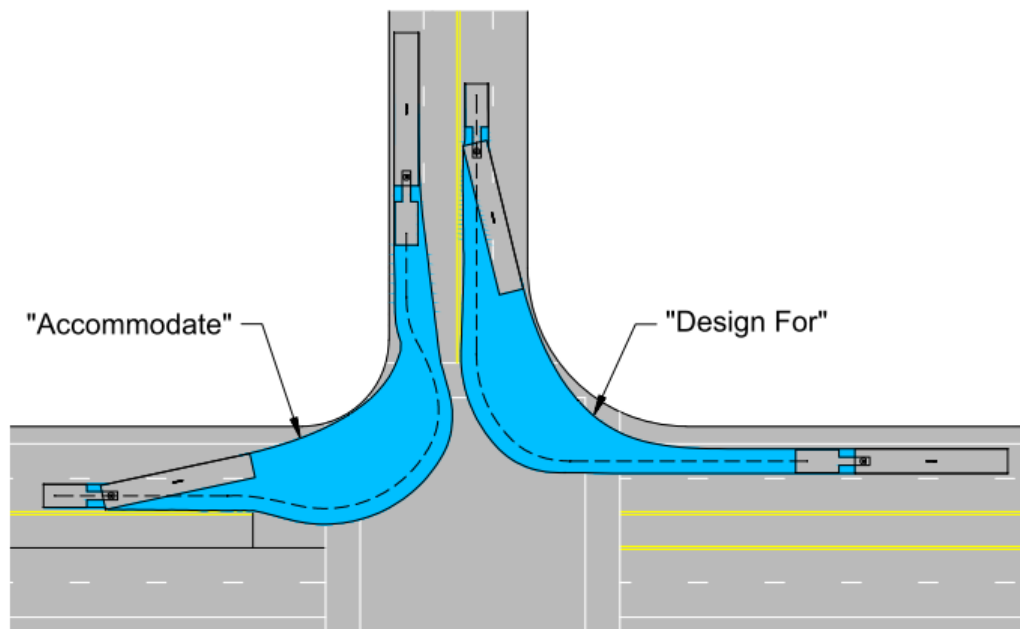
Improved constructed roadway geometry supports freight movement and allows truck traffic to blend in harmoniously and travel predictably with other roadway users. Small-scale geometric improvements for better truck mobility and access include:

- Adding left-turn lanes at critical intersections
- Adding truck-only lanes on highly used truck routes
- Repositioning utility poles
- Standardizing lane widths
- Modifying curbs and/or providing recessed stop bars to allow long trucks to easily turn corners
- Signals and/or modifications to buildings with alley access; address safety issues at alley entry points

A key concept in the design of a project is the “design for” versus “accommodate” trucks, especially as they make turns at an intersection. With the safety of all users in mind, the goal is to allow truck movements for specific truck types at specific locations (context-sensitive), while incorporating the smallest possible curb radius to limit pedestrian crossing distances at intersections and provide pedestrian safety. This is in line with the city’s Vision Zero goals to eliminate serious injury and fatal crashes.

Accommodating a vehicle allows for encroachment of other lanes, shoulders, or other elements to complete the required maneuver. Designing for a vehicle does not require encroachment onto those elements. *Streets Illustrated (Seattle Right-of-Way Improvements Manual)* defines when “designed for” versus “accommodate” should be employed for street designs, including for the freight network and transit networks that must address large vehicle movements. The concept of design for versus accommodate is depicted in **Figure 8**.

Figure 8: “Designing for” Versus “Accommodating” Vehicles



As shown in **Figure 9** there are various types of freight trucks traveling on city streets, each with their own unique design characteristics. These include weight, distribution over axles, dimensions (width and height), and turning radius. Providing adequate right-of-way for freight movements can support the ability of a range of truck types to operate in a safe and efficient way.

Typically, an intersection turn movement is considered “designed for” if the design vehicle is allowed to encroach on the lane adjacent to the typical receiving lane for the turn movement (right lane for right turns), provided that encroachment is not into opposing traffic.

When accommodating truck turning movements, over-steering of the truck into adjacent lanes is generally assumed to occur within the intersection. This may require a setback of the stop bar for opposing traffic.

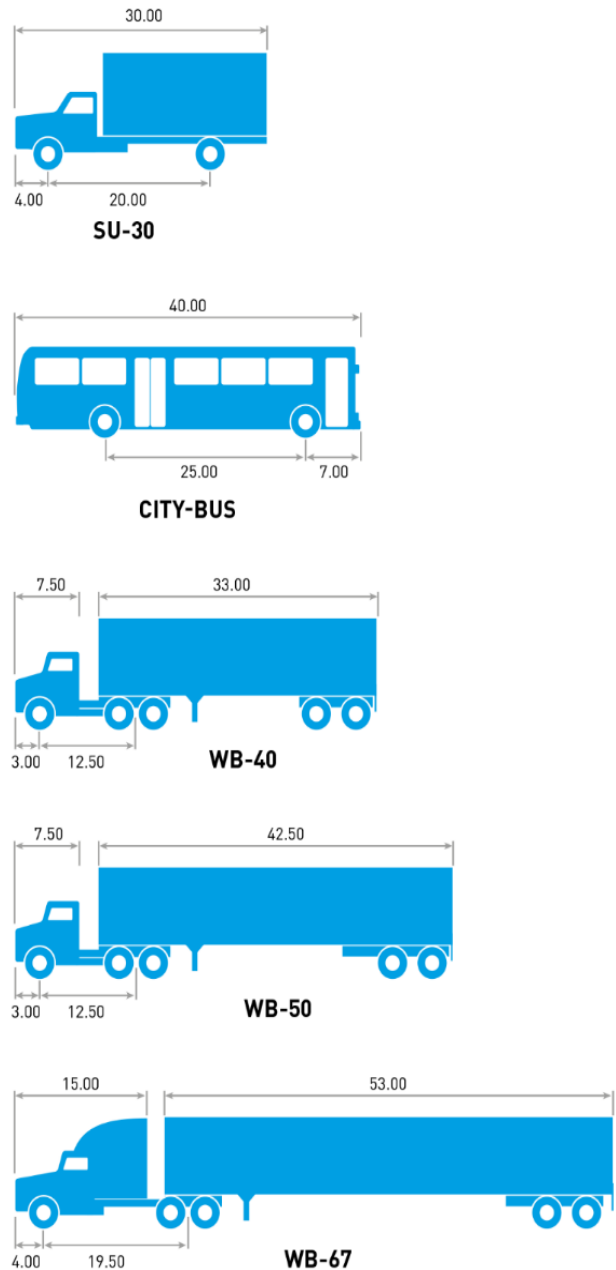
Providing updated information and education opportunities to drivers, pedestrians, and cyclists about accommodate for” and “designed for” turn movements can also help to increase safety at intersections.

### *Freight Operations Management*

Freight operations management includes a range of treatments such as truck restrictions, time-of-day variations, idling control, and loading zone control. Options include management of traffic to prioritize freight movements during certain times of the day, areas, or street segments, such as establishing delivery windows and off-peak delivery.

These projects can reduce traffic congestion and improve parking conditions on congested urban streets with limited additional physical capacity or infrastructure.

Figure 9: Typical Vehicle Designs



## Capital Investments

Capital investments can address a range of mobility and connectivity needs. They may be large investments (costing \$100M or more) or smaller-scale spot improvements (typically under \$500,000). These types of improvements include:

- Grade-separation of roadways
- Bridge replacement or retrofit
- New roadway connections
- Direct freeway access ramps
- Truck-only lanes
- Overnight parking for trucks and electric charging facilities

Large capital projects may consist of packages of smaller-scale projects that can be implemented in phases. We also make spot improvements—small-scale projects that improve truck mobility through key bottleneck locations. A dedicated spot improvement program allows the city to be more responsive to smaller, unforeseen needs as they arise.

## Freight Mitigation

Freight projects can also include elements to mitigate the impacts that freight may have on the environment or surrounding neighborhoods. These projects may overlap with other toolbox items, like paving unpaved roads and shoulders, or incorporating stormwater management into a project. Additional strategies include increasing the tree canopy in the MICs, reducing truck idling, and promoting use of zero-emission trucks (electric or clean-energy powered trucks) to improve air quality in areas highly affected by freight.

## Modal Conflict Resolution

Specific locations may require improvements to alleviate conflicts with other travel modes and increase safety. These conflicts may be with other freight modes, such as at-grade railroad crossings, or with transit and people walking or bicycling. Where freight routes share a street with a bicycle route, facilities for trucks and bicycles should be clearly separated and comply with width and materials standards, consistent with *Streets Illustrated*. Generally, improvements could include grade separations at railroad crossings or separated facilities (such as protected bike lanes where appropriate) to provide for the predictable movement of all users.

## PROGRAMMATIC ACTIVITIES

SDOT engages in a variety of programmatic activities (that is, activities that relate to programs or are ongoing, rather than specific to a project) to complete the work outlined in this Element. This section highlights existing and new programs or initiatives we will seek to implement. Over time, it's not uncommon for program groupings and organization to change; however, the programmatic activities listed here provide helpful general information to describe the types of tools and methods SDOT will employ to manage the transportation system.

### *Urban Goods Movement and Delivery Planning*

On-demand goods and service delivery has increased significantly as customers purchase and receive products online. Growth in e-commerce has increased pressure on limited curbside space in our urban neighborhoods and business districts, especially those locations with limited off-street parking and loading opportunities. We will seek to develop long-term strategies for promoting urban goods delivery. See the Curbside Management Element for more information.

Additional freight and urban goods strategies and actions may include:

- Establish minimum distances for loading opportunities from any business address, either in on-street, alley, or off-street locations; maintain or reassign loading locations when designing transportation and private development projects
- When alleys are vacated, address loading and circulation impacts to adjacent/nearby properties
- Improve enforcement of commercial vehicle load zones and other related zones.
- Expand commercial vehicle load zone and related zone hours to 24 hours a day, 7 days a week in select locations
- Review commercial vehicle load zone permit process and pricing to manage demand, access, and types of user
- Consider potential expansion of the Downtown Traffic Control Zone in a manner that improves daytime street network reliability but still provides sufficient urban good delivery access
- Recommend on-/off-street tactics for bicycle, non-truck, and small truck deliveries in dense areas
- Explore best off-street loading practices, including loading dock development and use standards
- Develop a pilot program for off-hours delivery in areas with a mix of residential and commercial land use to facilitate truck movement
- Explore freight demand management strategies to consolidate freight delivery trips and ensure vehicles are rightsized for an urban environment
- Identify and employ innovative uses of technology to guide urban good deliveries to destinations and manage access to loading locations
- Develop a data collection plan and seek funding to regularly monitor on-street and off-street commercial loading locations and gather user input.
- Reevaluate and update design requirements in new development.

- Collect and maintain citywide truck data.
- Gather data required for triennial grade crossing reporting through Federal Railroad Administration’s (FRA) Grade Crossing Inventory System via Washington State Utilities and Transportation Commission, including annual average daily traffic (AADT), percentage of trucks, percentage of school buses, emergency vehicle routes, etc.



*A bicyclist and vehicle wait at an at-grade rail crossing for a BNSF train to pass at Alaskan Way and Broad St in Downtown Seattle. Shared bikes and scooters are parked nearby. Image Source: SDOT*

### *Critical Access Needs (CAN) Curbside Review*

Critical access needs at the curbside include passenger and goods loading/unloading, waste staging/collection, building maintenance, and more. During project development processes, CAN reviews should consider safe and efficient access for freight and goods deliveries. Such reviews should be conducted when a project physically and/or programmatically alters curbside access for an adjacent property and limits or eliminates building critical access needs.

### *Neighborhood Delivery Hubs*

Zero-emission neighborhood delivery hubs in key areas of the city can support growth in urban goods deliveries while advancing the STP goals. By partnering with off-street parking lot operators, we can open and manage delivery hubs to provide additional support to freight partners in need of off-street delivery space for e-cargo bike coordination and to further improve last-mile delivery efficiency. We can look to other peer city partners that are launching similar programs, such as in New York City and Portland, OR. Activities to explore and develop neighborhood delivery hubs may include:

- Identify and fund program development and partnerships



- Examine land use code zoning for opportunities and barriers for neighborhood, micro-hub type developments
- Explore implementation of urban consolidation centers, joint distribution centers, or local building logistics centers in Seattle
- Work with other City departments and agencies to conduct a feasibility study to create urban consolidation centers, joint distribution centers, or local building logistics centers
- Assess real estate opportunities, site development needs, and partner options, including third-party logistics firms

### *Support for Low- and No-Emissions Vehicles*

The curbside element plays an important role in meeting our ambitious climate goals, including support for the shift toward electric vehicles. Freight and commercial goods are an important part of our economy. However, almost all commercial deliveries to bring packages to residents and businesses are made by gas or diesel-powered vans and trucks, which contribute to poor air quality, congestion, and safety issues. We will work collaboratively with the private sector and our local business community to be a liaison for the zero-emission transition, including the use of rightsized personal delivery devices (PDDs) to support urban goods movement.

#### **Commercial Cargo E-Bike Program**

Development of a commercial e-cargo bike program is another way to reduce freight-related emissions. This includes design of e-cargo bike standards, rules of operation, and new curb space allowances in the ROW for parking and loading. Program development will include legislation, outreach, and monitoring for the duration of the program.

Other elements of a commercial cargo e-bike program could build upon the findings of two relevant study efforts. In 2020, the University of Washington's Urban Freight Lab (UFL) published a report on a test delivery pilot in Seattle for cargo e-bikes. The study evaluated the implementation of e-bikes with removable cargo containers to perform last-mile deliveries in downtown Seattle. The study compared truck versus e-bike metrics for time spent cruising for parking, delivery distance, and dwell time. The results also included evaluations for delivery area, number of delivery locations, number of packages delivered, and failed first delivery rate.

SDOT's 2023 Zero Emissions Freight report evaluated e-cargo bike program typologies across North America to determine the best approach for a Seattle commercial e-cargo bike program. The final report identifies a three-tiered program approach for cargo bikes to operate safely and efficiently on Seattle streets. Pursuit of zero emission freight curb management programs supports Mayor Harrel's 2022 Climate Executive Order.



*Electric pallet used for goods delivery*

### **E-Cargo Bike Lending Libraries**

Due to the cost-prohibitive nature of many zero emission delivery vehicles, including e-cargo bikes, additional programmatic support is needed to ensure the city's small to medium business community is supported in the transition. One way to do this could be to launch e-cargo bike lending libraries at community hubs to provide bikes on a lease-to-own basis. Similar to ride-and-drive events for electric vehicles, these libraries would allow businesses to test e-cargo bikes and learn from community advisors how they may fit into their existing operations before making a purchase. Development and management of E-cargo Bike Lending Libraries may include:

- Identification of external funding and vendor selection process
- Incentive program development to pair equipment discounts with library launches
- Ongoing staff management and business outreach support

### **Low- and Zero-Emission Loading**

Setting loading zone standards can help drivers better navigate traffic and achieve more efficient deliveries, reducing circling for parking and associated emissions. To further Seattle's climate goals and urban delivery improvements, climate-friendly loading facilitated through a low- and zero-emission loading program would provide priority access for climate-friendly vehicles and incentivize freight companies to transition to EV alternatives. Development of this program would build upon work with the C40 Zero-Emission Freight Project and the Green and Healthy Streets Accelerator signatory cities and partners, aiming to accelerate the uptake of zero-emission vehicles (ZEVs) and infrastructure for zero-emission urban goods and servicing transportation. See Curbside Management Element for more.

### *Green Infrastructure in Industrial Areas*

To support climate and livability goals, we will seek to plan, design, and construct green infrastructure, such as tree canopy and bioswales, in the MICs. Complementary strategies and actions include:

- Assess landscaping in the right-of-way to reduce truck-specific sightline issues on the freight network
  - Regularly maintain landscape complexes
  - Integrate the freight network into landscape maintenance management plans
- Assess street trees in the right-of-way to reduce truck-specific sightline issues on the freight network
  - Evaluate overlap of the freight network with SDOT-maintained street trees and integrate the freight network into tree maintenance plans
  - Assess and enforce tree clearance issues along the freight network for trees that are privately owned and maintained

### *Freight and Bus (FAB) Lanes*

Our efforts to pilot and evaluate the performance of FAB lanes in strategic street segments in the city will require close coordination with associated transit improvement projects and development of transit infrastructure. Learnings from the pilot can be used to formalize and update the freight lane policy and fine-tune evaluation and design criteria to ensure that freight and transit can coexist in, and benefit from, a shared lane. Implementation of a FAB lane is not intended to remove a road segment's freight network designation.

## MAINTENANCE AND MODERNIZATION

Maintaining and improving the freight network is essential to preserving access and mobility for goods movement throughout the city, as well as advancing our safety, climate, and equity goals. Alongside maintenance, we seek to continually modernize supportive infrastructure, which includes updating our policies, processes, and procedures to align our work with our goals, and as new and emerging best practices become available. A summary of key actions related to maintenance and modernization is included below.

### *Transportation Asset Management Plan*

Strategically manage the life cycle of our freight assets in accordance with our Transportation Asset Management Plan (TAMP) to achieve the best performance results for the preservation, improvement, and operation of infrastructure assets, given the resources available. This will include the monitoring of pavement quality for the freight network, including the heavy haul network, critical freight corridors, and first-and-last mile connections among other freight-related infrastructure assets.

### *Update Streets Illustrated (Seattle Right-of-Way Improvements Manual)*

Based on the tools in the freight toolbox, update *Streets Illustrated* to reflect best practices in design guidance and standards. Additional strategies to increase safety between and among modes that should be considered when updating *Streets Illustrated* include:

- Integrate planning for freight with other modes. Use the multimodal right-of-way allocation process within the updated Comprehensive Plan to move people and goods as safely as possible.
- Assess conflicts between transit and freight mobility. Design transit waiting and boarding facilities to minimize conflicts with goods movement and deliveries.
- Assess conflicts between bicycle and freight mobility. Address freight delivery needs, including alley access and Commercial Vehicle Load Zone locations, when developing bicycle infrastructure projects to minimize conflicts with goods movement and deliveries.
- Design bicycle facilities to provide predictable movement of people on bicycles and to avoid conflicts with goods movement and deliveries. Assess conflicts between pedestrian and freight mobility.
- Design pedestrian facility treatments to provide predictable movement of people and to avoid conflicts with goods movement and deliveries.
- Review pedestrian crossing opportunities on streets in the freight network and provide controlled or pedestrian-activated crossings, where appropriate

## Rail Safety and Maintenance

A range of initiatives to improve safe interactions between various travel options and trains at rail crossings could include:

- Staff for onsite inspections to field-verify conditions and needs and perform required triennial inspections for USDOT inventory updates
- Necessary enhancements to address any safety concerns
  - Duty to maintain crossings
- Railroad responsibility to maintain crossings per RCW 81.53.90
  - Traffic signal preemption and active warning devices
- Partnerships with railroad companies to evaluate and make improvements at at-grade rail crossings; upgrades should be coupled with multimodal, environmental, drainage, and greening improvements for freight and other modes
- Assess conflicts between pedestrians and freight, as well as between bicycles and freight
  - Out-of-service track removal and street surface repairs
- Track removal may require additional legal proceedings. In some cases, it may only require the railroad to “retire” the track. Full street rehabilitation will require a full capital program—it is not a spot improvement.
  - Surface light-rail and streetcar corridor safety enhancements
- Collaborate with transit partners to ensure safety in these corridors as they relate to freight mobility
- Assess conflicts between transit and freight mobility
- Increase security around railyards and rail corridors, including anti-trespassing measures (fencing, etc.) being forwarded by Federal Railroad Administration (FRA), Federal Highway Administration (FHWA), and Washington State Utilities and Transportation Commission.

*See the Bicycle and E-Mobility Element for more information about rail crossing improvements.*

### RAILROAD CROSSING SAFETY

Collisions between trains and vehicles at grade crossings are the second leading cause of rail-related fatalities across the U.S. Between 2012 and 2021, about 364 highway-rail grade crossing incidents occurred in Washington (including 53 incidents with Amtrak trains), leading to 54 deaths and 104 injuries. Nearly 80 percent of the incidents were at public highway-rail crossings.

Railroad crossings that are blocked by slowly moving, extremely long, or stopped trains are also a concern across the state, especially as freight and passenger traffic increases on both roadways and rail lines. Blocked rail crossings can create safety risks to local communities by temporarily increasing emergency response times.

An increase in train lengths following the implementation of precision scheduled railroading (PSR) operating practices on Class I railroads is a safety and mobility concern for communities living near at-grade crossings in Washington.

*From WA State Freight System Plan & Appendices, 2022, page 35*

# DEFINING SUCCESS

To track progress toward the STP goals, it is important to define what success looks like and how we'll measure it. This section defines the performance measures that have been identified as important indicators of our progress, as well as relevant Transportation Equity Framework (TEF) tactics this Element supports. Performance measurement is how SDOT is held accountable and provides transparency for community members and decision makers to understand the impacts of the plan as it is implemented over time.

A freight-friendly city supports the efficient movement of goods to help strengthen the economy for the city and the region. It provides safe operating environments—separation of travel modes and predictable movements for all travelers on city streets. It also includes:

- **Reliable access** to/from manufacturing/industrial centers and intermodal hubs
- **Clear designation of truck streets/routes** to avoid trucks using alternate routes
- **Reduced freight-related impacts** on nearby historically underserved communities adjacent to the industrial lands
- **Reduced carbon emissions and noise pollution** by promoting the transition to low- or zero-emission truck fleets and incorporating consolidated delivery hubs with electric vehicles
- **Keep up well-maintained truck facilities** including loading zones, truck routes, wayfinding signs, truck parking, and other assets related to goods movement
- **Reduced impact to emergency response vehicles**
- **Critical freight and goods delivery access** to buildings
- **Responsiveness to changing trends** and increased demand for urban goods and e-commerce parcel deliveries
- **Proactive maintenance** of at-grade rail crossings and consistent railroad interactions
- **Safe, clean, and comfortable spaces** for employees and travelers in industrial areas to rest outside of work and vehicles

## MEASURABLE OUTCOMES

This section outlines desired outcomes and recommended performance measures to monitor the implementation of the STP Freight and Urban Goods Element. They are part of a 3-tiered system of measures that includes:

- **Tier 1:** Overarching outcome-based measures are identified in the STP implementation strategy (see Chapter 4 of the Part I document). Generally, they are tracked at a citywide scale, and SDOT may not have primary control over their achievement. Examples include a reduction in vehicle-miles traveled and the percentage of household income dedicated to transportation.
- **Tier 2:** These measures are tracked in individual elements, as they are not as overarching as the measures in Tier 1. Typically measures in Tier 2 are a combination of outcome and output measures over which SDOT has a relatively large degree of control. These measures help SDOT track progress towards our Tier 1 goals. Examples include increasing the percentage of fleet vehicles that are zero emissions and increasing the percentage of Major Truck Streets with fair or better pavement condition.
- **Tier 3:** Measures in the Tier 3 category are typically tracked by individual programs. SDOT has a high degree of control over these measures. They are used to track productivity and to help allocate resources. Examples might include increasing the number of truck street segments with annual truck counts and the lane miles of heavy haul network reconstructed.

While all metrics in the table below will be tracked at a citywide scale, it will be important to track several metrics by demographics and/or geography so that SDOT can pivot as needed to meet our equity goals over the next 20 years.

The table indicates which metrics will be tracked using the city's Race and Social Equity Index (RSEI) and/or race. RSEI combines information on race, ethnicity, and related demographics with data on socioeconomic and health disadvantages to identify census tracts where priority populations make up relatively large proportions of neighborhood residents.<sup>13</sup>

The ability to successfully track performance measures is dependent on city staff capacity to collect and analyze data, the availability of relevant data, and/or the availability of resources to acquire data.

**Table 4** on the following page identifies the Tier 2 performance measures that will be tracked for the Freight Element.

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<sup>13</sup> <https://data.seattle.gov/dataset/Racial-and-Social-Equity-Composite-Index-Current/w3kz-xmq>

Table 4: Freight and Urban Goods Movement Performance Measures

Desired Outcome	Performance Measure (source)	Baseline (year)	Target or Desired Trend	Track measure by RSEI and/or race	Related STP Goal
End traffic deaths and serious injuries on city streets	Number of fatal and serious injury crashes involving trucks or rail (SPD collision report data)	4 (2022)	Zero fatalities or serious injuries by 2030	Yes	Safety Equity Sustainability Livability
Improve reliability of freight corridors	Percent of Major Truck Street network operating reliably (TBD) <sup>14</sup>	TBD	Increase percent of network operating at a TTI of 1.5 or better  ("Travel Time Index" (TTI) – ratio of congested to free-flow travel time on a segment)	Yes	Mobility & Economic Vitality Maintenance & Modernization
Decrease the carbon footprint of in-City package delivery	Percentage of fleet vehicles that are zero emissions (TBD) <sup>14</sup>	TBD	30% of goods delivery fleet is zero emissions by 2030	No	Sustainability Mobility & Economic Vitality Livability Maintenance & Modernization
Support a well-maintained freight network	Percentage of Major Truck Streets with fair or better pavement condition (SDOT)	58% (2023)	Achieve and maintain a higher percent of Truck Street segments with fair or better pavement conditions than streets as a whole	Yes	Safety Mobility & Economic Vitality Maintenance & Modernization

<sup>14</sup> Seattle DOT working to identify an appropriate dataset to calculate this baseline.



## RELEVANT TEF TACTICS

- TEF 17.3—Provide low-tech and language-accessible information to businesses about parking/loading and how communities can make requests for load zones or other curbside uses.
- TEF 20.5—Consider travel time and air quality impacts of changes to roadway configurations. Use this information to make equitable investment decisions that consider travel time and air quality impacts and benefits, and to communicate those benefits and impacts to community.
- TEF 22.1—Analyze how movement of goods were impacted during COVID-19 and whether there are specific ways we can maintain any benefits that were seen.
- TEF 36.2—Support transition to EVs for all segments of transportation, including personal mobility, goods movement, and services (e.g., skilled labor/repair, landscapers, home health care workers, trash collection) through targeted, equitable incentives and policy design. Implement related actions in the Transportation Electrification Blueprint.
- TEF 37.4—Identify and allocate funds to new or existing programs to address pedestrian safety concerns that are reflected from community data collection.
- TEF 40.1—Emphasize and incorporate pedestrian safety into the street character and design process; ensure staff are trained and educated on how to do this.
- TEF 40.3—Include individual and community's crossing needs and challenges into data storytelling and incorporate this qualitative data into SDOT decision-making processes.
- TEF 56.4—Improve, identify, and maximize current opportunities for street trees and greenscapes in SDOT activities ranging from routine maintenance to capital project delivery; ensure design guidance and functions of maintenance include this consideration for long-term sustainability.
- TEF 56.5—Increase open space for improved air and water quality, implement de-paving projects, and commit right-of-way (ROW) allocation in areas that are impacted by nearby industrial land uses.

# APPENDIX A: FREIGHT PROJECTS

**Table 5:** Freight Projects below includes key freight projects building upon the 2016 Freight Master Plan (FMP) and the 2020 Freight Program Report.

The project number associated with each project in the FMP is included for reference.

Projects 1 through 5 are large catalyst projects that will require multiple funding partners to implement.

Omitted FMP project numbers represent projects completed since adoption of the Freight Master Plan.

*Table 5: Freight Projects*

FMP No.	Project Name	Project Description
1	Ballard Bridge Project	Replace structure to increase capacity and improve access.
3	SODO Rail Corridor Grade Separation	Improve access to manufacturing and industrial center and Port of Seattle facilities. May include non-motorized grade separation to increase safety and reduce modal conflicts.
4	4 <sup>th</sup> Ave S Viaduct Replacement (4 <sup>th</sup> Ave S grade crossing over Union Pacific Railroad Argo Yard)	Replace the viaduct structure spanning the Union Pacific Railroad (UPRR) yard at the conclusion of its service life, which is expected to occur within the 20-year planning timeframe (by 2035). The new structure will increase vertical clearance above the railroad tracks to improve safety and rail operations. Columns and pier walls will be removed to increase and optimize rail yard functionality and operations.
5	1 <sup>st</sup> Ave S Viaduct Replacement (Grade crossing over Union Pacific Railroad Argo Yard)	Replace the existing viaduct structure spanning the Union Pacific rail yard at the end of its useful life span
6	BINMIC Truck Route Improvements (Area bounded by W Dravus St, W Nickerson St, NW Market St, and Fremont Ave N)	<p>This project will evaluate truck freight movements to identify projects to address geometric and operating challenges for trucks. The projects will be focused on readily implementable improvements with primary consideration given to safety and freight connectivity. They may include signal timing adjustments, additional signage or wayfinding, larger intersection turn radii, lane width adjustments, and joint use of bus lanes.</p> <ul style="list-style-type: none"> <li>• Phase I: Collect data on needs through a detailed assessment of truck volumes, truck sizes, and over-dimensional truck activity. Build from the forecasts developed in the Freight Access Project and work with stakeholders to identify and prioritize specific truck route projects.</li> <li>• Phase II: Implement top priority projects given funding availability and opportunities. Develop a long-term budget and funding strategy to implement remaining projects.</li> </ul>
7	15 <sup>th</sup> Ave W Spot Improvements at W Dravus St and W Emerson St	<p>This project addresses turn radii issues for trucks and enhanced multimodal operations through small-scale geometric and intersection operational improvements along 15th Ave W.</p> <p>Trucks of all sizes experience challenges traveling on the elevated structures at W Emerson St and W Dravus St. 15th Ave W, W Emerson St, and W Dravus St are vital connections for freight traveling to and from the Ballard-Interbay-Northend Manufacturing/Industrial Center (BINMIC). This project includes two components to implement changes at these locations.</p>

FMP No.	Project Name	Project Description
		<ul style="list-style-type: none"> <li>• The W Emerson St ramp over 15th Ave W serves trucks going to and from W Nickerson St. This component includes moving the centerline on the ramp to provide a greater turning radius for trucks and making adjustments to the stop bars channelization at the intersection on the west side of the ramp.</li> <li>• W Dravus St is used by trucks of all sizes, including over-legal vehicles unable to pass underneath the bridge on 15th Ave W. Northbound trucks have particular difficulty turning left onto W Dravus St from the off-ramp. This component of the project includes upgrading signal timing and hardware at the ramp terminals to ensure vehicle queues on the bridge clear to allow trucks adequate space to turn at the intersection. This project can be bundled with Ballard Bridge Access improvements.</li> </ul>
8	15 <sup>th</sup> Ave NW/ NW Market St Intersection Improvement	Improve southeast corner curb radius, which would impact existing signal equipment.
9	15 <sup>th</sup> Ave W/ Elliot Ave	Reconstruct and make operational/ ITS improvements to 15th Ave W/Elliott Ave W.
10	Dynamic message signs along 15 <sup>th</sup> Ave NW corridor (Ship Canal to Holmon Rd NW)	Install dynamic message signs to provide travel conditions on major freight corridors prior to connecting to major truck streets.
11	NW Leary Way at NW 46th St or NW 45th St (NW 46th St to Shilshole Ave NW)	Intersection operations should be evaluated and treatments considered to improve access to/from NW 46th Street or NW 45th St. Type of improvements to be coordinated with outcomes of the BINMIC Truck Route Improvements.
12	W Emerson St/21st Ave W/W Commodore Way Corridor Improvements	Reconstruct the existing intersection at 21st Ave NW and W Commodore Way to improve truck safety and mobility and improve bike/ped/truck facilities on W Emerson Place and 21st Ave W.
13	NW Market St / Leary Way NW / N 36th St Improvements	Reconstruct and make operational/ITS improvements to Leary Way NW corridor to facilitate freight movement. This project would coordinate specific truck operational improvements with the BINMIC Truck Route Improvements.
14	Mobility improvements along NW Market St between 8th Ave NW and Stone Way N	Restrict left turns at non-critical intersections to improve east/west mobility for freight.
16	Intersection Improvements at 4th Ave N, Westlake Ave N, Dexter Ave N, and Nickerson St	Evaluate the intersection of 4th Ave N, Westlake Ave N, Dexter Ave N, and Nickerson St to improve freight mobility.
17	Intersection Improvements at 6th Ave NE and NE 40th St	Eliminate the height restriction and turning movement conflicts on 6th Ave NE at the Burke-Gilman Trail bridge.
18	3870 Montlake Blvd NE - Montlake Blvd NE height restriction	Eliminate the height restriction on Montlake Blvd NE at the pedestrian bridge connecting UW to the Alaska Airlines Arena.
19	Ballard Bridge Access and Seismic Improvements	Address capacity constraints for bikes and pedestrians and seismic improvements to the Ballard Bridge.
20	7th Ave NE/ NE 40th St Intersection improvements	Reconfigure intersection to facilitate turning and crossing movements at 5-leg intersection.

FMP No.	Project Name	Project Description
21	Integrated corridor management system on N 85th St between 15th Ave NW/Holman Rd NW and I-5	Implement Integrated Corridor Management (ICM) and provide the opportunity for freight to avoid congestion on a given facility when it is present. Consider dynamic message sign and/or push out data on I-5 conditions and back-ups. Implement additional permanent surface street data collection.
22	ITS Improvements N 85th St from Aurora Ave N to I-5	Install traffic signal control improvements (either traffic adaptive or responsive) to provide consistent travel times on freight corridor. Implement additional detection to provide congestion information.
23	Dynamic message signs along 25th Ave NE corridor (Ship Canal to Montlake Blvd NE / NE 75th St)	Install dynamic message signs to provide travel conditions on major freight corridors prior to connecting to Major Truck Streets
24	ITS improvements Aurora Ave N	Modify signal timing on northbound Aurora Ave N to improve freight traffic during the morning peak.
25	W Galer St Interchange Ramp	Construct ramp to improve access over BNSF mainline tracks and storage yard.
26	Nickerson St / W Nickerson St Reconstruction	Reconstruct Nickerson St and improve freight movement alternatives in the Ballard-Interbay-Northend Manufacturing/Industrial Center.
27	Denny Way ITS (Denny Way from I-5 to Western Ave)	Update signal timing, vehicle detection, CCTV cameras, dynamic message signs, and fiber communications to improve traffic flow and provide enhanced traveler information along Denny Way from I-5 to Western Ave.
29	I-5 Connector ITS (areas surrounding I-5)	Installation of CCTV cameras along streets that provide Center City access to I-5/I-90 to provide congestion monitoring of traffic interchanging with the freeway.
30	ITS upgrades on Boren Ave from Howell St to S Jackson St (Rainier Ave S to Denny Way)	Upgrade all signals in Major Truck Street corridor to current-standards and improve north-south mobility in center city.
31	East Marginal Way S Corridor Reconstruction and Safety Enhancements (S Spokane St to S Michigan St)	Reconstruct a core freight route to heavy haul vehicle standards, add safety and advanced management systems and incorporate separate bicycle and pedestrian facilities while maintaining freight efficiency. Central Segment: S Spokane St to Diagonal Ave S; South Segment: Diagonal Ave S to S Michigan St. (Project is projected may be completed in 2025.)
32	East Marginal Way S / 8th Ave S / S Myrtle St Intersection Improvements	Improve intersection geometry, revise signalization, upgrade drainage, rehabilitate pavement at railroad tracks, and install streetscaping. Project should be coordinated with Next Generation ITS.
33	East Marginal Way S/ S Hanford St Intersection Improvements	Upgrade the signal, lengthen the northbound right-turn lane, improve the railroad crossing pavement, and evaluate the need for railroad crossing gates at the Whatcom track crossings. The project also includes rebuilding the intersection and its approaches to Heavy Haul route requirements. This project will also more clearly delineate parking on the southeast corner of the intersection. (Project is projected to be completed in 2024 with Project 31: East Marginal Way S Corridor Reconstruction and Safety Enhancements.)
35	Duwamish Local Freight Access Improvements (S Holden St/ 5 <sup>th</sup> Ave S/ S Kenyon St/ 8 <sup>th</sup> Ave S)	Reconstruct roadway with drainage, curb, sidewalks, and landscaping. Coincides with W Duwamish Trail construction and, Seattle Public Utilities drainage substation proposal.
36	S Spokane St Freight-only Lanes Pilot	Pilot project to design, implement, and evaluate freight-only lanes on the corridor. The first phase of the project would determine project limits and identify design options, and new infrastructure needed to implement the pilot. The second phase would implement modifications to roadway channelization for truck-only lanes,

FMP No.	Project Name	Project Description
		install signal and signage upgrades, and provide ITS equipment such as variable message signs and detection equipment. The project would evaluate time-of-day operations, while providing a contingency for allowing all traffic to use the lanes in the event of an incident on the upper bridge.
37	S Holgate St Rail Crossing Improvements (S Holgate St from Occidental Ave S to 4 <sup>th</sup> Ave S)	Reconstruct the pavement to Heavy Haul route requirements, and improve channelization, signage, and pedestrian and bicycle environment.
38	S Atlantic St Corridor Reconstruction (S Atlantic St - Alaskan Way to 1st Ave S)	Reconstruct and make operational ITS improvements.
39	S Spokane St ITS Upgrades (Chelan Ave SW to S Airport Way)	Install ITS equipment along the corridor to collect and provide real-time travel time information for trucks and the general public. Specific equipment would include Bluetooth readers and dynamic message signs installed along the corridor to collect and disseminate travel time information between S Airport Way and Chelan Ave SW, including access to Port Terminal 5. An additional project component, which has not yet been evaluated for cost, may be to improve the signal system at the intersection of Chelan Ave SW at the western terminus of the corridor.
40	SW Spokane Pl Reconstruction	Reconstruct and make operational/ITS improvements to SW Spokane Pl.
42	Railroad Crossing Delay Warning System (S Holgate St, S Spokane St, and S Horton St)	Install ITS equipment to monitor and inform the public of road closures due to train activity and provide alternative routing options via of dynamic message signs that display real-time information to drivers at key locations.
43	S Hanford Reconstruction	<p>Improve access to the Main Seattle International Gateway (SIG) Yard. Examine the feasibility of installing a traffic signal and other potential changes to facilitate traffic flow in the area. If or when warranted, a traffic signal at the Main SIG entrance could alleviate congestion and allow for improved truck access to the yard.</p> <p>This project also rebuilds the segment of Hanford St between the East Marginal Way S and 1st Ave S to Heavy Haul route standards, including new pavement at railroad crossings. It may include rail crossing gates or other devices, if needed.</p>
44	S Michigan St ITS Improvements (East Marginal Way S to Corson Ave S)	Update signal timing, vehicle detection, CCTV cameras, dynamic message signs and fiber communications to improve traffic flow and provide enhanced traveler information along S Michigan St
45	West Marginal Way SW/ Chelan St SW Intersection Improvement	Intersection signal operational improvements for freight. There is another study underway to improve access for cyclists. (Expected project completion in 2024)
46	W Marginal Way SW Reconstruction	Reconstruct and make operational/ITS improvements to West Marginal Way SW.
47	1st Ave S Bridge ITS	SDOT and Port of Seattle partnership to determine best mode to disseminate route information to area trucking industry. Provide information and advance warnings about bridge openings during peak travel times for freight based on historical statistics and real-time information.
48	Airport Way S / S Edmunds St intersection improvement	Monitor and evaluate for future signal warrants and address geometric issues.

FMP No.	Project Name	Project Description
49	S Bailey St Channelization and Operational Improvements (S Michigan St to Carleton Ave S)	Improvements for the eastbound left-turn movement to access the I-5 ramps, including a review of signal operations and channelization changes.
50	16th Ave S and East Marginal Way S Intersection Improvements	Improve northbound right-turn curb radius.
51	S Lucile St Reconstruction (S Airport Way to SR 99)	Reconstruction and make operational/ITS improvements.
52	S Massachusetts St Rebuild (access road - Colorado Ave S to 1st Ave S)	Reconstruct S Massachusetts St to improve safety and access to North SIG Yard, while maintaining two-way operations. Seek to provide separated travel lanes for general purpose and truck traffic. Provide improved truck access/operations at the 1st Ave S / S Massachusetts St intersection.
53	Diagonal Ave S / S Oregon St / Denver Ave S Reconstruction (East Marginal Way (SR 99) to Union Pacific Argo Yard)	Rebuild existing truck route facility.
54	S Dallas Ave / 14 <sup>th</sup> Ave S Intersection Improvement	Improve curb radius for northbound and westbound turning movements.
55	West Seattle Bridge access to Port Terminal 18 and Terminal 5	Provide access improvements from the West Seattle Bridge to Terminal 18 and/or Terminal 5 from West Seattle Bridge.
57	SODO Phase 1 ITS (SODO area)	Provide advanced warning for railroad closures to minimize queuing as well as improve traffic monitoring capabilities for major haul routes in the SODO area.
58	S Holden St Reconstruction	Reconstruct and make operational/ITS improvements to S Holden St.
59	1st Ave S Reconstruction	Reconstruct and make operational/ITS improvements to 1st Ave S.
60	6th Ave S Reconstruction	Reconstruct and make operational/ITS improvements to 6th Ave S.
61	Duwamish Ave S Reconstruction/East Marginal Way Grade Separation Reconstruction	Reconstruct and make operational/ITS improvements to Duwamish Avenue S, Duwamish Ave Bridge and S Spokane St.
62	Harbor Island Access Improvements	Reconstruct and make operational/ITS improvements to 11th Ave SW, SW Florida St, 16th Ave SW and Klickitat Ave SW. Project does not include non-City right of way (T18 access portions).
63	SW Klickitat Way Reconstruction	Reconstruct and make operational/ITS improvements to SW Klickitat Way.
65	4th Ave S Reconstruction and ITS Implementation	Reconstruct and make operational/ITS improvements to 4th Ave S.
66	S Industrial Way	Reconstruct and make operational/design improvements to S Industrial Way.
67	Citywide Small Spot Improvement Program	Freight spot improvement program to help trucks move more quickly at key bottlenecks.
68	Integrated Corridor management on WSDOT operated facilities <ul style="list-style-type: none"> <li>• NB SR 99 at SW 103rd St</li> <li>• SB SR 99 at N 145 St</li> <li>• I-5 at NE 145th St</li> <li>• Northgate Way between SR 99 and SR 522</li> </ul>	Implement integrated corridor management (ICM) by establishing relationships with other jurisdictions to install dynamic message signs ahead of major connections between I-5, SR 99 and SR 522 that would provide the opportunity for freight to avoid congestion on a given facility when it is present. Install dynamic message sign and/or push out data on I-5 conditions and back-ups. Implement additional permanent surface street data collection.

FMP No.	Project Name	Project Description
New	Railroad Crossing Program	Maintain and update Rail crossings in coordination with railroads (Class I and Short line).
New	Railroad Removal Program	Remove identified unused rail to upgrade street pavement.
New	Freight Program (vs. Freight Spot Improvement Program)	Planning, design, research, and program management.

# GLOSSARY

**ADA:** Americans with Disabilities Act

**Annual Average Daily Traffic (AADT):** The total volume of vehicle traffic on a roadway for a year divided by 365 days.

**Bicycle and Pedestrian Safety Analysis (BPSA):** A data-driven study conducted by SDOT to understand where, how, and why pedestrian and bicycle crashes happen. The study used data of where crashes happened and pedestrian, cyclist, and vehicle volumes. The results are used to identify locations and prioritize safety investments with the goal of preventing future crashes.

**Bioswale:** Vegetated ditches that capture and filter stormwater runoff.

**BIPOC:** BIPOC stands for Black, Indigenous, and all People of Color (BIPOC). It is a term to make visible the unique and specific experiences of racism and resilience that the Black/African Diaspora and Indigenous communities have faced in the structure of race within the United States. BIPOC is a term that both honors all people of color and creates opportunity to lift up the voices of those communities.

**Cargo:** Cargo, for this document, typically refers to internationally shipped freight that is transported by large commercial trucks on city streets.

**C40 Green and Healthy Streets Accelerator:** An initiative by C40 in partnership with mayors of signatory cities to transform cities into greener, healthier, and more prosperous places to live. To achieve this, signatory cities commit to work with partners to procure zero-emission buses from 2025 onward; and to ensure a major area of the city is zero-emission by 2030. The City of Seattle committed to the actions of the initiative in 2017.

**C40 Zero Emission Freight Project:** A collaboration between C40 cities to accelerate the adoption of zero-emission vehicles and goods delivery.

**Community and Mobility Hubs:** Community and Mobility Hubs are places of connection that bring together transportation options, community spaces, and travel information into a seamless, understandable, and on-demand travel experience. They are located with major transit facilities and places and may feature People Streets and Public Spaces (PSPS) elements.

**Comprehensive Plan:** A 20-year vision and roadmap that guides City decisions on where to build new jobs and houses, how to improve the transportation system, and where to make capital investments such as utilities, sidewalks, and libraries.

**Connected and autonomous vehicles (CAVs):** Vehicles that can communicate with other vehicles (connected) and can drive without a human operator (autonomous).

**Critical access needs (CAN):** The services necessary for a building to perform its core operating functions safely and successfully. These include goods delivery, designated parking and loading spaces, and building spaces.

**E-cargo bikes:** Human-driven bikes with battery-powered pedal assist that can transport packages or other small goods in a front-mounted wagon or rear-hitched trailer.

**E-commerce:** The buying and selling of goods online that are then delivered directly to a home or business. Examples include Amazon and eBay.

**EV:** Electric vehicles

**Executive Order 2022-07:** An executive order signed by Mayor Bruce Harrell to advance the City's climate goals. The order sets goals of establishing 3 low-pollution neighborhoods by 2028, making 20 miles of Healthy Streets permanent, hosting a Youth Transportation Summit, and making the City's fleet zero-emission by 2030.

**First-/last-mile:** The distance traveled at the beginning or end of a trip from transit to a final destination.

**FHWA:** Federal Highway Administration



**FRA:** Federal Railroad Administration

**FRA Grade Crossing Inventory System:** The FRA's inventory on physical rail and road attributes, collision records, and unique coding for the over 200,000 railroad crossings in the US.

**Freight Advisory Board:** Founded by City Council in 2010, the Freight Advisory Board consists of 12 members – 6 appointed by the Mayor, 5 appointed by City Council, and 1 appointed by the Port of Seattle – that work with the City on matters related to urban freight to make Seattle's freight network efficient and reliable.

**Freight Master Plan (FMP):** A long-range plan developed by SDOT, adopted in 2016, to ensure Seattle's freight network can safely and reliably deliver freight and goods to meet City goals for social equity, economic productivity, sustainability, and livable neighborhoods. The Freight and Urban Goods Movement Element of the Seattle Transportation Plan (2024) builds on and supersedes the 2016 Freight Master Plan.

**FTA:** Federal Transit Administration

**Grade crossing:** An intersection where general purpose traffic and rail tracks cross at the same level.

**High-injury Network (HIN):** The High Injury Network (HIN) identifies where fatal and serious crashes have already occurred to inform safety corridors of focus for the Vision Zero program. It prioritizes corridors according to fatal and serious injury crash rates, as well as race and equity outcomes.

**Hours of Service (HOS):** The maximum amount of time drivers of commercial freight vehicles can drive in a day, set by the Federal Motor Carrier Safety Administration.

**Intelligent Transportation Systems (ITS):** Technologies to manage transportation systems, such as coordinating traffic signals and traveler information systems that provide data such as travel times and road closures.

**Key Moves:** A series of strategies across the 6 STP core values that explain how the goals of the STP can be achieved. The Key Moves represent an integrated view of our complex transportation system, touching multiple elements.

**Leading pedestrian intervals (LPIs):** Walk signals at intersections that give pedestrians an additional 3-7 seconds to cross the street before vehicles.

**Low-emission neighborhood:** Low-emission neighborhoods, sometimes called low-pollution neighborhoods, prohibit or restrict the types of vehicles allowed within an area and encourage zero- and low-emission travel options like walking, biking, electric vehicles, and deliveries by e-cargo bike. Implementation of these concepts will vary by neighborhood and are co-created with local communities.

**Micro-hubs:** Small-scale urban logistics facility located in between a major warehouse and the final delivery destination implemented to reduce vehicle emission trips by shifting to low or zero-emission modes (walking, biking). Goods are transferred from larger freight vehicles to smaller, lower emission modes for final delivery. Micro-hubs can be used by 1 or more carriers/operators based on the location to support consolidation efforts.

**MICs:** Manufacturing and Industrial Centers. These are areas of the city comprised of land used primarily for manufacturing and industrial activities, including regional manufacturing using warehousing and distribution land.

**Multimodal:** Refers to the various ways people use the transportation system, such as walking, riding a bicycle, taking transit, or driving a truck or personal automobile. It can also refer to a journey that employs more than one mode, such as walking to the bus stop and then taking a bus to a final destination. The vast majority of individual trips involve more than one mode.

**Neighborhoods:** Residential areas, typically, with some mix of commercial activity and distinctly different from the MICs (above).

**Operation Lifesaver:** Operation Lifesaver is a program dedicated to improving safety at railroad crossings and near trains.

**Personal delivery devices (PDDs):** Small automated or remotely piloted robots designed for short deliveries carrying food, packages, or other goods

**PSRC:** Puget Sound Regional Council

**RCW:** Revised Code of Washington

**RCW 81.53.90:** A section of the Revised Code of Washington (RCW) that specifically speaks to the railroad's responsibility to maintain crossings.

Regional manufacturing using warehousing & distribution lands

**Right-of-way (ROW):** A strip of land legally established for the primary purpose of public travel by pedestrians and vehicles.

**Road diet:** Physical changes to the right-of-way that decrease vehicle volumes and speeds and reallocate space toward non-motorized modes, such as walking and biking. Examples include curb bump-outs, pedestrian refuge islands, narrowed lanes, street cafes, and street trees and landscaping.

**Rolling:** A form of travel that includes low-speed, wheeled mobility devices that use the pedestrian network. Examples include wheelchairs and strollers.

**Safe System Approach:** A framework for transportation planning to move toward a transportation network that is safe for everyone. The approach differs from traditional approaches to traffic safety by recognizing that humans will make mistakes and layers of protection must be built elsewhere into the system to address that. The approach is based on 6 principles:

- Death and serious injuries are unacceptable
- Humans make mistakes
- Humans are vulnerable
- Responsibility is shared
- Safety is proactive
- Redundancy is crucial

Goals are to create safer vehicles, speeds, roads, and people and provide post-crash care.

**SDOT:** Seattle Department of Transportation

**Shared micromobility:** Shared bikes and scooters that offer low-cost options for a short distance trip. Riders locate and rent available devices with their phone, ride it where they want to go, and leave it responsibly parked for the next person.

**Standard Plans and Specifications:** City standards that apply to any public or private construction in the right-of-way. The document standardizes terminology, abbreviations, and symbols to be used in construction plans.

**STP:** Seattle Transportation Plan

**Streets Illustrated:** Seattle's Right-of-Way Improvements Manual is an online resource for property owners, developers, and architects involved with the design, permitting, and construction of Seattle's street right-of-way.

**TNC:** Transportation network company (e.g., Uber and Lyft)

**Traffic calming:** Physical changes to street design that slow traffic and make the street safer for all travelers. Examples include traffic circles, speed humps, and narrow lanes.

**Transportation Equity Framework (TEF):** A roadmap for SDOT decision-makers, employees, stakeholders, partners, and the greater community to collaboratively create an equitable transportation system. The TEF addresses disparities within the transportation system due to institutional racism.

**Urban goods (delivery):** This is a type of freight. These are products delivered to local businesses and residential neighborhoods in delivery vans or box trucks. This is distinct from "cargo."

**Urban Villages and Centers:** Areas in Seattle identified in the Seattle 2035 Comprehensive Plan where the most future job and employment growth is targeted. This strategy promotes the most efficient use of public investments and encourages walking, bicycling, and transit use.

**Vision Zero:** The City's goal to eliminate traffic deaths and serious injuries on city streets by 2030.

**Vulnerable communities:** Communities that have historically and currently been erased, intentionally excluded, and/or underinvested in by government institutions. SDOT’s Transportation Equity Program and Transportation Equity Workgroup include:

- BIPOC communities
- Low-income communities
- Immigrant and refugee populations
- Native communities
- People living with disabilities
- LGBTQIA+ people
- People experiencing homelessness or housing insecurity
- Women and female-identifying populations
- Youth
- Aging adults
- Individuals who were formerly incarcerated
- Displaced and/or high-risk displacement neighborhoods

**Vulnerable traveler:** As defined in City Code, “a pedestrian, a person riding an animal, or a person operating or riding any of the following on a public way: a farm tractor or implement of husbandry, without an enclosed shell, a bicycle, an electric-assisted bicycle, an electric personal assistive mobility device, a moped, a motor-driven cycle, a motorized foot scooter, or a motorcycle.” The STP intentionally uses the term “vulnerable traveler” instead of “vulnerable user” to better reflect that people are traveling in the public way.

**Wayfinding:** Visual information that helps people to orient themselves spatially. Wayfinding is important to ensure people can travel easily, comfortably, and safely. Methods of wayfinding include signs and maps.

**Washington State Rail Plan:** The state’s rail plan is an integrated plan for both passenger and freight rail and is the planning foundation for future actions. The plan addresses rail system challenges and identifies opportunities for improvement; the plan describes the rail system and the state’s interest in it. The plan identifies potential actions to improve the rail system and recommends strategies consistent with Washington’s’ transportation policy goals of economic vitality, preservation, safety, mobility, environment, and stewardship.

**Workforce:** In the industrial/freight context, workforce refers to the maritime, transportation, and manufacturing workers whose primary location of work is in MICs.

**WSDOT:** Washington State Department of Transportation

**WSDOT Freight System Plan:** The Washington Freight System Plan examines all modes of freight movement – including trucks, airplanes, rail, barges, and cargo ships. The efficient, safe, and reliable transportation of goods throughout Washington is critical to every aspect of economic and community vitality in the Pacific Northwest. The plan sets the vision for the state’s multimodal freight system and supports collaboration with public and private partners. WSDOT will update the plan every 4 years, with the most recent update in 2022.

**Zero-emission travel:** Modes of transportation that do not emit any greenhouse gases (GHGs).

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