2040FREIGHT
DRAFT PLAN

PBOT
PORTLAND BUREAU OF TRANSPORTATION

ACKNOWLEDGMENTS

PBOT PROJECT TEAM

Francesca Jones, Senior Planner & 2040Freight Project Manager, Policy Innovation & Regional Collaboration

Gabriela Giron-Valderrama, Urban Freight Coordinator, Complete Streets

Denver Igarta, Supervising Planner, Complete Streets

Nubia Milpas Martinez, former Community Service Aide

Sean Doyle, Community Service Aide II

Stephanie Lonsdale, former Community Service Aide II

Will Roberts, Planner I, Complete Streets

PBOT Contributors

Anamaria Perez, Vision Zero Data Analyst

Mel Krnjaic, Transportation Planner, Policy Innovation & Regional Collaboration

CONSULTANT TEAM

WSP

Bridget Wieghart, Project Manager

Mat Dolata, Modeling Lead

Ryan Weston, GIS Lead

Sebastian Guerrero, Freight Analysis GHG Strategy Lead

Tom Doolittle, Trends Research

SGA

Sorin Garber, Senior Advisor/QAQC, Safety Analysis

Fehr and Peers

Briana Calhoun, Safety and Travel Data Analyst

Fatemeh Ranaiefar, Existing and Future Conditions Lead

Jolene Hayes, GHG Advisor

Seth Contreras, GHG Researcher

TECHNICAL ADVISORY COMMITTEE (TAC)

Amanda Howell, PSU Urbanism Next

Andrew Aebi, PBOT Capital Projects Delivery

April Bertelsen, PBOT Transit Coordinator

Bryan Poole, PBOT Senior Planner

Cameron Glasgow, PBOT Bridges and Structures

Emma Kohlsmith, Bureau of Environmental Services Operations

Ingrid Fish, BPS

Jeff Owen, TriMet

John Wasiutynski, Multnomah County

Kim Roske, PBOT Civil Design

Kurt Krueger, PBOT Development Review

Lisa Strader, PBOT ADA Coordinator

Matthew Machado, PBOT Traffic Design

Michelle Marx, PBOT Pedestrian Coordinator

Mike Pullen, Multnomah County

Paul Van Orden, City of Portland Livability Program

Peter Hurley, PBOT Policy Innovation and Regional Collaboration

Roger Geller, PBOT Bicycle Coordinator

Steve Kountz, BPS

Tim Collins, Metro

Tom Bouillion, Port of Portland

2040FREIGHT COMMUNITY ADVISORY COMMITTEE (CAC)

Aaron Laheyne, United Parcel Service

Amelia Schlusser, Green Energy Institute

Bob Price, Rivergate Traffic Advisory Committee

Christophe Esayian, OIA Global

Clint Culpepper, Portland State University

Dave Chalmers, Bridgetown Enterprises

David Stein, Portland Bicycle Advisory Committee

Erik Molander, Bridgeton Neighborhood Association

Felix Eshesimua, Coyote Logistics LLC

Gary Hollands, Interstate Truck Driving Academy

Hannah Skutt, Skutt Ceramics and Sunrise Movement PDX

Heather Stebbings, Pacific Waterways Association

Isaura Ascensio, FWD Logistics LLC

Josh Kubisch, FedEx

Keith Jones, Friends of the Green Loop

Keith Wilson, Titan Freight Systems

Rachel Dawson, Brooklyn Yard neighbor

Russ Goff, United Parcel Service driver

Ryan Hashagen, Icicle Industries

Sara Wright, Oregon Environmental Council

Stephanie Fong, Goose Hollow neighbor

Victoria Paykar, Climate Solutions

2040FREIGHT CAC MEMBERS ALSO ON PFC

Bill Burgel, Burgel Rail Group

Ellen Wax, Working Waterfront Coalition

Tom Dechenne, Colliers International

PORTLAND FREIGHT COMMITTEE (PFC)

Active members

Mike Albrecht, Franz Bakery

Raihana Ansary, Governor's Office

Corky Collier, Columbia Corridor Association

Marie Dodds, AAA Oregon/ Idaho

Sorin Garber, Sorin Garber Consulting

Aaron Hunt, Union Pacific Railroad

Jana Jarvis, Oregon Trucking Association

Kristine Kennedy, Highway Specialized Transport

Active associate members

Kevin Johnson, Prosper Portland

Steve Kountz, Bureau or Planning and Sustainability

Tim Collins, Metro

Tom Bouillon, Port of Portland

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B-Line Sustainable Urban Freight

Bridgetown Enterprises

Brooklyn Action Corps

Central Eastside Industrial District

City of Portland Bicycle Advisory Committee

City of Portland Mayor Wheeler

City of Portland Pedestrian Advisory Committee

City of Portland Transportation Commissioner JoAnn Hardesty

Coco Donuts

Columbia Corridor Association

Columbia Distributing

Community Engagement Liaisons

Daimler

Franz Bakery

Gyroscope Pictures

Highway Heavy Hauling

Interstate Trucking Academy

OIA Global

Oregon Food Bank

Oregon Trucking Association

Pacific Coast Fruit Company

Portland Gas and Electric

Titan Freight Systems Inc

United Parcel Service (UPS)

City of Portland Transportation Commissioner

Climate Solutions

Department of Environmental Quality (DEQ)

Forth Mobility

Green Energy Institute

Neighbors for Clean Air

Nossa Familia Coffee

Metro Regional Government

Oregon Department of Transportation (ODOT)

Oregon Environmental Council

Oregon Walks

Prosper Portland

Safe Routes to School

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To obtain a copy of this document or more information about this project, please contact:

Portland Bureau of Transportation
1120 SW 5th Avenue, Suite 1331
Portland, OR 97204
Phone: 503-823-6152

Website: 2040Freight.com


Open here!
Open here!
GLOBUS
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prime
NAVARRA
RIBERA BAJA

EXECUTIVE SUMMARY

INTRODUCTION

The flow of goods and services is a critical part of everyday life in Portland, after all, it is the West Coast's fourth largest freight hub for international trade. But that trade relies on a complex and dynamic network of roads, rails, and ports to get goods to market and their destination. This multimodal system makes planning for urban freight a unique process. The 2040 Portland Freight Plan (2040Freight) is an update of the City's 2006 Freight Master Plan that will guide the work of the Portland Bureau of Transportation (PBOT) to support safe, equitable, efficient, and sustainable urban freight over the next 20 years.

The 2019 PBOT Strategic Plan requires the bureau to address structural racism and reduce carbon emissions in all its work. Thus, this freight plan update recognizes that while the movement of commodities has been an essential part of Portland's growth and development, it also has been at the expense of the Original People of the land, immigrant labor—especially Chinese—that built the transcontinental railroad, and the displacement of Black residents and businesses by routing Interstate 5 through the Albina neighborhood. At the intersection of environmental justice, the future of Portland's urban freight network has a role to play in addressing equity, reducing carbon emissions, and improving air quality.

This plan centers on the actions (**Chapter IV**) and infrastructure projects (**Chapter V**) that the city and other actors will pursue to meet our goals in a shared vision for the future of freight. But it also includes a robust review of existing and future conditions (**Chapter II**), new trends in urban freight (**Chapter III**), and tools and analysis to support and guide PBOT over the next two decades (**Chapter VI**).

EXISTING + FUTURE CONDITIONS

Collectively, freight-related occupations employ around 15% of the Portland workforce. The freight industry employs people with a high-school diploma or GED at higher rates than the rest of the economy, however women and people of color are underrepresented in freight-related occupations. With regards to safety, truck-involved crashes are much less frequent than automobile crashes, accounting for less than 3% of non-freeway crashes and 45 fatal or serious injuries between 2014 and 2018. Portland is committed to eliminating all fatalities and serious injuries from traffic crashes and this Plan's tools and projects address this.

Portland has some of the highest rates of diesel emissions exposure in the Oregon. On-road diesel vehicles, such as heavy-duty trucks, account for about 15% of total diesel emissions in the Portland area. Roads and ramps that access freeways and bridges crossing the Willamette are among the most congested points in the road network, contributing to unreliability and added cost of goods and services.

TRENDS

Technology and the pandemic are major drivers of new trends in urban freight operations. E-commerce grew three times faster than other retail over the last decade, accelerated further by the pandemic. E-commerce is also a major contributor to other trends like changes in last-mile operations, increased demand for warehouse space, and high competition for load/unload spaces. Driver shortages are another trend due to an aging workforce, working conditions, and regulation changes. And there is renewed interest in nearshoring or reshoring production/manufacturing in the US/North America. Electric vehicles and alternative fuels are increasingly being adopted, while technology is also leading advances in rail transportation operations, automated vehicles, and delivery robots/drones. And finally, the International Maritime Organization has set targets for carbon reduction, spurring changes in fueling and operational needs for marine freight and ports.

VISION, GOALS, STRATEGIES, AND ACTIONS

We envision Portland as a vibrant city and thriving economy that connects people, goods, and services within Portland, and to regional, national, and international markets. Our vision for a low-carbon future advances safe, equitable, and efficient urban freight movement for enhanced health, prosperity, and quality of life for all Portlanders.

To realize that vision, 2040Freight establishes eight goals and 50 actions to advance those goals. These actions include developing, expanding, or exploring new programs, policies, and tools, like studying grade-separated rail crossings, updating freight district pavement standards, and piloting new curb configurations to better serve freight and other modes. Half of the actions are "priority actions" which are further prioritized within the next 5 or 10 years. The remaining actions (or "opportunity actions") may be implemented if/as funding and staff resources are available or in the 11-20 year timeframe.

PROJECT LIST

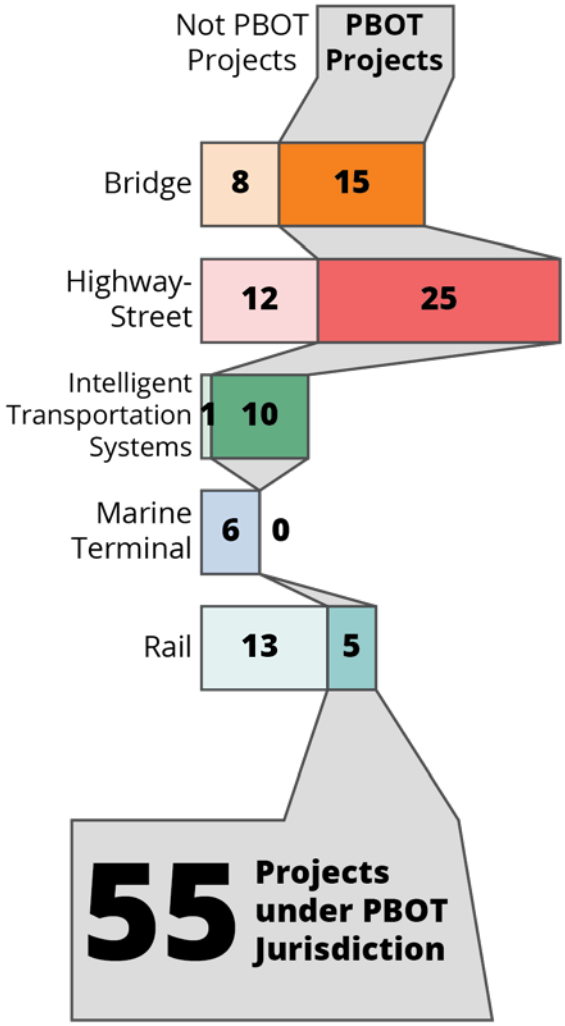
As of 2020, 41% of the freight projects identified in the 2006 Freight Master Plan had been completed. Incomplete projects were re-evaluated for inclusion in the 2040Freight project list. Additional projects were incorporated from a variety of different local and regional plans and new projects were identified through a critical infrastructure analysis ("Appendix C: Critical Infrastructure Resiliency Evaluation" on page 138). Ultimately, 55 projects in PBOT's jurisdiction were prioritized by category:

- Bridges
  15 projects, 5 high priority
- Intelligent Transportation Systems (ITS)
  10 projects, 3 high priority
- Railroad
  5 projects, 1 high priority
- Street/highway infrastructure
  25 projects, 5 high priority

Marine projects and other regional projects outside of PBOT's control are also included—for a total of 95 projects—but were not prioritized. Quick build projects were also identified for different categories, including wayfinding, loading and unloading infrastructure, and roadway design improvements.

FREIGHT DISTRICT/STREET CLASSIFICATION CHANGES

Street network classifications are a standard tool to support the planning, management, and integration of land uses and transportation systems. Classifications identify the significant freight routes serving the citywide network and are housed in Portland's Transportation System Plan and 2040Freight recommends five changes to freight street and district classifications to better reflect current and desired uses.



PRIORITY FREIGHT INFRASTRUCTURE NEEDS ASSESSMENT (PFINA)

Given 2040Freight's 20-year timeline, a data-driven tool was developed to support ongoing and dynamic project development. Sufficient data was available to assess five of the plans' goals: safety, system condition, access, efficiency, and economic vitality. During the development of 2040Freight, this tool helped evaluate our current infrastructure system and identify gaps where projects may be needed. During implementation, this tool will help guide resource allocation and decision making for improvement.

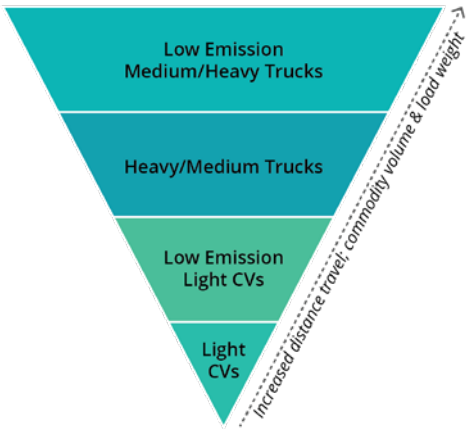
TRANSPORTATION STRATEGY FOR MOVING GOODS AND SERVICES

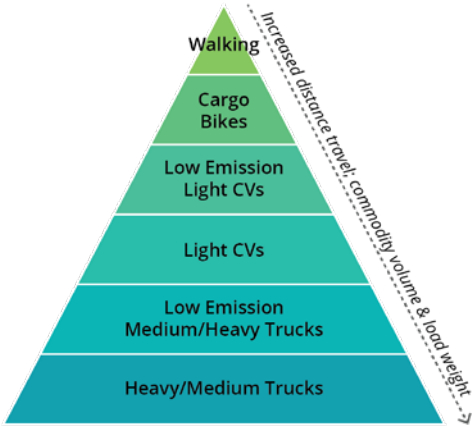
To help address carbon emissions, congestion, safety, and other efficiency goals. Portland emphasizes moving people and goods rather than the number of vehicles. But moving people requires fundamentally different considerations than moving goods and services, as the freight system is heterogeneous and complex. 2040Freight lays down a framework to better understand the nuance and variety of freight needs. And it can help guide the City's approach to planning for movement of goods and services while addressing environmental, safety, equity, and efficiency goals.

INDUSTRIAL AREAS NOT SERVED BY TRANSIT

Several industrial areas in Portland are disconnected from existing fixed-route transit services, forcing employees to drive to work and limiting employment opportunities for those without or unable to operate a car. To increase equitable access to these job markets and reduce vehicle trips, an analysis was conducted to identify which industrial areas were disconnected from transit. This analysis serves as a starting point for subsequent studies that will identify transportation solutions based on the context, needs, and challenges for individual markets.

Industrial-Serving Freight





Commercial/Residential -Serving Freight

The 2040 Freight Plan charts a course for the maintenance, improvement, and further development of a multimodal urban freight system in Portland. The research and analysis within provides a solid understanding of the novel challenges and opportunities facing urban freight. The actions and projects proposed reflect a more equitable and climate conscious approach to urban freight. And the tools and frameworks developed will help guide decision making as the freight network evolves over the next two decades and new issues arise. All in pursuit of a vibrant city and thriving economy with safe, equitable, and efficient urban freight movement.

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CH. 6: PRIORITIZING FREIGHT-RELATED NEEDS

Chapter Six focuses on prioritizing freight-related needs in the city using the Transportation Strategy for Goods and Services Movement, Priority Freight Infrastructure Needs Assessment, and the Industrial Markets Not Served by Transit analysis

APPENDICES

A bicycle user riding on a green bike lane. A white United States Postal Service (USPS) mail truck drives in the background. [Source: PBOT]

CH. 1: WHAT IS THE 2040FREIGHT PLAN?


APPROVED FOR TRANSPORT
UNDER CUSTOMS SEAL
CSC SAFETY APPROVAL
NET
CU. CAP.
28,2
62,2
33
1,1

INTRODUCTION

With its location at the confluence of the Willamette and Columbia rivers, the City of Portland developed as a freight hub with marine, rail, and air terminals. In fact, the Portland/ Vancouver region is the fourth largest freight hub on the West Coast for international trade[1]. As Portland has grown, freight continues to be an important part of the economy.

The Portland Metro region's economy is heavily trade-dependent and the freight industry is critical to meet the daily needs of all who live and work in Portland. Thus, local industries require a reliable goods movement system to operate efficiently and maintain profitability.

Portland has outperformed national economic growth over the last decade in the manufacturing space, with strong growth also noted in transportation, warehousing, and construction sectors.[2] Strong economic growth, fueled in recent years by e-commerce expansion, has led to continued outpacing of the U.S. from a Gross State Product (GSP)/ Gross Domestic Product (GDP) perspective. Beside the growth shown in jobs in freight related industries, the overall tonnage and value of goods transported from/to the city has increased significantly too.[3]

As consumption patterns shift and supply chains become more complex, goods are transported over longer distances and the footprint of the freight industry continues to increase. Approximately 75% of freight movement in the region relies on trucks, with potential for significant impacts on Portland's transportation facilities and residents.[4] Further, as e-commerce expands and the freight industry adjusts to meet the needs of a higher volume of smaller, demand-responsive shipments, there is likely to be increased conflict in the right-of-way with other road users. Mounting congestion and capacity issues on several freight modes, including freight rail and trucking corridors, could impede local goods movement and affect the Portland region's ability to compete regionally and globally.[5]

The 2040 Portland Freight Plan (herein 2040Freight or 2040Freight Plan) is a blueprint of solutions and strategies to address the unique needs and impacts of urban freight movement. The State of Oregon requires the City of Portland to have a freight system element in its Transportation System Plan. The content of the 2040Freight Plan will be used to update the freight related policies and projects in the future version of the Portland Transportation System Plan.

A stock overhead photo of 18-wheelers and trailers backed up to loading docks.

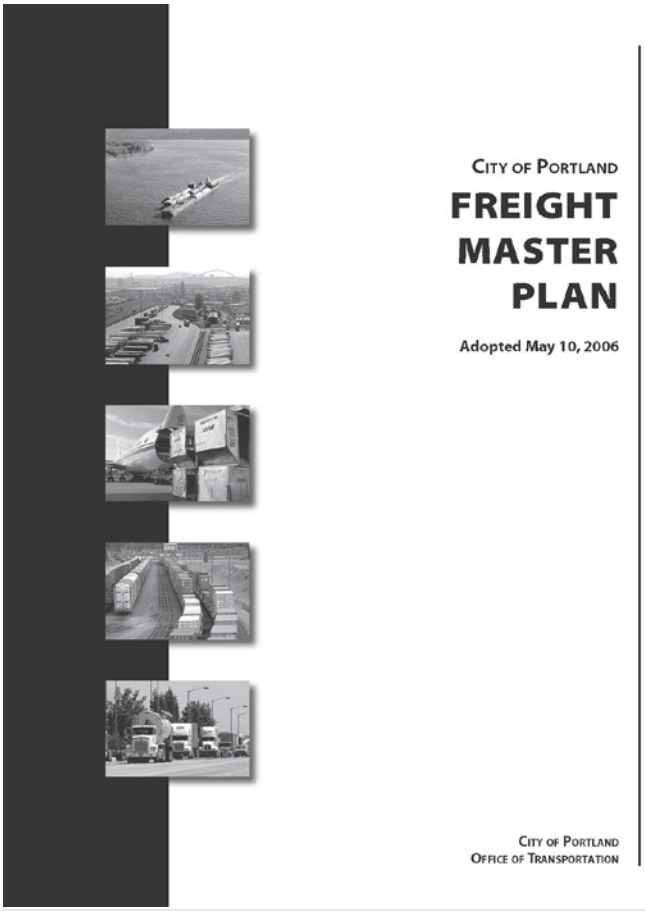
2040FREIGHT PLAN PURPOSE

2040Freight is an update of Portland's original Freight Master Plan. Portland's existing Freight Master Plan was adopted in May 2006 as a 20-year roadmap (2006-2026) to address the unique characteristics, needs, and impacts of freight movement. The 2006 Freight Master Plan objectives center around three main themes: mobility, livability, and healthy economy. It was organized around five major elements:

- Freight-related policies and objectives
- Freight system classifications
- Implementation actions and strategies
- Key freight system infrastructure improvements
- Right-of-way design guidelines for trucks

Since 2006, the Freight Master Plan has guided freight-friendly design and policies in Portland and has served as a model across the country. However, there is more we can do. Despite consistent investment in the freight network, significant gaps remain and new policy questions have emerged.

The 2040Freight Plan builds on the 2006 plan and updates the City's approach to freight planning to reflect current freight system needs and challenges. The Plan also realigns freight planning with current City policies, including freight-related Comprehensive Plan and Transportation System Plan policies. 2040Freight reflects the new trends in urban freight operations and changes to freight policy best practices that have emerged since the original 2006 plan.



The cover of the 2006 Freight Master Plan. [Source: City of Portland]

BUILDING THE PLAN

During the development of the 2040Freight Plan, a series of technical analyses assessed themes like needs and deficiencies, best practices, new and disruptive trends, and the state of Portland's freight infrastructure. The supporting technical documentation for the Freight2040 Plan is contained in a series of technical memoranda including:

- Freight Greenhouse Gas Reduction Best Practices
- Stakeholder Interview Summary
- Plan, Program & Policy Review
- E-commerce and Emerging Logistics Technology Research Report
- E-commerce Summary
- 2006 Freight Master Plan Project Status Audit
- Demographics, Equity & Environmental Justice (Parts 1 and 2)
- Existing Conditions Report
- Future Conditions Report
- Needs, Conflicts, and Opportunities
- Public Engagement Report
- Dominant and Disruptive Trends

The public involvement for the 2040Freight Plan's development included three advisory groups:

- A Community Advisory Committee (CAC) that was comprised of community members, industrial real estate businesses, freight industry leaders, trucking industry members, bicycle advocates, and environmental advocates.
- A Technical Advisory Committee (TAC) composed of key staff from PBOT, other City bureaus, partner agencies, and the project consultants, who guided the technical analysis.
- The Portland Freight Committee (PFC), a standing, volunteer advisory group on freight transportation issues. The committee includes a diverse mix of representatives from the transportation and logistic industry as well as participation from the federal, state, regional, and city agencies that oversee freight mobility issues.

In particular, the CAC and the TAC served for the duration of the planning process and provided feedback that was integrated into the plan. Members were responsible for keeping their individual organizations, agencies, neighborhoods, and/or community and business groups up to speed on the progress of the plan. Other responsibilities included reviewing and commenting on project materials, helping to distribute invitations to public feedback opportunities, providing regular updates to community on the project, and consulting with members of the community on how to best represent their views, concerns, and recommendations.

Learn More:

Click this box to explore the 2040Freight technical reports

Key pieces of the 2040Freight public involvement strategy were:

- Stakeholder interviews with industry leaders, shippers and carriers, as well as community leaders and policymakers.
- Community focus groups held with the Black Food Sovereignty Coalition; disability/ accessibility community; and Spanish, Russian, Chinese, and Vietnamese-speakers who live in/ near industrial or heavy freight areas and/or work in transportation or warehousing.
- A city-wide online survey to gather public feedback on priorities related to urban freight movement and general locations where community members and different stakeholders experienced concerns related to freight.
- A joint TAC/CAC/PFC workshop on prioritization and refinement of strategies and actions, projects, and classification change recommendations (the elements in this plan).

WHY IS URBAN FREIGHT IMPORTANT?

In the 2040Freight Plan, urban freight refers to commercial items ("goods") and services that are moved to, from, and through the city. The flow of goods and services in a city is critical to everyday life. In an urban area such as Portland, freight moves by all modes of transportation including marine, air, rail, and heavy and medium-heavy trucks. In some of the more dense areas of the city, small trucks, vans, bicycles, and hand carts are common delivery vehicles.

Urban freight movement relies on the available transportation infrastructure. However, economic and population growth, the rise of e-commerce, and increased congestion and competition for curb parking/loading space have created challenges for commercial vehicles to complete their deliveries and meet customer needs.

Every item that is in your home, favorite restaurant, favorite store, or city institution has been delivered from another location, which

Figure 1 – Examples of Urban Freight

Image showing nine examples of urban freight, including bulk products like grain or sand; fuels like propane or gasoline; construction goods like wood and cement; mail and packages like letters and parcels; medical supplies like wheelchairs and PPE; home goods like furniture and garden supplies; apparel like shoes and rain gear; electronics like cameras and computer parts; and groceries like legumes and beverages.

could be local or on the other side of the world. Similarly, the products made and packaged in the City of Portland are shipped to a wide range of locations.

Portland is the state of Oregon's central freight hub. Based on 2019 data from the Bureau of Economic Analysis, Portland is considered the 21st largest metropolitan economy in the US. Trade is a major contributor to Oregon's economy and freight plays a critical role as a facilitator of trade. As the epicenter of Oregon's trade, Portland is predominantly responsible for the health and wellbeing of the state's economy. Portland is a known gateway and distribution center for domestic inland and international markets, with $19.3 billion total import-export trade in 2017. This equates to over 17.8 million tons in imports and exports in 2017. These trade flows are expected to grow to nearly 37.7 million tons and be valued at $68.3 billion in 2040, which will place greater demands on transportation infrastructure, particularly at the region's marine ports and airports.[6]

As the urban population continues to grow, the demand for the transportation of goods and services to homes and businesses in urban areas will increase. While e-commerce retail sales represent just 10% of the total retail sales made in Oregon in 2018, online sales had jumped 50% by 2021. The global e-commerce market for all goods surpassed $2 trillion in 2017 and is expected to nearly double by 2021 as more products are only sold online, deliveries are made more quickly (often at minimal or no cost), and merchandise returns are a hassle-free process.[7] Even more, it is expected that COVID-19 pandemic will likely have lasting effects on consumer behavior, accelerating a shift towards e-commerce.

According to the World Economic Forum, if these trends continue, central cities can expect an estimated 36% more delivery vehicles by 2030. That increase in vehicles will increase delivery emissions in the top 100 cities globally by 32% and increase traffic congestion by 21%, or about 11 minutes of commute time per day.[8] Particularly important for urban street networks is last-mile delivery trends, which refers to how goods are transported from warehouses to their final destinations: people's homes and businesses.

Growing and transforming alongside consumer demand is a burgeoning workforce, including drivers, warehouse workers, technicians, and operations and logistics employees. On one hand, new job opportunities can be seen as a positive development, making it easier for people to find flexible opportunities to earn money. On the other hand, the "gig" nature of many of these jobs, which often don't include benefits or job security, generates scrutiny and debate among labor advocates.[9] The staggering growth of urban delivery services also places significant pressure on the limited space of the urban street network. Because of this, many transportation agencies are looking at strategies for managing commercial services in the right-of-way as they consider how to effectively address traffic congestion, improve safety, reduce overall vehicle miles traveled (VMT), and cut transportation emissions.

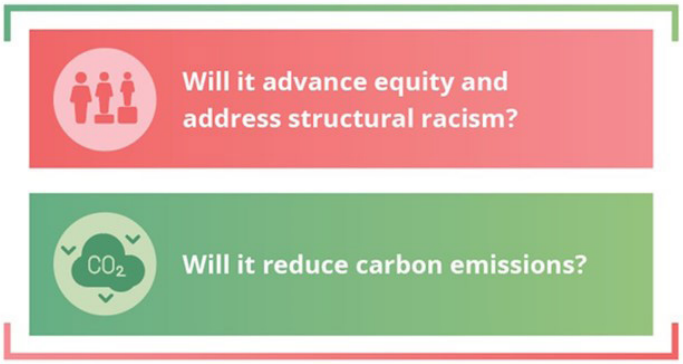
Finally, the freight industry is a significant source of employment for many who live and work in Portland. Freight industry jobs are especially important for those with less than a four-year college degree, who are employed in freight at substantially higher rates compared to the rest of the economy.

As the City and region plan for the future of freight, policies and plans should attempt to preserve, improve, and bring innovation to freight jobs, while also addressing the inequities in employment and wages that exist today.

OUR FRAMEWORK FOR URBAN FREIGHT PLANNING

Moving to our Future, PBOT's 2019 Strategic Plan, directs all PBOT staff to center two key questions in their work:[10]

Figure 2 – Questions that Guide PBOT's Work



Graphic showing PBOT's two guiding questions: Will it advance equity and address structural racism? Will it reduce carbon emissions? [Source: Moving to Our Future, Portland Bureau of Transportation. 2019.]

Centering these questions into the context of a freight plan resulted in a deeper look at, and reframing of, the history of developing the freight network in Portland. It required an environmental justice examination with two research components, and robust community engagement with neighborhoods adversely impacted by freight, people who work in freight and warehousing jobs, and people who live in or near industrial or freight activity. This work required asking who is most impacted and where and then engaging impacted communities in the planning process so recommendations will have a positive impact on desired objectives. 2040Freight found that by reducing carbon emissions produced by freight vehicles and at/near freight terminals, the City will also be advancing equity and addressing structural racism.

Learn More:
Click this box to explore the Demographics, Equity & Environmental Justice Report - **Parts I & 2**

Image of gray and red freight trains stopped near a train station. [Source: Chris Yunker]

AN ANTI-RACIST OVERVIEW OF PORTLAND'S FREIGHT HISTORY

Traditional framing of Portland's history with freight (and the framing in the 2006 Freight Master Plan) discusses the development of the freight system over time, from marine shipping, to rail, the airport, and highways. And it notes the advancements to goods movement and the economic gains from each improvement. What this narrative does not include is context to who benefited and at whose expense.

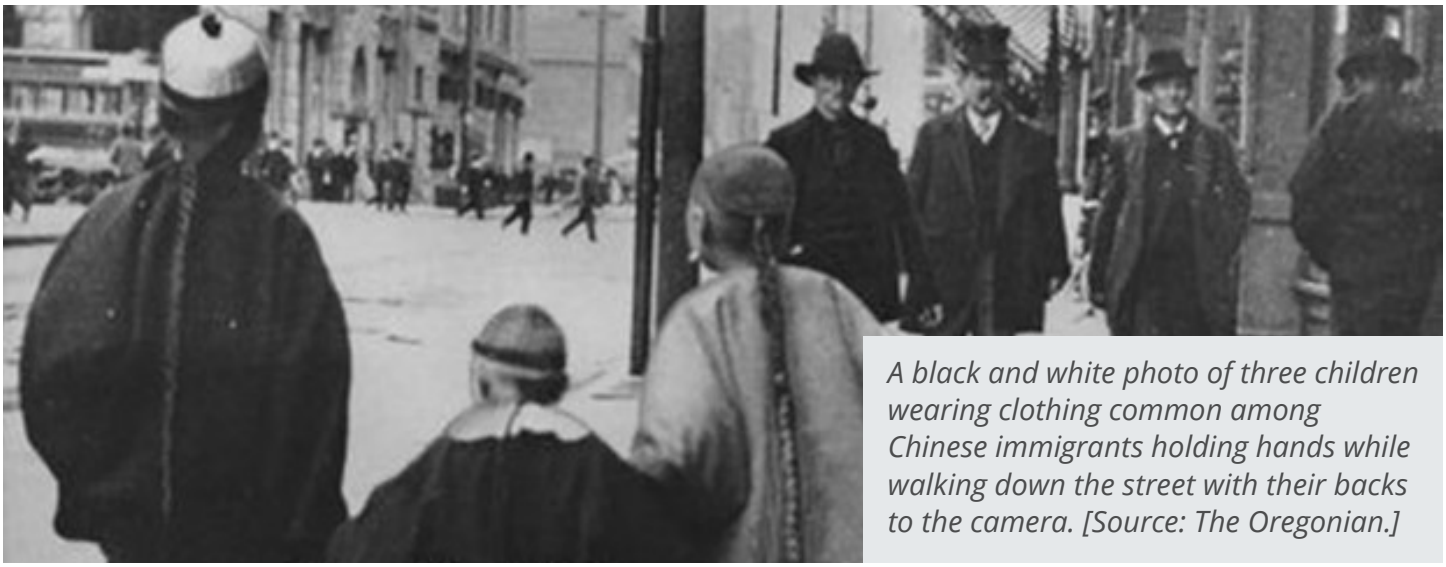
Portland's growth and development has been driven by the movement of commodities. Before colonized times, the Original People of the Land, including tribes of the Chinook and Multnomah people, traded goods with one another. When the European colonizers came in the middle of the 19th century, they found Portland to be an accessible point of inland navigation and engaged in shipping and trading with the Native People and among other white settlers. Colonization of Portland dealt substantial death and anguish to Native People as they were killed by war and foreign diseases, driven out, or sent to reservations.[11]

In 1883, Portland's railroad connection to the east was completed, an objectively significant feat of engineering and construction amidst substantial challenges, like boring through the Cascade Mountains. Development of the rail lines was also on the backs of exploited skilled immigrant labor, especially Chinese labor, whose immigration for this purpose led to the establishment of Portland's historic Old Town Chinatown. These workers were in constant danger, risking death and serious injury from dynamite, lofty heights, demanding labor, dangerous equipment, and diseases present in worker encampments.

At this point, goods could be moved by water and by rail, and at the beginning of the 20th century over local roads and bridges. In 1940 the Portland International Airport (formerly the Portland Columbia Airport), added to Portland's economic advantage as a center for goods trading. Construction of Portland area freeways in the 1950s and 60s brought the next big evolution in trade, but it came at the expense of many vulnerable communities. I-5 in particular devastated the heart of Portland's Black community in the Albina neighborhood—the center of Portland's African-American culture, businesses, schools, and religious institutions.

By beginning to acknowledge this past harm and history, Portland may begin to look to a more inclusive future that considers freight's impacts on community in pursuit of a more equitable city. This scratches the surface. The strategies and actions point to what's next.

Learn More:
Click this box to explore the Demographics, Equity & Environmental Justice Report - Part 2



A black and white photo of three children wearing clothing common among Chinese immigrants holding hands while walking down the street with their backs to the camera. [Source: The Oregonian.]

WHY DO WE NEED TO REDUCE CARBON EMISSIONS?

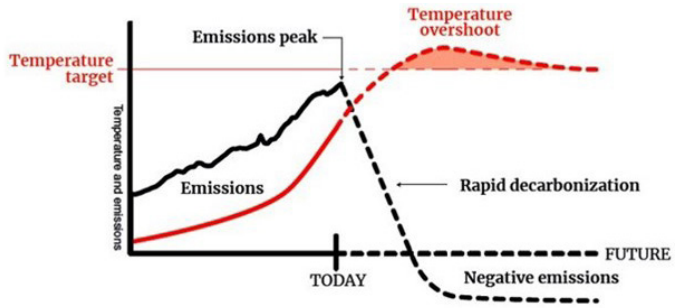
In June 2020, the Portland City Council adopted a Climate Emergency Declaration that says:

> *"Be it further resolved, that the City of Portland adopts a new target of achieving at least a 50% reduction in carbon emissions below 1990 levels by 2030 and net-zero carbon emissions before 2050. These targets will be carried forward into future Climate Action Plan updates and work plans."*[12]

The City has set ambitious carbon emission reductions goals due to the inertia behind climate change. Even if emissions begin dropping today, temperatures will continue to rise as greenhouse gases already emitted continue to warm the planet—greenhouse gases (GHG) persist in the atmosphere for months to millennia, depending on the gas. But we do not have millennia to act. If global temperature rise surpasses 1.5 degrees Celsius (2.7 degrees Fahrenheit), the planet will reach a tipping point—or "point of no return"—beyond which our climate will irreversibly deteriorate. All life on Earth will be impacted immensely, including substantial human impacts and especially for the most vulnerable and marginalized communities.

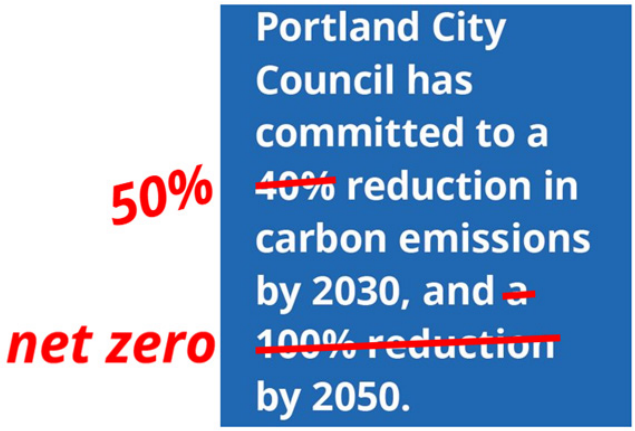
The City's collective action on climate change cannot wait. According to the Intergovernmental Panel on Climate Change, by 2030, the climate future will be sealed. Within the lifetime of this plan, science will show if the planet is fated for the point of no return.[13]

Figure 3 – Illustration of Temperature Overshoot



The chart shows an illustrative example of emissions and temperature graphed overtime and projected into the future. Even when emissions start falling (theoretically) through future rapid decarbonization, the temperature continues to rise past the upper target—i.e. temperature overshoot. [Source: UN Environment Programme and World Meteorological Organization, Understanding the IPCC Special Report on 1.5°C. 2018.]

Figure 4 – Evolution of Portland's Climate Goals



A graphic illustrating the change in Portland's climate goal saying "Portland City Council has committed to a 40% reduction in carbon emissions by 2030 and a 100% reduction by 2050" with '40%' crossed out and replaced by 50% and 'a 100% reduction' replaced with net zero. [Source: City of Portland]

CH. 2: ASSESSING EXISTING AND FUTURE URBAN FREIGHT CONDITIONS

Oregon is the ninth most trade-dependent state in the US, with the success of many industries relying on participation in domestic and international markets.[14] Between 2008 and 2019, there was an increase of 3,911 jobs in the transportation and warehousing industry, the highest total growth of the industrial sectors in the city.[15] In the Portland region, local projections estimate that by 2040, the region's goods movement system will need to serve an additional 670,400 residents (around a 27% increase from 2020) and 420,000 jobs. The boost in consumption of goods and services associated with increased residents and jobs is expected to nearly double current local freight volumes to 600 million tons of annual goods movement.[16]

These statistics and other evidence of significant growth in e-commerce demonstrate the importance of goods movement and freight related activities and the need for proactive planning for safe, equitable, efficient, and sustainable truck flows through the city.

A WEST COAST HUB

The Columbia-Willamette River Systems provide deep water port facilities and a navigable waterway for barges, steamships carrying bulk commodities, and container ships as large as post-panamax vessel types. The Columbia-Snake River Systems move 10 million tons of cargo annually, including bulk materials such as grain, forest products, minerals, finished goods, and containers. Portland is also served by two class I railroads (Union Pacific and BNSF) with level access over the Cascade Mountains through the Columbia River Gorge, and north-south connections to Canada and Mexico. On the roads, Portland has access to the interstate highway network with I-5 linking the entire west coast to Canada and Mexico, and I-84 providing access to Midwest markets. Finally, PDX is an international airport serving the Portland-Vancouver region with passenger and commercial flights and the PDX Air Freight Consolidation Area.

The Portland/Vancouver region is the fourth largest freight hub for international trade on the West Coast behind Los Angeles/Long Beach, Seattle/Tacoma, and San Francisco/Oakland.[17]

About 51% of the imports to the Portland region in 2017 were from Eastern Asia, followed by Europe (17%), Canada (17%), and South/Central Asia (both at 6%)—the remaining 3% of imports were from Mexico, Africa, the Middle East, South America, and other parts of Central America. Non-metal mineral products, base metals, and motorized vehicles were the top imports by weight in 2017.[18] Although Portland has access to both major BNSF and Union Pacific (UP) rail lines, given the portfolio of high value commodities imported to the ports (motorized vehicles, electronics, textiles, etc.), trucking is still the main mode of transportation to distribute imported and exported commodities to/from their final destinations.

Unlike the other large ports along the West Coast, which predominantly import goods, the Port of Portland predominantly exports them. Cereal grains were the most exported commodity by tonnage in the Portland Metro region in 2017 but the vehicles exported are more valuable. Over half of the export and import tonnage to/from the Portland region are to/from Asia.[19]

Figure 5 – Major Imports and Exports in the Portland Region

Map of North and South America and East Asia with arrows pointing to/from Portland showing major imports like autos, apparel, metals, and wheat and major exports like footwear components, chemicals, and transportation equipment. [Source: Port of Portland.]

In the Portland region, most exports (about 69%) are transported by truck to the port and 84% of imports are distributed by trucks from the port of entry to their final destinations.[20] However, since the top export commodity from the Portland metro region is grain, the share of rail transport tonnage for export commodities (14%) is higher relative to imports (4%). Railroad is the competitive mode to transport bulk commodities over long distances (e.g., over 600 miles). Due to the importance of barge transportation for bulk goods along the Columbia River, marine vessels carry a significant portion of exports (16%) to Portland as well.[21]

Image of the Willamette River waterfront hosting rail, marine freight, and grain elevators, with the Steel Bridge towering in the background. [Source: Chris Yunker]

Figure 6 – Access to Freight Rail Networks from Portland

Map of the rail networks in the U.S. and Canada with the cross-continental networks operated by Union Pacific and BNSF and originating from Portland Oregon emphasized. [Source: Port of Portland.]

ECONOMIC AND EMPLOYMENT TRENDS

In the year 2020, the Portland region ranked as the 10th most valuable export trade region in the US despite being the country's 25th largest population base.[22]

The Portland region's economy is anchored by six key industries: 1) computers and electronics; 2) metals and machinery; 3) sporting equipment, apparel, and design; 4) clean technology; 5) software and media; and 6) health sciences and technology.[23] Local industries require a reliable goods movement system to operate efficiently and maintain profitability.

Meeting local freight needs creates transportation, warehousing, and distribution jobs within the region. Based on PBOT analysis, collectively, freight-related occupations employ at least 15% of the Portland workforce.[24] Most freight-related industry employees earn 13-18% less than the average annual income in the Portland region ($63,027 in 2019), although union coverage and membership is significantly higher in freight and transportation and material moving occupations than at the national, state, or local level.[25]

While Black, Indigenous, and People of Color (BIPOC) communities are underrepresented in overall freight-related occupations, they are represented at comparable rates within a subset of freight jobs (Transportation and Material Moving Operations). Women are underrepresented in nearly every freight-related industry and job category. Gender disparities are especially stark within road-freight related industries, which are 82% male and 18% female.[26]

Within the Portland workforce, workers with a high school diploma or General Educational Development (GED) credential make up 68% of workers and 78% of freight-related occupations. Furthermore, those without a high school diploma are employed at almost double the rate in freight-related jobs (11%) than they are in other jobs (6%).[27]

Additionally, people living with disabilities tend to be more likely to work in transportation and material moving occupations than those living without a disability.[28]

A worker operating a Toyota forklift in a warehouse.. The worker is lifting a pallet of brown, stretch-wrapped boxes. [Source: U.S. Department of Agriculture]

ENVIRONMENT AND HEALTH

Portland has some of the highest rates of diesel emissions exposure in Oregon. In fact, Portland-area residents are exposed to diesel emissions at a rate five to 10-times higher than the Oregon health-based particulate exposure standard.[29] On-road diesel vehicles, such as heavy-duty trucks, account for about 15% of total diesel emissions in the Portland area.[30]

One study indicates majority-BIPOC neighborhoods are exposed to diesel emissions at two-to-three times the rate of the average Portland-area resident.[31] Portland Air Toxics Solutions (PATS) environmental justice analysis finds disproportionate impacts from air toxics on BIPOC and low-income populations in the Portland area. Asian communities and populations living below the poverty line experience the greatest impacts from on-road mobile emissions (i.e. freight). Hispanic and Latinx communities are most impacted by emissions from residential wood combustion, while Black communities are most impacted by other area sources.[32] There are also high levels of noise pollution present near freight-related infrastructure such as freeways, arterial streets, railroads, and airport facilities.

Exposure to diesel exhaust (particulate matter, nitrogen oxides, other toxicants) is shown to increase the risk of multiple health problems, including heart attack, stroke, cardiovascular disease, asthma, low-weight and pre-term births, cognitive and developmental impacts, decreased lung function and impaired lung development, and lung, breast, and blood system cancers. Children are particularly vulnerable as exposure can cause permanent damage to lungs that are still developing, leading to reduced lung capacity through adulthood. Exposure to noise pollution can lead to cognitive impairment, insomnia, lack of sleep, and corresponding health issues, and is associated with increased risk of cardiovascular disease and hypertension. Children, older adults, and people experiencing chronic illness suffer most from noise pollution and children are particularly vulnerable to cognitive impairment and other developmental issues from noise pollution.[33]

There are also many climate impacts from diesel emissions. Diesel fuel emits approximately 14% more carbon dioxide (CO2) than gasoline on a per gallon basis. Black carbon, a potent short-lived climate pollutant, accounts for approximately 75% of diesel particulate matter emitted from diesel fuel.[34] Given the short-lived nature of black carbon, reducing diesel emissions can create substantial near-term climate benefits. On-road heavy duty diesel vehicles are also the second largest contributor to nitrogen oxides in Oregon, an ozone precursor.[35] Both nitrogen dioxide and ground-level ozone have negative health impacts. Ozone trends are on the rise across the Willamette Valley and actions to reduce ozone and protect health need to be strengthened.[36]

Image a white freight truck driving through a street with multiple orange traffic cones. Two people on bicycles ride to the left of the freight truck. A white car is visible in the background. [Source: ODOT]

SAFETY

In 2015, the Portland City Council unanimously adopted Vision Zero, the City of Portland's commitment to eliminating traffic deaths and serious injuries for all road users. The 2016 Vision Zero Action Plan identifies the three guiding principles of Vision Zero: equitable, data-driven, and accountable. The Action Plan also identifies several major crash factors and actions PBOT will take to address them. One of the leading factors in fatal and serious injury crashes is street design. Fifty-seven percent of fatal and serious injury crashes occurred on just 8% of Portland streets, also called the High Crash Network.[37] Many of these High Crash Corridors are also primary freight routes where 48% of truck-involved crashes occurred.[38]

Although truck-involved crashes are much less frequent than automobile crashes, and trucks are involved in fewer deaths and serious injuries, the numbers are rising. Of the 44,280 crashes that occurred on non-freeway roadways in the City of Portland between 2014 and 2018, 1,165 involved trucks, 2.6% of the total. Of those truck-involved crashes, 45 resulted in a fatality or a serious injury (compared to 1,150 fatalities and serious injuries for all motor vehicles—i.e., personal vehicles and buses).[39] The majority of truck-involved crashes that resulted in severe or fatal injury involved pedestrians or people on bicycles. As trucks are driven many more miles and hours than passenger vehicles, the number of crashes per 100 million vehicle-miles of traveled (VMT) is a common and more accurate measure of truck safety. For all vehicular traffic there were 202.3 crashes/100 million VMT from 2014 to 2018, while the rate for truck crashes was 5.3 crashes/100 million VMT.[40] Traffic crashes involving trucks have increased over the past twenty years, and more sharply since 2010 as e-commerce has grown.[41]

2040Freight Community Advisory Committee members have pointed out that even if actual deaths and serious injuries from freight crashes are relatively low, the number is not zero and no loss of life is tolerable. Some members also shared that the perception of safety-risk is likely impacting mode choice. Many people don't feel comfortable walking across a street with heavy freight traffic, or riding a bicycle next to trucks. Improving the built environment to reduce truck-involved crashes should include solutions to improve safety for pedestrians and bicyclists, which would increase safety while increasing the number of people traveling on foot and bicycle.[42]

Most truck collisions were a result of drivers who did not yield right-of-way (20% of collisions), followed by improper turns (17% of collisions). The most common collision type for truck collisions in the City of Portland is turning movement (38%), followed by rear-end (22%) and sideswipe-overtaking (18%). In contrast, for all collisions, the most common type were rear-end (34%) followed by turning movement (26%).[43]

Intersection collisions accounted for 62% of freight collisions. Of those, 59% were at a four-legged 'cross' type intersection, and 33% occurred at a three legged intersection. Also, 48% of truck collisions that occurred on designated freight network streets in the City of Portland, occurred on Portland's designated High Crash Network.

Therefore, improving visibility, especially at intersections, to allow vehicles to safely pass freight trucks turning to access businesses could help reduce these types of crashes. Implementing safety countermeasures for vulnerable users, such as separated facilities for bicyclists, clear signage, or providing for alternate parallel routes will improve safety, reduce congestion, and improve air quality.

Areas with the highest concentration of truck collisions in the city are:[44]

1. Columbia Boulevard
2. 82nd Avenue
3. Martin Luther King Jr Boulevard
4. Downtown core
5. Central Eastside Industrial District
6. NE Broadway near the I-5 on/off ramps

Most of the truck-involved crashes at each of the six locations involved:

- Crashes during turning movements—which may be caused in part by visibility, signage, and driveway access characteristics.
- Rear-end crashes—which may be due to poor visibility of driveways and turning movements.
- Sideswipe/overtaking crashes—which may be due to last-minute turns and merging into restricted lanes.

Learn More:

Click this box to read more about freight safety in the 2040Freight Existing Conditions Report

Table 1 – Possible Tools to Address Truck Involved Crashes by Type of Crash[45]

Collision Type	Proven Safety Countermeasures				
	Improve Visibility	Improve Signage	Review Access*	Speed Reduction or Enforcement	Fill Sidewalk or Bike Route Gaps
Turning Movement	☑	☑	☑		
Rear-end			☑		
Sideswipe/ Overtaking			☑	☑	
Involves Vulnerable User					☑

**Countermeasures include lengthening distance of driveways from intersections and lane markings/ channelization to support ability for traffic to maneuver to freeway entrances on heavily traveled multi-lane roads.*

MOBILITY

Traffic congestion negatively impacts the reliability and cost-effectiveness of supply chains. All aspects of production, warehousing, distribution, packaging, and retailing have been optimized and streamlined to reduce costs and improve customer service, while the transportation of products connecting these stages is exposed to significant risk and uncertainty. Not only does roadway congestion impede the efficiency of the supply chain and generate costs for businesses and consumers, it also constrains the ability to further improve supply chain operations; thus, stifling business competitiveness.

As described in the 2040Freight Existing and Future Conditions reports, an analysis was conducted to identify the roads in Portland that generate the highest delay to trucks.[46,47] This analysis used the regional travel demand model, which estimates the flow of trucks during different hours of the day, forecasts those flows out to 2040, and estimates the ability of the transportation system to accommodate these flows (including expected changes in passenger vehicle volumes). The model assumes that fiscally constrained projects through 2040 are implemented. Therefore, where the model projects future congestion, there will be unmet needs even with the pipeline of projects that are expected to be funded in the next 20 years. Metro's regional travel demand model is calibrated and statistically validated for facilities with higher traffic volumes; for local streets the model may have greater uncertainty and less sensitivity.

The Metro model measures class 5 trucks and higher, which are those with two axles and six tires or those with more than two axles. Although, smaller vans/pick-ups/panels in class 3 (four tire, vehicles other than passenger cars) and passenger cars (class 2) are increasingly being used by last mile delivery companies and service providers they are not tracked as commercial vehicles in Metro's model. The difficulty of distinguishing the commercial vs. personal use of the class 2 and 3 vehicles has resulted in a lack of reliable and available data sources that would account for smaller commercial vehicles in the city of Portland. Recent on-going efforts in other cities have aimed to develop data collection methods that would fill the gap and provide a complete picture of commercial vehicles flows.[48]

Many of the locations with congestion needs are roads and ramps that provide access to and from the interstate system. This finding demonstrates that a primary cause of congestion on city streets stems from the interstate system backing up onto local roads. This problem is likely more severe

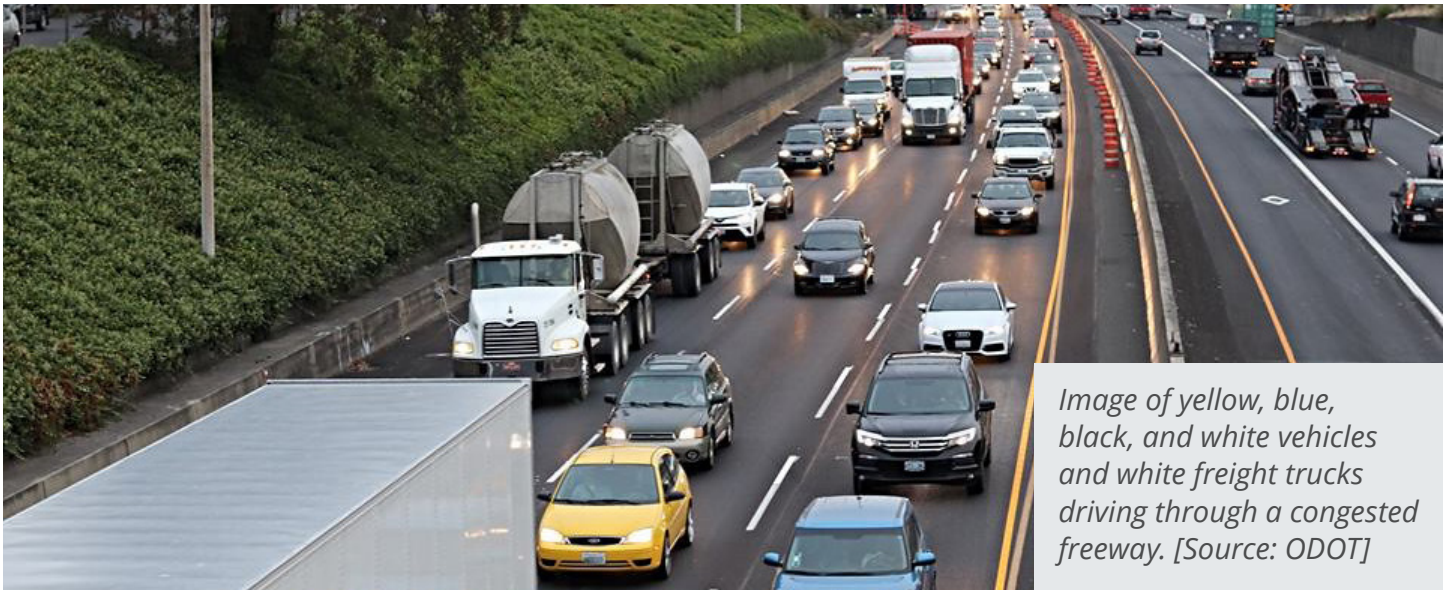


Image of yellow, blue, black, and white vehicles and white freight trucks driving through a congested freeway. [Source: ODOT]

than shown in "Map 2 – Non-Ramp Locations with Significant Truck Delay" on page 20, as the travel demand model does not propagate queues downstream from congested segments. Therefore, the small red and yellow segments likely represent the bottlenecks at the front of a longer congested segment or corridor.

However, there is not much the City can implement to resolve congested at highway access points without involving other agencies in a broader process. As seen in "Map 2 – Non-Ramp Locations with Significant Truck Delay" on page 20, when highway access points are excluded, several of the most congested locations are bridges crossing the Willamette River, including the Sellwood Bridge, St. Johns Bridge, Ross Island Bridge, and Hawthorne Bridge. Other locations that accumulated significant truck congestion include segments along McLoughlin Boulevard and at several intersections on Columbia Boulevard.[49]

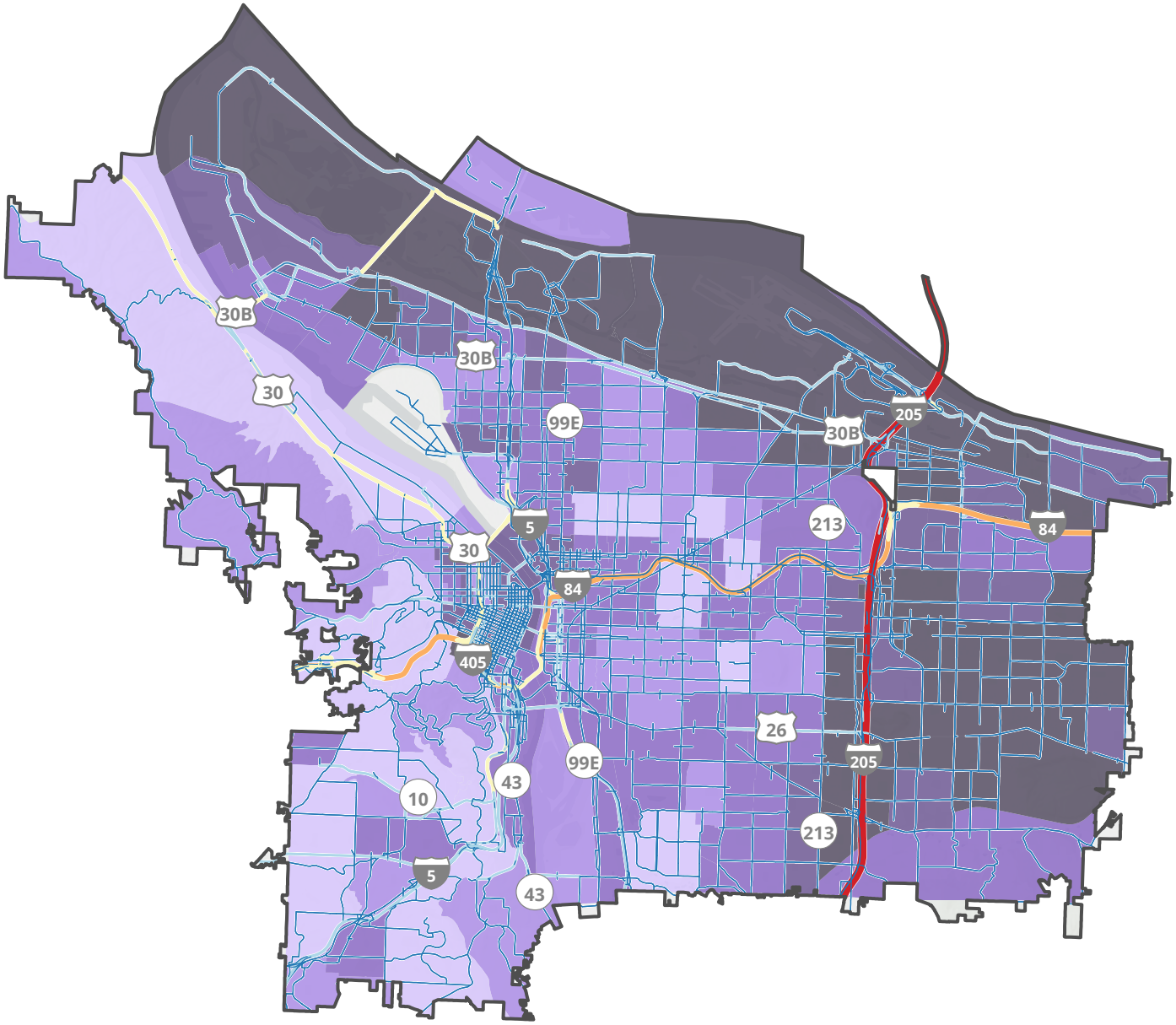
As illustrated in "Map 3 – Existing Daily Truck Volumes from Regional Travel Demand Model" on page 21, the Equity Matrix Score shows that the neighborhoods with the highest BIPOC and low-income populations also have high congestion levels. In addition to congestion, overall truck volume growth is projected to occur in these areas, as can be seen in "Map 1 – Incremental Daily Truck Volume from Regional Travel Demand Model, 2015-2040" on page 19. For example, significant growth is expected on I-205, which traverses parts of the city with the highest Equity Matrix Scores. Growth is also expected on arterials through industrial parts of the city with a high Equity Matrix Scores, such as the Columbia Boulevard corridor. This will translate into higher emissions, congestion, and safety risk to those neighborhoods. Projects that address these challenges could have a significant positive impact on mitigating adverse impacts to BIPOC and low-income populations.

Locations with truck mobility needs were identified primarily by measuring the hours of truck delay expected in 2040 on non-interstate roadways during the PM peak hour where roadways are operating at a volume-to-capacity ratio higher than 0.9. This measure is useful for several reasons:

- It focuses on roads that are expected to have large volumes relative to capacity, which are the locations that will experience the greatest delay.
- Delay is a proxy for the inefficiency of the roadway system, representing the time wasted that could have been used more productively elsewhere.
- It focuses on the PM peak, which is when the system and freight see the highest delays.
- This analysis only considers delays on non-interstate roadways, which allows for the identification of mobility issues on roads that the City can improve. Otherwise, interstates would dominate the analysis.

A line of bright yellow, red, and blue long-haul trucks parked.

Map 1 – Incremental Daily Truck Volume from Regional Travel Demand Model, 2015-2040



Daily Truck Volume Change

- 4433 - 8601
- 2269 - 4432
- 813 - 2268
- 204 - 812
- -1548 - 203

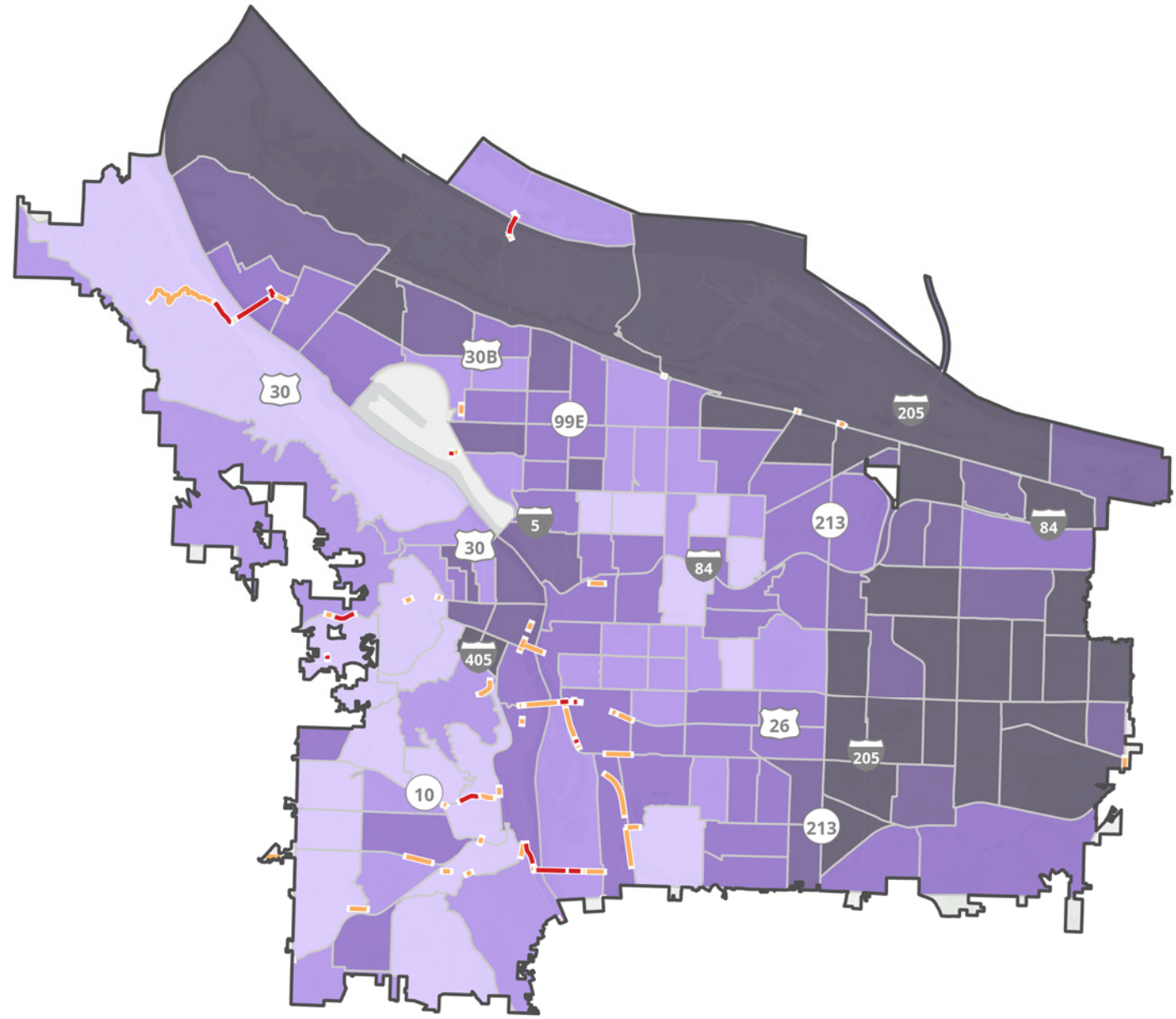
Combined Indicators

- 2 - 3
- 4 - 5
- 6 - 7
- 8
- 9 - 10

0 1.25 2.5 5 Miles

N

Map 2 – Non-Ramp Locations with Significant Truck Delay



High Future Congestion Need Locations

Medium Future Congestion Need Locations

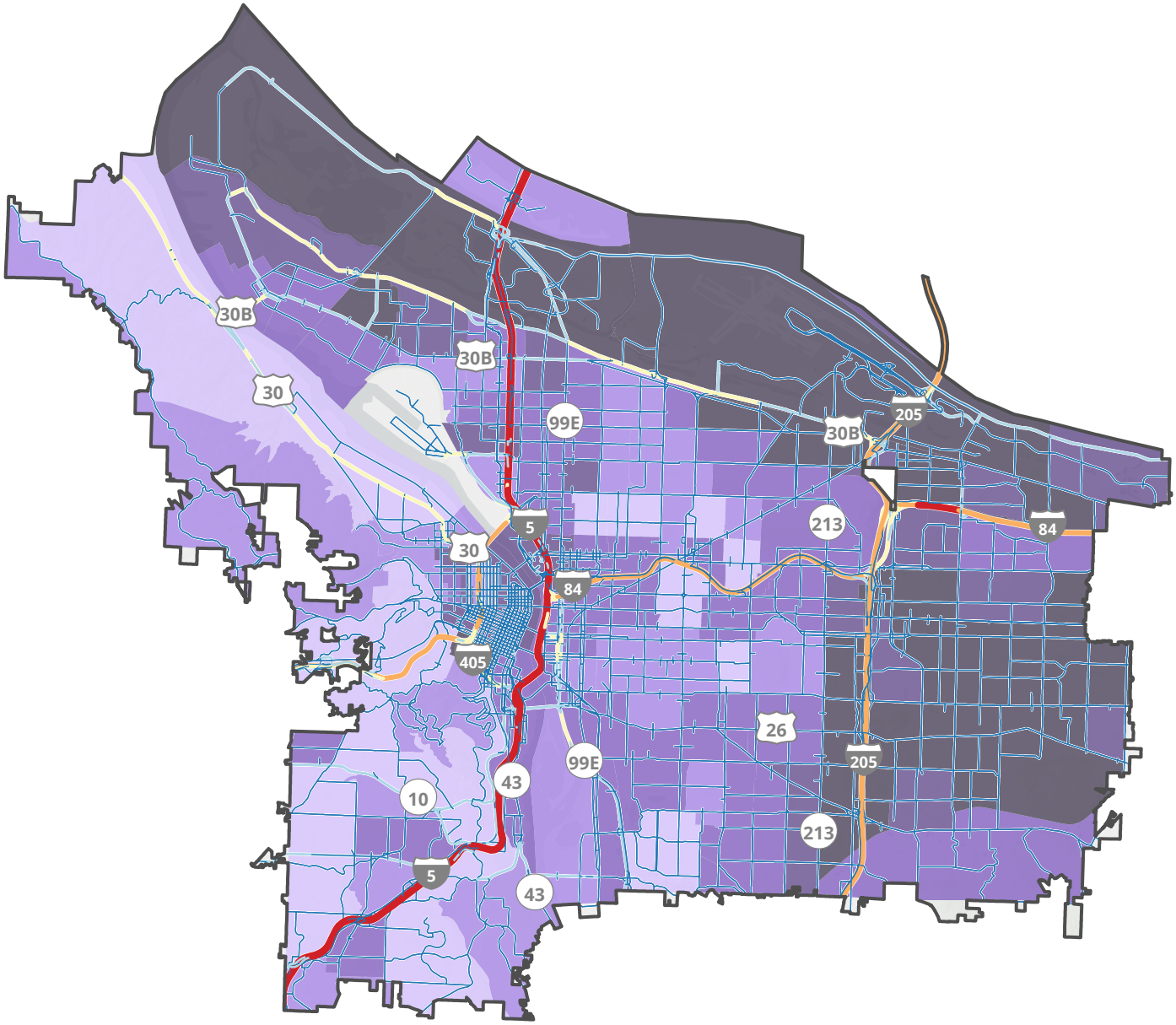
Combined Indicators

- 2 - 3
- 4 - 5
- 6 - 7
- 8
- 9 - 10

0 1.25 2.5 5 Miles

N

Map 3 – Existing Daily Truck Volumes from Regional Travel Demand Model



Existing Daily Truck Volume

- 0 - 322
- 323 - 1129
- 1130 - 2519
- 2520 - 5109
- 5110 - 9093

Combined Indicators

- 2 - 3
- 4 - 5
- 6 - 7
- 8
- 9 - 10

0 1.25 2.5 5 Miles

N

CH. 3: NEW TRENDS IN URBAN FREIGHT

This chapter briefly describes several trends in freight movement that are likely to impact changes in land use, technology, and goods movement in the next 20 years. These trends are discussed in depth in the 2040Freight Dominant and Disruptive Trends report and in part in the Greenhouse Gas Reduction Best Practices report.

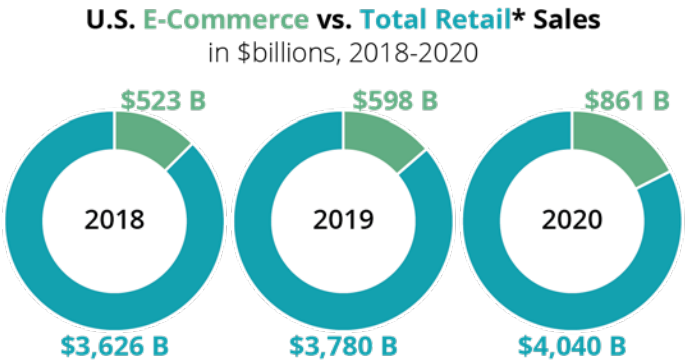
CONTINUED GROWTH OF E-COMMERCE

The increasing market share of e-commerce is having significant impacts on the composition of the truck fleet and how they are used.[50] Customers have growing expectations for faster delivery, which has made shippers and carriers move to using a wide assortment of delivery modes including smaller trucks, vans, cargo bikes, transportation network companies (like Uber and Lyft), personal cars, and in some locations outside of Portland, licensed drones, bots, and automated vehicles (AVs). Carriers have expanded their work weeks to 7 days, extended workday shifts, and hired an unprecedented number of couriers, drivers, sorters, inventory managers, etc. Even before the pandemic, between 2009 and 2017, the average number of monthly online deliveries per household more than doubled from 2.4 to 4.9 (National Household Travel Survey/FHWA).[51]

From a truck vehicle miles traveled (VMT) perspective, it is challenging to estimate the effect e-commerce has had as trucks are traveling shorter distances, but the amount of overall truck activity has increased. For example, one observed trend is a reduction of trip lengths for truck fleets as e-commerce levels rise. Despite reduced long-haul truck mileage, US vehicle miles traveled (VMT) increased 18% between 2011 and 2016, primarily due to significant growth in short-haul and last-mile truck trips.[52] This highlights that as purchases through e-commerce channels continue to rise post-pandemic, urban centers will likely see an increase in new short-haul and last-mile trips for trucks even if passenger travel declines due competition from other modes, increased teleworking, and other economic stressors.[53]

The growth of e-commerce has also increased trucking activities related to reverse logistics. Reverse logistics related to customer returns of online purchases has added a facet to the supply chain that did not exist prior to e-commerce, with a nearly 20 to 30 percent average return rate for online sales.[54] This suggest that as e-commerce growth continues a significant percentage of freight VMT will be generated from return of those goods.

Figure 7 – E-Commerce Share of Total Retail Sales, 2018-2020



*Total retail figures exclude sales of items not normally purchased online such as spending restaurants, bars, automobile dealers, gas stations, and fuel dealers

A graphic showing three pie charts showing the relative increase in the share of e-commerce sales, growing from 14.4% ($523 billion) of total retail sales in 2018 to 21.3% ($861 billion) of retail sales in 2020. Source: Digital Commerce 360, analysis of U.S. Department of Commerce data. Updated January 2021.

PERSISTENT DRIVER SHORTAGES

A national driver shortage has been a rising issue over the last few years due to an aging workforce, working conditions, and regulation changes.[55] Portland-region truck driver employment decreased by 0.9% between 2019 and 2021, due largely to the COVID-19 crisis and associated recession. Although demand for truck freight rebounded in the second half of 2020, sustained driver shortages will increase costs for carriers and increase rates for shippers, impacting local economies such as Portland's. The driver shortage that exists in Portland and elsewhere may also directly influence adoption timelines of alternative delivery methods such as automated vehicles.[56]

CHANGES IN LAST-MILE OPERATIONS

As e-commerce and its channels for consumers continue to multiply, so have the patterns of consumption by individuals, requiring last-mile delivery techniques that address the increased demand for goods and services. One reason various strategies have evolved is because the last-mile is inherently the most costly and time-consuming part of the shipping process.[57] Last-mile delivery can often be inefficient, and the increasing volume of shipments during the pandemic coupled with heightened customer expectations surrounding free shipping and fast delivery have led to the need for last-mile delivery evolution and iteration.[58]

Various strategies have developed recently including the crowdsourcing model (i.e. the gig economy), which has been growing in popularity in transportation, hospitality, and food delivery prior to but especially during the pandemic.[59] In Portland, urban consolidation centers, delivery micro-hubs (like The Redd in Southeast Portland), and self-service delivery lockers (like Amazon Hub Lockers)—collectively known as secondary logistics centers—are among the last-mile delivery approaches being used to streamline deliveries.[60]

To account for the increase in overall freight volume and fragmentation in delivery of goods to consumers, North American cities have become increasingly reliant on last-mile carriers to handle volatile demand. To combat growing traffic concerns related to increasing last-mile deliveries in urban centers, cities and companies have developed innovative strategies to prevent roadway and curbside congestion. Strategies in this area include but are not limited to mode shift, micro-consolidation, curb management tools, and off-hours delivery.

INCREASED USE OF ALTERNATIVE FUELS

With diesel fuel and gasoline price volatility, alternative fuels are appealing more to vehicle fleet managers and consumers across the West Coast. Alternative fuel options have a direct impact on the environment and health of residents in Portland. From an emissions perspective, these alternatives provide an opportunity for investment in fueling options that reduce particulate matter (PM), volatile organic compounds (VOCs), nitrogen oxides (NOx), and other harmful greenhouse gases. The State of Oregon and the City of Portland have legislation in place that supports the shift towards greener and electric fuel options.

In December 2022, the Portland City Council passed an ordinance to phase out the sale of petroleum diesel within the City's limits by 2030.[61] A first in the US, this regulation will require the blending of diesel with renewable fuels at increasingly higher increments until 99% of it is phased out.

A rise in alternative fuels within the region will also require increased refueling infrastructure, requiring planning and construction to support expansion efforts. With the known increase in freight volume that e-commerce has created, fuel alternatives and their impacts, both positive and negative, will affect Portland's built and environmental footprint and thus, the health of its residents.

Renewable diesel, which is made entirely from feedstock products, including vegetable oils, animal fats, as well as timber slash and other wood residues, has become one of the leading alternative vehicle fuels utilized by truck fleets across the US. Costs of renewable diesel (also known as R99) are competitive with those of gasoline and petroleum diesel.[62] Additionally, renewable diesel fuels would not require the purchase of new vehicles, equipment, engines, or refueling/recharging infrastructure, as compared with other alternative fuels, allowing for immediate adoption across fleet vehicles. According to the US Department of Energy, there has been an increase in renewable diesel production within Oregon since 2013, illustrating its growing influence in the region.[63]

Compressed natural gas (CNG) has risen in popularity among fleets in the transit and trucking sectors because refueling costs are minimal. The main barriers to transition are the significantly increased costs that are required to retrofit heavy-duty trucks for natural gas consumption and associated operational costs. From an environmental perspective, CNG is not especially beneficial due to the risks posed via the natural gas extraction process as well as its adverse climate impacts. With these environmental and cost-related barriers to consider, there is a potential that the market share for CNGs may not continue to grow as other alternatives are considered.

BREAKTHROUGHS IN COMMERCIAL VEHICLE ELECTRIFICATION

Electric vehicle (EV) technology has reached the point of being viable and cost effective in several commercial vehicle applications. As the costs of batteries have decreased and government incentives to electrify have increased, the purchase of small and medium electric trucks has grown in recent years.

While medium- and heavy-duty vehicles represented only 6% of vehicles registered in 2018[64], they accounted for 26% of US petroleum consumption and 23% of transportation-related greenhouse gas (GHG) emissions.[65] By contrast, electric trucks emit zero tailpipe emissions, have a lower cost of operation, and are starting to achieve total cost of ownership that is competitive with diesel freight vehicles.[66] However, while electric trucks are often described as zero-emission vehicles, emissions are involved in the manufacturing of the trucks and the generation of the electricity used to recharge batteries. Emissions from the generation of electricity depend heavily on the mix of generation sources.

Several barriers remain in the electrification of the truck fleet. While companies are currently able to order electric trucks, production volumes are so low that deliveries of these vehicles are many years away. Additionally, the cost of these electric trucks are currently many times higher than the costs of conventional trucks, even after incentives. This has slowed the adoption of these vehicles to pilot programs and niche operations where the vehicles are profitable over their service life. The current range of electric trucks also favors drayage operations, where trucks serve a fixed set of destinations that can be retrofitted with high-speed charging equipment.

Public policy actions are key to advancing freight electrification, improving the charging infrastructure, and passing measures that increase access and affordability while reducing costs that are often the barrier to entry. The shift towards electric vehicles requires coordination and collaboration between industry and public sector, and policy implementation can be very effective in driving the shift towards EV.

A fleet of yellow trucks with electric charging cables attached.

CONNECTED & AUTOMATED VEHICLES

Advancements in the connected and automated vehicle space have accelerated in recent years with an array of emerging technology including self-driving robots, drones, cars and trucks. Companies like Amazon and Postmates have piloted automated delivery for packages and food orders, while grocers Stop & Shop and Kroger have piloted self-driving vehicles. In the wake of COVID-19, investor and consumer appetite for technologies such as these bots has increased and they may become more valuable as public perception of automated technology continues to evolve.[67]

While robotic delivery is still in its early phase, it is important to consider that similar to warehouse automation, low-paying jobs may be eliminated through expansion of robotic delivery and likely be replaced by higher-paying jobs in the technology space.

For Portland, automation of delivery services has direct implications on roadway and infrastructure planning and design. City ordinances and regulations will be integral in developing a built environment that supports technology like autonomous sidewalk robots. Future planning will need to consider the emergence of such vehicles in urban centers and best determine how space can be created or modified to optimize interaction with humans, street features, and other components of the urban environment.

INCREASING COMPETITION FOR THE CURB

As consumers become more accustomed to fast, convenient home-delivery of goods, the growth in e-commerce and related urban freight activity is anticipated to increase. This will exacerbate the demand for parking, loading, and unloading operational needs of commercial vehicles that many municipalities are already experiencing.

Improvements in the ability of commercial vehicles to find parking, particularly in dense areas, could potentially yield significant pollution reduction benefits. Increased availability of commercial vehicle parking where needed avoids commercial vehicles circling/cruising to find a spot, or parking in a travel lane or illegal space and causing congestion/safety conflict.[68]

Parked and double-parked trucks are a major contributor to urban congestion and the obstruction of pedestrian infrastructure, along with trucks and delivery vans idling and emitting pollutants and GHGs. The insufficient data on delivery driver behaviors makes it challenging for policymakers to account for the complexity of commercial vehicle parking behavior.

INCREASING EFFICIENCIES OF FREIGHT RAIL

Recent rail trends include positive train control, precision scheduled railroading (PSR), rail pulse freight car monitoring technology, and restructuring of the international intermodal network.

- **Positive Train Control** is a safety system that tracks train speed and movement, warns train operators of potential problems, and can automatically bring the train to a stop in an emergency.[69] They "are designed to prevent train-to-train collisions, over-speed derailments, incursions into established work zones, and movements of trains through switches left in the wrong position."[70]
- **Precision scheduled railroading** enables greater use of point-to-point trains, resulting in increased velocity and longer trains while avoiding the classification and reshuffling of cars from train to train at yards on course to their destinations. The technology enables railroads to make better use of their assets, shipping the same volume of freight using fewer freight cars, locomotives, train crews, and classification yards.[71]
- **RailPulse** is a joint venture among rail freight companies to provide real-time, precision location and operational information (like open/closed doors, handbrakes applied, loaded/empty) for boxcars anywhere in North America. The program that launched in early 2022 with a pilot and has since expanded with the intent of including the entire North American freight car fleet. Data will be available to shippers, Class I railroads, short lines, regional railroads, switching carriers and rail car operating lessors with protocols established to protect proprietary information.[72]

For example, PSR emphasizes the scheduling of freight cars on trains over the prior practice of holding railcars at a yard until enough were on-hand to meet a predetermined tonnage requirement. The PSR operating model is based on increased use of point-to-point trains, resulting in increased velocity and longer trains while avoiding the classification and reshuffling of cars from train to train at yards on course to their destinations.

These new technologies have led to increased efficiency of operations for freight trains nationwide, which could potentially lead to an increase in competitiveness of rail compared to trucking in the Portland region. The Portland region has three rail intermodal terminals (BNSF Lake Yard, Port of Portland Terminal 6, and UP Brooklyn) where containers can be transloaded from trucks to rail and moved on intermodal trains to their destination. This type of service is most competitive relative to trucking on shipments of over 1,000 miles in length. Shifting just one shipment from truck to this type of rail service would eliminate thousands of miles of truck travel, resulting in a substantial reduction of GHG emissions.

However, longer trains result in more traffic disruptions for at-grade-crossings. Grade separation can further improve operations, making rail more competitive while eliminating emissions from automobiles and trucks idling at crossings. This makes rail more competitive while eliminating emissions from automobiles and trucks idling due to frequent crossing closures. While rail is significantly cleaner from a GHG perspective, steps should be taken to reduce emissions of other pollutants at rail terminals. In total, rail emits less non-GHG pollutants than trucking per freight moved, however rail emissions are concentrated at terminals and along railroads, and therefore could result in high concentrations for nearby residents.

NEW TARGETS FOR MARITIME TRANSPORT AND PORTS

The International Maritime Organization (IMO) has developed a set of targets for reducing carbon emissions between 2020 and 2050 that may influence local fueling needs. By 2030, IMO is targeting a reduction of at least 40% in CO2 emissions per transport work compared to 2008 levels and a 70% reduction by 2050.[73] IMO also expects total annual GHG emissions from shipping to be at least halved by 2050, as part of its initiative towards full decarbonization. To meet these caps, maritime companies are exploring a range of cleaner fuel alternatives including renewable diesel, and increasingly liquified natural gas (LNG), liquified petroleum gas (LPG), methanol, and biofuels. Hydrogen and ammonia are to less developed options being explored.[74]

The Port of Portland has taken steps to address issues related to climate change, including reducing diesel particulate matter by 76% from 2000 level for operations, and fueling container-handling equipment with ultra-low sulfur diesel and improved exhaust systems for cleaner emissions. In 2014, Port of Portland replaced three engines in their Dredge Oregon, which helps maintain the lower Columbia River shipping channel, reducing diesel particulate emissions by more than 85%.[75]

Additionally, the growing complexity of port operations is leading to a diversification and intensification of land use, which requires new synergies between ports and cities. To account for potential challenges related to shortage of space within urban ports, innovation and automation are integral to spatial productivity.[76]

A large stack of multi-colored shipping containers at a port facility.

ELEVATED DEMAND FOR URBAN WAREHOUSING

National trends demonstrate an increase in larger and/or more centrally located warehouse sites within urban centers.[77] This is due to rising volumes seen from growing e-commerce sales, which have led to higher trade flows and freight volumes. Additionally, modern supply chains are focused on reliability, speed, and customer service. This has shifted warehousing development to include more decentralized warehousing that sits closer to the end customers.

In 2019, Portland opened nearly 2.1 million sq. ft. of warehouse and distribution space, with an additional 3.7 million sq. ft. opening in 2020.[78] As of Q4, 2020, 2.8 million additional sq. ft. of industrial, warehouse, and flex space is under construction in Portland.

The emergence of warehouses in urban centers will continue to influence the repurposing and redevelopment of other warehousing, office, and building spaces in downtown centers as distribution centers. This trend is likely to continue across larger cities, especially post-pandemic as some businesses have left urban centers, and as "work from home" strategies have increased. Innovations in the design and operation of warehouses in urban landscapes will be key to timely delivery of goods in concentrated metro centers.

A RESURGENCE OF NEARSHORING

Prior to the pandemic, and exacerbated by COVID-19's impact on global supply chains, carriers and shippers have escalated efforts investigating the feasibility of increasing production capacity domestically or nearer to the US. Offshoring of American production to Asia and other countries was originally driven by lower foreign labor costs, with production for the consumer market moving overseas. Recent advances in e-commerce and automation have led to increased interest in domestic production. Additionally, the US-China trade conflict, COVID-19 pandemic, recent cybersecurity threats, and heightened geophysical risks due to climate change have also raised concerns over supply chain resilience.

Nearshoring in the US would likely pivot import and export locales to Canada and Mexico, and with potential to reshore within the US. While exact impacts are not currently known, it is likely that nearshoring/reshoring of certain commodities may directly impact freight flows through the Port of Portland and other West Coast ports, resulting in an increased reliance on rail or truck transport of such goods. With various goods coming from Canada or Mexico, less international freight flows will travel through ports on the West Coast, requiring a shift in supply chain strategies in the Portland region that rely on ground transportation for delivery.[79]

CH. 4: VISION, GOALS, OBJECTIVES, STRATEGIES AND ACTIONS

GUIDING PRINCIPLES AND GOALS

The 2040Freight Plan establishes a vision and a set of goals to guide implementation of the actions and projects recommended in the Plan.[80] The vision and goals are rooted in the 2035 Citywide Comprehensive Plan and PBOT's Strategic Plan. These documents provide direction in the form of five guiding principles and three overarching goals (described below).

THE 2035 COMPREHENSIVE PLAN'S GUIDING PRINCIPLES INCLUDE:[81]

1. **Economic Prosperity:** Support a low-carbon economy and foster employment growth, competitiveness, and equitably distributed household prosperity.
2. **Human Health:** Avoid or minimize negative health impacts and improve opportunities for Portlanders to lead healthy, active lives.
3. **Environmental Health:** Weave nature into the city and foster a healthy environment that sustains people, neighborhoods, and fish and wildlife. Recognize the intrinsic value of nature and sustain the ecosystem services of Portland's air, water, and land.
4. **Equity:** Promote equity and environmental justice by reducing disparities, minimizing burdens, extending community benefits, increasing the amount of affordable housing, affirmatively furthering fair housing, proactively fighting displacement, and improving socio-economic opportunities for under-represented populations. Intentionally engage under-served and under-represented populations in decisions that affect them. Specifically recognize, address, and prevent repetition of the injustices suffered by communities of color throughout Portland's history.
5. **Resilience:** Reduce risk and improve the ability of individuals, communities, economic systems, and the natural and built environments to withstand, recover from, and adapt to changes from natural hazards, human-made disasters, climate change, and economic shifts.

THE 2019 PBOT STRATEGIC PLAN GOALS INCLUDED:[82]

6. **Safety:** Make Portland streets safe for everyone.
7. **Moving people and goods:** Provide transportation options for a growing city.
8. **Asset Management:** Deliver smart investments to maintain our transportation system.

Workshop participants providing feedback on 2040Freight strategies, actions, and goals.

ENGAGEMENT AND ITERATION

The mission, vision, goals, and objectives were developed with input from the project's guiding committees, the City's modal committees (Portland Freight Committee, Bicycle Advisory Committee, and Pedestrian Advisory Committee), and feedback from the 2040Freight online public survey. In addition, focus groups were held with the (Black Food Sovereignty Coalition; disability/ accessibility community; and Spanish, Russian, Chinese, and Vietnamese-speakers who live in/ near industrial or heavy freight areas and/or work in transportation or warehousing. Finally, input was gathered from interviews with community leaders, industry leaders, and policymakers early in the plan's development. PBOT staff then drafted goals and objectives from the themes of those discussions for iterative review by the 2040Freight Technical Advisory Committee and Community Advisory Committee.

For more details, please refer to the Public Involvement Report and "Appendix E: Engagement and Iteration Process" on page 147

Learn More:

Click this box to read more about freight safety in the Public Engagement Report

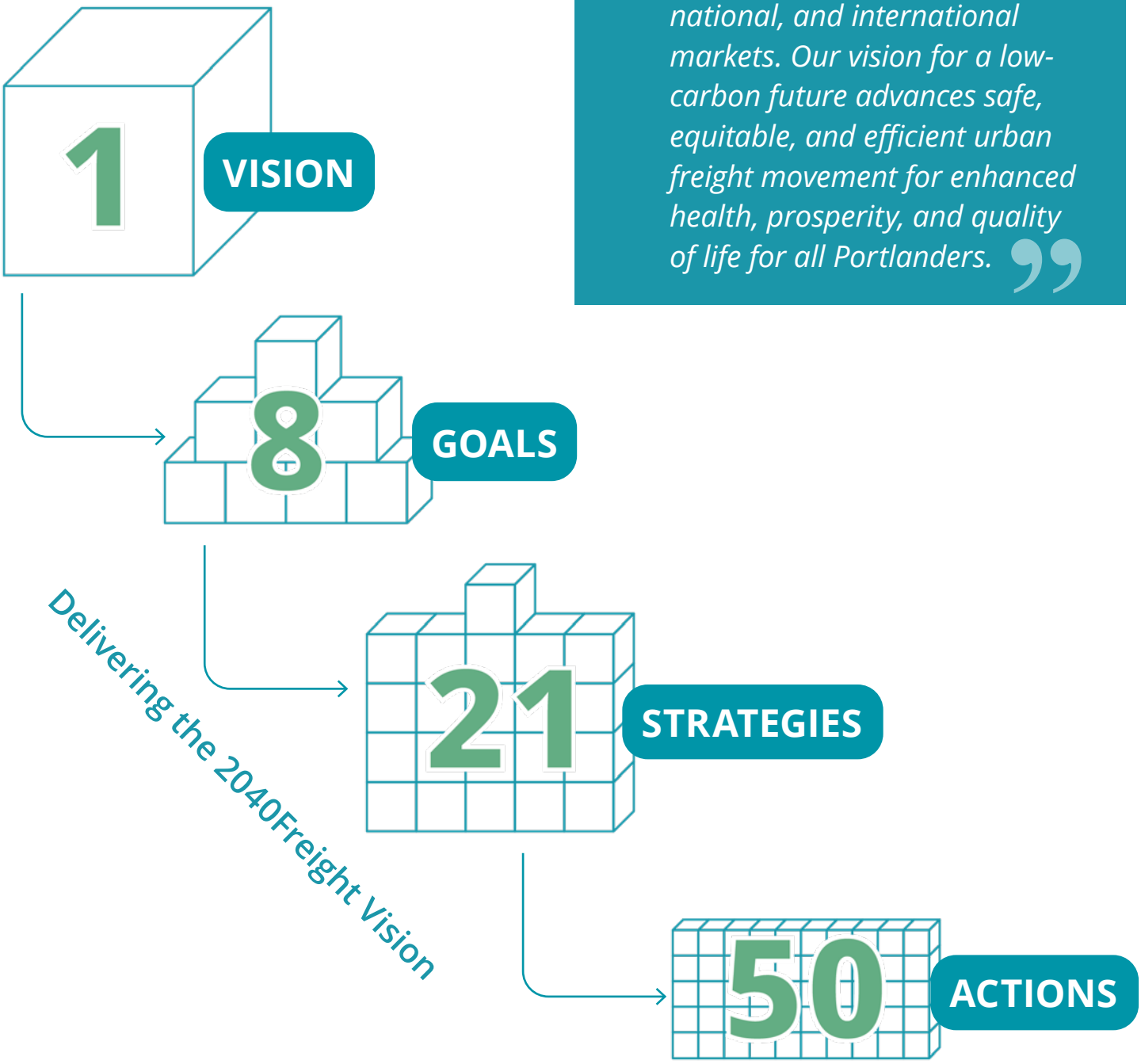
PBOT staff presenting 2040Freight updates to a room of workshop participants.

FROM VISION TO ACTION

The plan's vision and goals inform the strategies, actions, and proposed projects that together shape a long-range work plan for goods movement within and through the city. Together, the goals from the Comprehensive Plan and PBOT Strategic Plan form the foundation for 2040Freight and the specific strategies and actions that will be used to fulfill the vision as they are addressed over the plan's 20-year horizon.

VISION STATEMENT

"We envision Portland as a vibrant city and thriving economy that connects people, goods, and services within Portland, and to regional, national, and international markets. Our vision for a low-carbon future advances safe, equitable, and efficient urban freight movement for enhanced health, prosperity, and quality of life for all Portlanders."



2040FREIGHT GOALS

Eight goals were developed that flowed from the City's overarching goals and the vision statement.

ECONOMIC VITALITY

Foster a thriving, competitive economy and employment growth for Portland's industrial districts, businesses, and communities.

EFFICIENCY

Provide and improve travel reliability and efficiency of the movement of goods and services to, from, and within the city.

ACCESS

Provide and improve freight vehicle access to key freight origins and destinations (access to the curb or other loading/unloading and parking facilities).

SAFETY

Improve freight movement to address safety needs for freight drivers and people walking, riding bicycles, scooting, and driving automobiles

ENVIRONMENT

Improve environmental sustainability of urban goods movement to preserve resources and minimize carbon emissions, stormwater runoff, air quality impacts, noise, and visual intrusion, while fostering healthy communities.

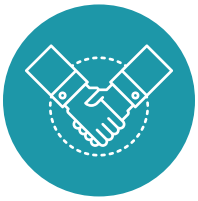
EQUITY

Develop and implement freight investments that address injustice suffered by communities of color, low-income, people with disability and other vulnerable communities including fostering the physical, mental, and social well-being of communities living and working in Portland.

SYSTEM CONDITION

Maintain and improve the freight transportation infrastructure to lower its life cycle cost and improve resilience of critical infrastructure.

PARTNERSHIP & KNOWLEDGE



Work with external and internal partners to advance freight priorities and grow public knowledge and awareness about freight.

STRATEGIES AND ACTIONS

Sixty-one actions were initially identified and then combined, refined, and reduced through an iterative engagement and refinement process with feedback from the 2040Freight Community Advisory Committee, Technical Advisory Committee, and Portland Freight Committee, as well as comments collected through an online survey, focus groups, and a public workshop. **Fifty actions were ultimately advanced.** Action summaries and detailed tables can be explored on the following pages.

ACTION SUMMARY TABLE

Priority actions

Opportunity actions

***bolded actions** are prioritized in the 1-5yr timeframe

Table 2 – Summary of Actions (1-4)

Safety		Environment		System Condition		Efficiency	
No.	*Action*	*No.*	*Action*	*No.*	*Action*	*No.*	*Action*
1A.1	Framework for small capital improvements	2A.1	Pilot green loading/low emissions zones	3.A.1	Prioritize heavy vehicle projects for Quick Build funds	**4A.1**	**Develop demand management strategies**
1B.1	Revise truck movement design guides	2A.2	Analyze anti-idling regulation	3A.2	Identify new funding to improve system condition	4A.2	Identify intersection improvements
1C.1	City fleets with safety technologies	2A.3	Integrate air quality measures in the TSP and RTP	3A.3	Update freight district pavement standards	4B.1	Pilot urban freight consolidation hubs
1C.2	Incentivize vehicle safety improvements	2A.4	Incentivize clean fleet technologies	3A.4	Study I-84 crossings for seismic improvement	**4B.2**	**Study Bus and Truck (BAT) lanes on Columbia Blvd**
		2B.1	Evaluate PPP for EV infrastructure	**3A.5**	**Study Columbia Blvd bridge replacements**	4B.3	Framework to implement freight lanes
		2C.1	Improve intermodal facilities to advance efficient modes	3A.6	Study freight bridge over the Willamette River		
		2C.2	**Study grade-separate rail crossings in Central Eastside**	3B.1	Update asset management for infrastructure resiliency		
		2C.3	**Study Brooklyn Yard connectivity to SE Holgate**	3B.2	Integrate freight with multi-modal resiliency approach		
		2C.4	Study traffic impacts of Kenton Rail Line upgrades				

Priority actions

Opportunity actions

***bolded actions** are prioritized in the 1-5yr timeframe

Table 3 – Summary of Actions (5-8)

Equity		Economic Vitality		Access		Partnership & Knowledge	
No.	*Action*	*No.*	*Action*	*No.*	*Action*	*No.*	*Action*
5A.1	**Pollution reduction strategies**	6A.1	Identify investments to improve travel reliability	**7A.1**	**Explore last mile operation improvements**	8A.1	University partnerships to study freight needs
5A.2	Explore air quality monitoring program	6A.2	Enhance multi-modal connectivity	7A.2	Evaluate a Commercial Cargo Bike Pilot program	8A.2	Prepare for AV, drone, and robot freight movement
5A.3	Study and track e-commerce impacts	6B.1	Construct grade-separated at railroad crossings	7A.3	Develop regulations for emerging last-mile solutions	8B.1	Collaborate to gather continuous freight data
5B.1	Partner with industry and eds on workforce development	6B.2	Partner to improve the street system in Freight Districts	7A.4	Update building standards for delivery storage and loading	8C.1	Implement annual freight education campaign
5B.2	Improve transportation connections to jobs			**7B.1**	**Study curb and loading zone usage**	8C.2	Develop a resource center on urban freight movement.
5C.1	Engage communities to mitigate freight impacts			**7B.2**	**Pilot new curb designs better serve freight and other modes**	8D.1	Establish working groups on technology/ fueling, last-mile
5C.2	Incorporate freight interests in modal plans			7B.3	Evaluate commercial parking permits		

PRIORITIZING THE ACTIONS

2040Freight has a 20-year time horizon. In order to focus effort on accomplishing actions that provide the most positive impact on achieving 2040Freight goals, the actions were prioritized.

The prioritization will help guide implementation over the next 20 years.

The actions were prioritized into the following lists:

Priority Actions:

These actions were recommended by staff, agency, industry, and community partners for their perceived ability to make the most impact on the goals. They have a recommended implementation timeline being in the near and medium-term of the plan's 20-year time horizon—either in 1-5 years or 6-10 years.

Opportunity Actions:

The remaining actions and their associated strategies may be implemented if/as funding and staff resources are presented, or in the 11 to 20-year time frame.

Ongoing Actions:

Some priority and opportunity actions may be considered continuous or led by another agency so that the start and end of the action would not be controlled by PBOT. While status updates will be provided for such actions, they cannot be checked off an implementation list. Therefore, in addition to noting whether an action is priority or opportunity, certain actions are marked "ongoing."

Stock aerial photo of multi-color rail cars filling a rail yard.

SAFETY ACTIONS

Table 4 – Strategies, Actions, and Implementation Timelines: SAFETY

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 1A. Reduce the severity and frequency of truck-involved crashes.					
1A.1	Develop a framework for the evaluation and implementation of operational and design small capital improvements (e.g., turning radius, daylighting) at freight districts and locations with high concentrations of truck-involved crashes with a special emphasis on those locations with higher PBOT's Equity Matrix scores and incompatible land uses. This includes non-freight network roadways with high freight volumes of truck traffic in residential areas.	PBOT Urban Freight Coordinator PBOT Traffic Design Team PBOT Vision Zero Team	Priority	Small Cap Project - Vision Clearance Implementation in the industrial districts	6-10 years
Strategy 1B. Continue to integrate freight needs into a system of Complete Streets.					
1B.1	Revise and refine the truck movement design guides.	PBOT Urban Freight Coordinator PBOT Traffic Design Team	Opportunity	Design Guide Update	--
Strategy 1C. Support and develop public information and education programs, and legislation focused on reduction of freight-involved crashes.					
1C.1	City Council action to require city fleets and city contractors to equip their trucks with safety technology including truck side guards and rear-wheel guards and encourage use of additional safety devices such as collision mitigation systems, forward-looking camera systems, driver scorecards, and in-cab camera systems that alert drivers of obstacles. This strategy should include equity considerations for small and BIPOC owned fleet operators.	PBOT Maintenance Operations PBOT Vision Zero Team	Opportunity	City Council motion	--

Table 4 – Strategies, Actions, and Implementation Timelines: SAFETY

No.	Actions	Lead Implementers	List	Type of Action	Timeline
1C.2	Explore and develop policies and strategies to incentivize vehicle safety strategies (e.g., sideguards, rear-wheel guards, forward-looking camera systems, blind spot mirrors, high- visibility truck cabs), including city mechanisms, The proposed strategy should include equity considerations for small and BIPOC owned fleet operators.	PBOT Vision Zero Team PBOT Parking Division PBOT Regulatory Division PBOT Urban Freight Coordinator	Opportunity	Exploratory Research	--

ENVIRONMENT ACTIONS

Table 5 – Strategies, Actions, and Implementation Timelines: ENVIRONMENT

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 2A. Evaluate and implement City programs, and strategies that support reduction of GHG and local pollutants emissions.					
2A.1	Pilot green loading zones and low emissions zones to send market signals, test implementation strategies, and collect data on the benefits and costs in consideration of broader implementation. The proposed strategies should include equity considerations for small and BIPOC owned fleet operators.	PBOT Policy Team PBOT Parking Operations PBOT Urban Freight Coordinator BPS	Priority	Pilot study	6-10 years
2A.2	Conduct a feasibility analysis to examine costs, and effects of anti-idling regulations on certain delivery vehicles and operations, aiming to reduce GHG emissions and noise pollution impacts.	PBOT Policy Team PBOT Parking Operations PBOT Urban Freight Coordinator PBOT Accessibility Coordinator Office of Community and Civil Life Noise	Opportunity	Exploratory Research	--

Table 5 – Strategies, Actions, and Implementation Timelines: ENVIRONMENT

No.	Actions	Lead Implementers	List	Type of Action	Timeline
2A.3	Integrate freight PM 2.5, carbon dioxide and GHG performance measures, monitoring, and evaluation in the TSP and RTP.	PBOT Policy Team BPS Air Quality Lead	Opportunity	Research, policy development, & data collection program?	--
2A.4	Explore and develop policies and strategies to incentivize the use of clean fleets and technology, including city mechanisms. The proposed strategies should include equity considerations for small and BIPOC owned fleet operators.	BPS PBOT New Mobility Coordinator PBOT Regulatory Division Academic Institutions	Opportunity	Exploratory research	--
Strategy 2B. Accelerate conversion from dirty diesel to clean trucking.					
2B.1	Evaluate and explore public-private partnership to support the construction of public EV charging and low/zero-carbon refueling infrastructure for freight vehicles, including the development of EV-Ready requirements for new freight facilities.	PBOT Policy Team BPS	Priority	Exploratory research and building/ development code update?	6-10 years
Strategy 2C. Support the improvement of inter-modal facilities to advance the competitiveness of more efficient modes for long distance movement (rail and maritime).					
2C.1	Collaborate with multi-modal stakeholders and public, state, and regional partners to leverage local/state/federal funding to support the connectivity and operations improvement to freight intermodal facilities (e.g., rail yards, port terminal and transloading facilities) that address GHG emission reduction by advancing competitiveness of more efficient modes for long distance movement.	PBOT Urban Freight Coordinator BPS	Priority	On-going effort (capital projects; capture in the Albina-Brooklyn yard and Kenton line studies)	
2C.2	Conduct a corridor study along the Union Pacific Mainline Railroad from Albina Yard to Brooklyn Yard to improve, close and/or grade-separate rail crossings in the Central Eastside.	PBOT Urban Freight Coordinator PBOT Planning Division	Priority	Future study	1-5 years

Table 5 – Strategies, Actions, and Implementation Timelines: ENVIRONMENT

No.	Actions	Lead Implementers	List	Type of Action	Timeline
2C.3	Conduct a study to look at alternatives to improve the Union Pacific Brooklyn Yard connectivity to SE Holgate Ave.	PBOT Planning Division	Priority	Future study	1-5 years
2C.4	Conduct a study if a rail study to evaluate and address traffic impacts resulting from the future upgrade of the Kenton Rail Line.	PBOT Planning Division	Priority	Future study	6-10 years

SYSTEM CONDITION ACTIONS

Table 6 – Strategies, Actions, and Implementation Timelines: SYSTEM CONDITION

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 3A. Address major maintenance, rehabilitation, and resiliency needs on the City-owned freight network.					
3.A.1	Identify heavy vehicle specific projects and prioritize them for Portland's Quick Build funding that would improve efficiency and safety for all transportation users by addressing infrastructure needs and impacts related to heavy freight traffic.	PBOT Urban Freight Coordinator	Priority	On-going effort (projects based on PFINA; captured in the bridge feasibility, I-84 crossing and widening of Columbia Blvd)	
3A.2	Identify new sources of funding to support roadway system condition improvements (i.e., maintenance, rehabilitation, and resilience) to the regional and local freight network that align with our City's policy goals.	PBOT Urban Freight Coordinator PBOT Planning PBOT Resource Manager	Opportunity	On-going effort (project funding)	
3A.3	Update pavement construction and reconstruction standards for major freight corridors and streets inside the freight districts based on changing vehicle equipment volumes and their characteristics.	PBOT Asset Manager PBOT Maintenance Operations	Priority	Guideline Update	6-10 years

Table 6 – Strategies, Actions, and Implementation Timelines: SYSTEM CONDITION

No.	Actions	Lead Implementers	List	Type of Action	Timeline
3A.4	Conduct a resiliency study of all I-84 crossings to determine which crossing or crossings require seismic improvement to support freight mobility in the City and the region.	PBOT Engineering PBOT Urban Freight Coordinator PBOT Planning Division	Priority	Future study	6-10 years
3A.5	Conduct Bridge Replacement Feasibility studies of 28th Ave over UPRR, Columbia Blvd over Columbia Way and UPRR, and 33rd Ave bridge and ramp over UPRR and Columbia Blvd.	PBOT Engineering Supervisor PBOT Modal Coordinators PBOT Planning Division	Priority	Future study	1-5 years
3A.6	Conduct a study of a freight-only or freight-priority bridge over the Willamette River from Hwy 30 to Rivergate.	PBOT Engineering Supervisor PBOT Urban Freight Coordinator PBOT Planning Division	Priority	Future study	11+ years
Strategy 3B. Incorporate resilience parameter in the evaluation of the freight network and into the transportation planning and programming process.					
3B.1	Update road and bridge asset management systems to incorporate risk assessments associated with climate and other natural threats and hazards to better ensure the resiliency of critical freight infrastructure.	PBOT Engineering PBOT Urban Freight Coordinator	Priority	Guideline Update	11+ years
3B.2	Integrate freight resiliency considerations in City's efforts to develop a multi-modal transportation resiliency approach that will help increase the network and community resiliency (i.e., natural disasters) pre-, during, and post-recovery process.	PBOT Policy Team	Opportunity	Guideline Update	--

EFFICIENCY ACTIONS

Table 7 – Strategies, Actions, and Implementation Timelines: EFFICIENCY

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 4A. Manage transportation demand and remove barriers to efficient freight movement.					
4A.1	In coordination with the POEM project, develop and evaluate demand management strategies to: a) improve the transportation network efficiency by the reduction of single-occupancy vehicles (SOVs) and business-generated Vehicle Miles Traveled (VMTs); b) address rapidly growing VMT generated by on-demand parcel and food delivery; c) reduce Greenhouse Gas (GHG) emissions; d) provide equitable access to middle-wage freight-related jobs; d) support competitive and growth of the Portland's freight sector; f) improve access, efficiency and reliability of freight movement and delivery operations. This strategy should include equity considerations for a) small and BIPOC owned fleet operators; b) urban delivery workers, and c) vulnerable consumers of these services (low-income and people with disabilities) and other groups that may have limited options to access good.	PBOT Policy Team	Priority	Policy development	1-5 years

Table 7 – Strategies, Actions, and Implementation Timelines: EFFICIENCY

No.	Actions	Lead Implementers	List	Type of Action	Timeline
4A.2	Identify locations where ITS, traffic signal priority, directional signage, and other intersection improvements would be beneficial to address current and forecasted delay and unreliability for freight movement.	PBOT Urban Freight Coordinator PBOT Traffic Design PBOT Signals and Street Lighting PBOT Planning Division	Opportunity	On-going effort (PFINA and Project development)	
Strategy 4B. Promote and support use of the "right sized vehicle" depending on the freight operational needs, available infrastructure, and existing demand (volume & number of customers) to reduce the number of freight trips and VMT for regional and last-mile operations.					
4B.1	Conduct a research study and pilot urban freight consolidation hubs in collaboration with BPS, other City agencies, and private stakeholders through zoning, incentives, and other actions, with the goal of reducing CO2 emissions, distribution costs, and the number of truck trips.	PBOT Urban Freight Coordinator PBOT Policy Team Academic Institutions BPS	Priority	Exploratory research and pilot program	11+ years
4B.2	Conduct a study of the potential implementation of a Bus and Truck (BAT) lane on the Columbia Corridor from N Lombard St. and NE 60th Ave	PBOT Urban Freight Coordinator PBOT Transit Coordinator PBOT Traffic Design TriMet	Priority	Future Study	1-5 years
4B.3	Identify policy framework to study, evaluate and implement Bus and Truck (BAT) lanes and dedicated freight vehicle lanes in key freight corridors to improve both transit and freight reliability, and safety for all street users.	PBOT Urban Freight Coordinator PBOT Transit Coordinator PBOT Traffic Design TriMet	Priority	Exploratory research and implementation	6-11 years

EQUITY ACTIONS

Table 8 – Strategies, Actions, and Implementation Timelines: EQUITY

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 5A. Prioritize investments, regulations, and research in areas with high concentrations of low-wage and communities of color to mitigate the adverse impacts of freight.					
5A.1	Explore and evaluate implementation strategies to reduce freight-related pollution in areas with BIPOC and low-income communities that are disproportionately impacted by truck, rail, and other freight-related exhaust emissions.	PBOT Urban Freight Coordinator	Priority	Exploratory research and implementation	1-5 years
5A.2	Explore opportunities for an air quality monitoring program to evaluate air quality impacts related to truck movement to develop mitigation actions, particularly in BIPOC, low-income, and other vulnerable communities.	PBOT Urban Freight Coordinator BPS Air Quality Lead	Opportunity	Exploratory research	--
5A.3	Study and identify measures for tracking how e-commerce growth may impact BIPOC and low-income communities, particularly where there is a lack of access to these services.	PBOT Urban Freight Coordinator Academic institutions	Opportunity	Exploratory research	--
Strategy 5B. Promote and support freight industry job opportunities to provide upward mobility for low-wage workers, as a strategy to reduce racial income disparities, and support living wages for all.					
5B.1	Work with industry to identify skilled worker needs and partner with educational institutions to develop programs that meet those needs while introducing students to opportunities in the freight industry focused on green-technology, smart technology, and higher-level positions, particularly for people who are BIPOC, low-income or at-risk youth.	PBOT Urban Freight Coordinator BPS	Priority	On-going effort (partnership)	

Table 8 – Strategies, Actions, and Implementation Timelines: EQUITY

No.	Actions	Lead Implementers	List	Type of Action Timeline
5B.2	Identify, develop, and expand the "right-size" transportation services (transit), programs (BIKETOWN, carshare, ridesharing) and active transportation infrastructure improvements (bicycle and pedestrian) for locations that are not served by fixed-route transit (temporally and spatially), aiming to a) provide convenient, safe, reliable and climate friendly connections to high-quality freight jobs, particularly for underserved communities; b) support the reduction of SOV trips, and mitigate lengthy commutes for low and middle-wage employees.	PBOT Modal Coordinators TriMet	Priority	On-going effort (partnership)
Strategy 5C. Encourage community engagement in the planning and implementation process.				
5C.1	Engage with the BIPOC community, people with low-incomes, people with disabilities, and other vulnerable communities to identify and acknowledge any harms caused by governmental decision-making related to freight movement and develop strategies to mitigate impacts.	PBOT Equity Manager PBOT Public Involvement Coordinator PBOT Planning Team	Opportunity	On-going effort (outreach)
5C.2	Engage and collaborate with a wide variety of voices within the freight stakeholder community, including grocery stores, manufacturers, exporters, small businesses, technology companies, last-mile operators, consumers, and others, as part of all modal planning and project development efforts.	PBOT Planning Team	Priority	On-going effort (outreach)

ECONOMIC VITALITY ACTIONS

Table 9 – Strategies, Actions, and Implementation Timelines: ECONOMIC VITALITY

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 6A. Maintain and grow the City of Portland's competitive position as a West Coast international trade gateway.					
6A.1	Collaborate with the Port of Portland, Prosper Portland, Oregon Regional Solutions teams, Business Associations, railroad companies, private Freight District property owners, national and local carriers and shippers, entrepreneurs, and other business stakeholders, to identify investments to improve travel reliability on key freight corridors.	PBOT Urban Freight Coordinator	Priority	On-going effort (major capital project investment)	
6A.2	Collaborate with other agencies and freight industry partners to help enhance Portland's freight system and its multi-modal connectivity for economic and workforce development.	PBOT Urban Freight Coordinator BPS	Priority	On-going effort (multi-modal project development)	
Strategy 6B. Improve the viability of industrial zones, intermodal terminals (e.g., marine, rail, pipeline, airport), and freight hubs by improving access to and from the freight transportation system.					
6B.1	Collaborate with the railroad companies and regional stakeholders to seek funding to construct grade-separated facilities at at-grade railroad crossings to reduce delay for freight vehicles and other road users, particularly in Freight Districts and other key freight locations. This strategy also aims to accommodate terminal bound unit trains without blocking crossings.	PBOT Urban Freight Coordinator PBOT Capital Delivery Division	Priority	On-going effort (rail project development; captured in the Albina-Brooklyn yard and Kenton line studies)	

Table 9 – Strategies, Actions, and Implementation Timelines: ECONOMIC VITALITY

No.	Actions	Lead Implementers	List	Type of Action	Timeline
6B.2	Help facilitate street system improvement in industrial areas with the formation of local improvement districts (LIDs) Bureau of Environmental Services and/or Parks & Recreation partnerships where there can be joint investments to share costs between property owners and the City that will help the development of underutilized sites and support middle-wage job growth in Freight District.	PBOT LID Coordinator BPS Portland Parks and Recreation	Priority	On-going effort (PFINA and Project development)	

ACCESS ACTIONS

Table 10 – Strategies, Actions, and Implementation Timelines: ACCESS

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 7A. Explore last-mile solution alternatives to consolidate demand and reduce freight vehicle trips (i.e., mode shift, micro-hubs, alternative drop/pick-up locations).					
7A.1	Identify regulatory barriers, evaluate feasibility, and develop research opportunities for the implementation of first/last mile improvement strategies; such as shared off-street loading docks; fleet decarbonization; cargo bikes; micro-hubs; and other emerging technology.	PBOT Urban Freight Coordinator PBOT New Mobility Program PBOT Policy team BPS	Priority	Exploratory research and pilot program	1-5 years
7A.2	Evaluate the feasibility, costs and benefits of an enhanced Commercial Cargo Bike Pilot program - including roadway needs and enabling regulations, as well as security, storage, EV charging, and safety considerations - for accommodating pedal and electric-assist cargo bikes as a means for reducing last-mile truck delivery trips.	PBOT Active Transportation PBOT New Mobility Program PBOT Policy team BPS	Priority	Exploratory research and pilot program	6-10 years

Table 10 – Strategies, Actions, and Implementation Timelines: ACCESS

No.	Actions	Lead Implementers	List	Type of Action	Timeline
7A.3	Develop regulations and operational/ design requirements for emerging technology in last-mile solutions such as cargo bikes, personal delivery devices (PDD), and drones/urban air mobility, including load/unload infrastructure design and clearance requirements.	PBOT Policy Team PBOT Development & Permitting PBOT Urban Freight Coordinator PBOT New Mobility Program BPS	Opportunity	Guideline update	--
7A.4	Reevaluate and update building design requirements for new development to accommodate increased online delivery package storage and reduce freight dwell time at the load/unload infrastructure (e.g., load/unload infrastructure, building delivery plans, delivery lockers).	PBOT Development Review BPS	Opportunity	Guideline update	--
Strategy 7B. Improve delivery and service vehicles' access to their final delivery destination to reduce unauthorized parking and minimize conflict with freight vehicle circulation, deliveries, pick-up, and service operations.					
7B.1	Conduct study to assess current curb usage by freight vehicles and the usage of Truck Loading Zones to better understand factors associated with commercial parking operations, including unauthorized parking, parking utilization, cruising, dwell time, vehicle size and activity type. This action will also include the evaluation of the technology that can help assist the evaluation of curb operations.	PBOT Parking Operations	Priority	Exploratory research	1-5 years

Table 10 – Strategies, Actions, and Implementation Timelines: ACCESS

No.	Actions	Lead Implementers	List	Type of Action	Timeline
7B.2	Evaluate and pilot new curb designs (e.g., Fast Stops) to increase flexibility, reduce unauthorized parking, and reduce dwell time of on-street space for multiple users including transit, deliveries, drop-off, and pickup, etc., without compromising the safety and separation vulnerable road users need.	PBOT Parking Operations PBOT Complete Street Team	Priority	Exploratory research and pilot program	1-5 years
7B.3	Evaluate current commercial parking permits and existing loading/ unloading spaces to ensure adequate design, safety consideration and placement for freight vehicles based on the vehicle fleet configuration (i.e., vehicle size, dwell time and other operation's needs, including charging infrastructure for electric vehicles).	PBOT Parking Operations PBOT Urban Freight Coordinator	Opportunity	Exploratory research	--

PARTNERSHIP & KNOWLEDGE ACTIONS

Table 11 – Strategies, Actions, and Implementation Timelines: PARTNERSHIP & KNOWLEDGE

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 8A. Support research and development to test and evaluate innovative last-mile freight strategies with the goal of providing a pathway for data-driven policy development.					
8A.1	Partner with university researchers to evaluate present and future freight transportation needs and challenges, with the objective of developing evidence-based knowledge and fostering innovation.	PBOT Urban Freight Coordinator Academic institutions	Priority	On-going effort (research)	

Table 11 – Strategies, Actions, and Implementation Timelines: PARTNERSHIP & KNOWLEDGE

No.	Actions	Lead Implementers	List	Type of Action	Timeline
8A.2	Prepare for the advent of freight applications of connected automated vehicle (CAV) technology, drones/urban air mobility, and personal delivery devices. Define potential test locations and design of initial pilots in alignment with the City's goals and policies, including Vision Zero and safe systems approach, climate, equity and reducing VMT.	PBOT New Mobility Coordinator PBOT Urban Freight Coordinator PBOT Policy Team	Opportunity	Exploratory research and pilot program	--
Strategy 8B. Describe and demonstrate the value of the freight economy to policymakers, stakeholders, and the public through a data-driven approach to improve decision-making.					
8B.1	Identify data needs and develop collection programs or collaborative efforts to gather continuous freight data, including a) Freight volume (differentiating between vehicle size, type, activity, engine age and fuel type); b) freight temporal patterns, delay and travel reliability; c) commercial loading/unloading infrastructure demand by different adjacent land uses; d) greenhouse emissions and local pollutants updated inventory related to the freight industry disaggregated by sector. This action includes evaluating opportunities for data sharing with the city, such as a) data requirements as part of the loading zone permit and city license to assess freight operations; b) data-sharing partnerships, such as through the Open Mobility Foundation and with GPS navigation providers and other data providers.	PBOT Urban Freight Coordinator PBOT Performance Operations Academic institutions PBOT Parking Operations	Priority	Several data collection efforts specific to each of the items	6-10 years

Table 11 – Strategies, Actions, and Implementation Timelines: PARTNERSHIP & KNOWLEDGE

No.	Actions	Lead Implementers	List	Type of Action	Timeline
Strategy 8C. Increase public engagement, awareness, and education of urban freight movement.					
8C.1	Design and implement annual freight-information campaign content aiming to a) educate the wider public on urban freight movement, related rules, emerging trends, actions the industry is taking to reduce its carbon footprint, and regulations; b) promote actions individuals can take, such as reducing or consolidating their online shopping to reduce their freight carbon footprint; c) enhance understanding about traffic safety in freight districts and along freight corridors.	PBOT Active Transportation and Safety Division PBOT Urban Freight Coordinator PBOT Vision Zero team	Opportunity	On-going effort (education)	
8C.2	Develop a resource center for staff, City agencies, and elected officials to share information about current and emerging trends and needs, associated risks and impacts related to the urban freight movement.	PBOT planning team	Opportunity	Resource center development	--
Strategy 8D. Work with partners to explore additional opportunities for clean vehicle technology.					
8D.1	Establish public/private working groups on vehicle technology/ fueling, and last-mile exchange.	BPS PBOT Urban Freight Coordinator	Opportunity	On-going effort (outreach)	

CH. 5: FREIGHT INFRASTRUCTURE SYSTEM IMPROVEMENT

MAJOR CAPITAL FREIGHT-RELATED INFRASTRUCTURE IMPROVEMENTS

IMPLEMENTATION PROGRESS SINCE THE 2006 FREIGHT MASTER PLAN

The 2006 Freight Master Plan included highway, street, system management, bridge, rail, and marine terminal projects. However, roughly a third of the projects identified in the 2006 plan are not under City of Portland jurisdiction and are instead the responsibility of either state, county, Port of Portland, or other public or private entities that own and operate the region's essential freight infrastructure.

Although responsibility is distributed, many of the freight projects outlined in 2006 have been completed. As of 2020, 41% of freight projects have been completed in the 15 years since the adoption of the 2006 Freight Master Plan. Of the 59% of incomplete projects, less than half are within the City of Portland's jurisdiction.[83]

WHAT CONSTITUTES A FREIGHT PROJECT?

Building on the criteria defined by the 2006 Freight Master Plan, freight-related infrastructure improvements will meet the following criteria:

- Improves a freight route of significance, as defined by a Transportation System Plan, Regional Transportation Plan, Oregon Highway Plan, and/or National Highway System freight route designation or improves access to properties zoned for industrial, commercial and employment land uses, with special focus on industrial and commercial districts.
- Includes project elements that improve or facilitate freight movement aligned to the 2040Freight goals.
- Demonstrates consistency with state, regional, and local transportation policies.

IDENTIFYING PROJECTS FOR 2040FREIGHT

The 2040Freight project list includes regional and local projects that were listed in the 2006 Freight Plan but have not yet been implemented. Additionally, this list draws from multiple other resources including:

- 2018 Regional Transportation Plan
- 2020 Transportation System Plan
- 2020 PBOT's ITS Plan
- 2021 Columbia-Lombard Mobility Corridor Plan
- New Project identified on the 2040Freight Critical Infrastructure Analysis [Resiliency needs] - See "Appendix C: Critical Infrastructure Resiliency Evaluation" on page 138
- 2020 Seismic Retrofit Program Report—PBOT Bridge Seismic Resilience Assessment and Prioritization Program Project Rec
- 2018 PBOT's Highway-Rail Grade Crossings recommendations
- 2040Freight mobility, safety and equity needs assessments
- Refinements and additions identified by 2040Freight outreach to city and regional partners/stakeholders including Metro, ODOT, the Port of Portland, and the Portland Bureau of Planning and Sustainability.

INFRASTRUCTURE CATEGORIES

- **Highway-Street Infrastructure:** Improvements on Portland's freeway system such as interchange upgrades and auxiliary lanes. Improvements on Portland's arterial street system. Potential improvements include, but are not limited to, intersection upgrades, access management, and new road connections.
- **Intelligent Transportation System (ITS):** Upgrades such as closed-circuit TV cameras and variable message signs to provide real-time information to dispatchers and truck drivers.
- **Bridges:** Including but not limited to upgrading load-limits, improving clearances, seismic upgrades, resiliency improvements, and new structures.
- **Rail Infrastructure:** Such as signalization upgrades, crossing grade separations, quiet zones to improve rail capacity, reduce mode conflict and improve efficiency for both rail and road movement.
- **Marine projects:** Including channel dredging and marine terminal facilities improvements.

REGIONAL COLLABORATION

2040Freight acknowledges the need and the importance of inter-regional coordination and support for regional freight-related infrastructure improvements to proactively address climate change, improve access, equity, and mobility, and support other desired outcomes aligned with local, county, and other regional plans.

PROJECT PRIORITIZATION

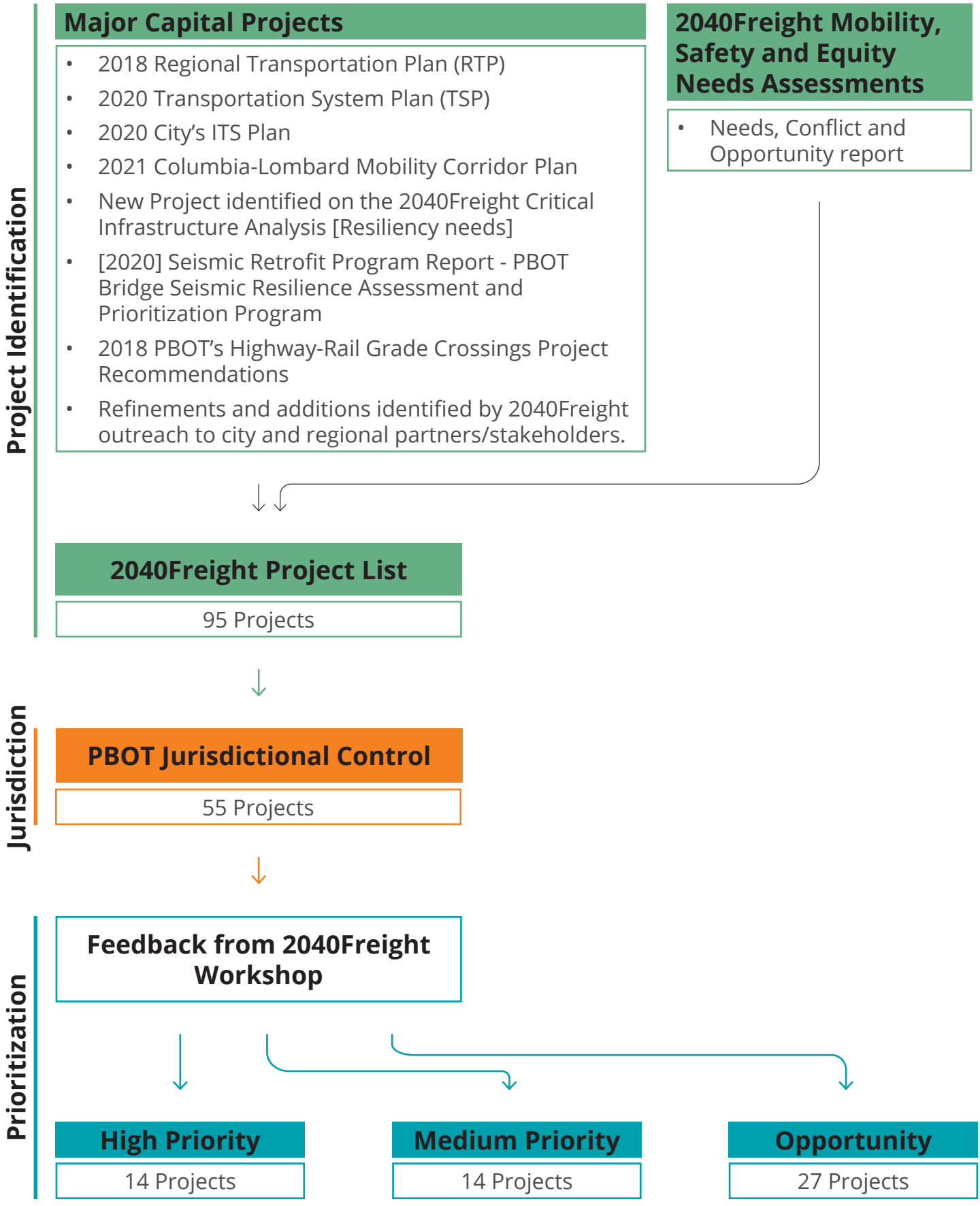
The 2040Freight Plan includes a recommended project list of 95 major projects. The complete list includes projects led by different local, regional, and state agencies, including PBOT, ODOT, and the Port of Portland. However, the 2040Freight Plan only prioritizes the 55 projects that are led by or are under PBOT's jurisdiction. These projects are classified into three priority tiers to guide PBOT's infrastructure improvement efforts:

- **High:** Near-term advancement for funding and implementation, within five years.
- **Medium:** Mid-term advancement for funding and implementation, within 10 years.
- **Opportunity:** Long-term advancement for funding and implementation, within 20 years.

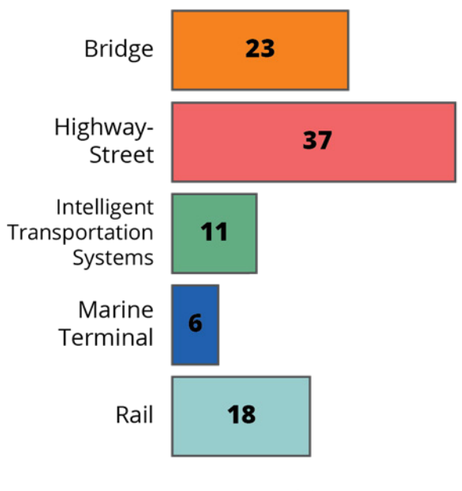
This prioritization is based on the feedback provided by the three 2040Freight advisory committees, internal staff review, and public engagement efforts.

The following pages identify each of the 2040Freight major capital projects by category and location. Many of the infrastructure improvements identified here will require further study, more neighborhood input, and additional City Council review prior to construction. The projects may be modified with further evaluation. "Appendix B: Proposed Regional and Local Freight-Related Infrastructure Improvements" on page 127 includes the list of infrastructure improvements with detailed descriptions and their estimated costs.

Figure 8 – Freight Project Identification and Prioritization Process



Map 4 – Full Freight Project List, Displayed by Project Type



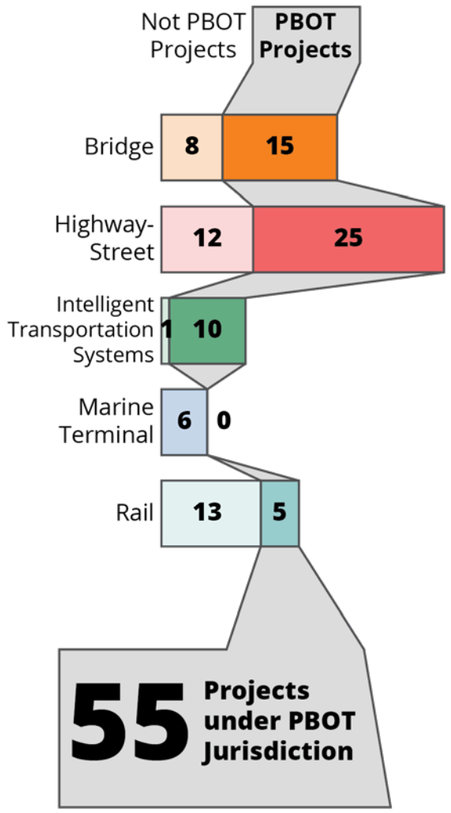
95 **Total Number of Projects**

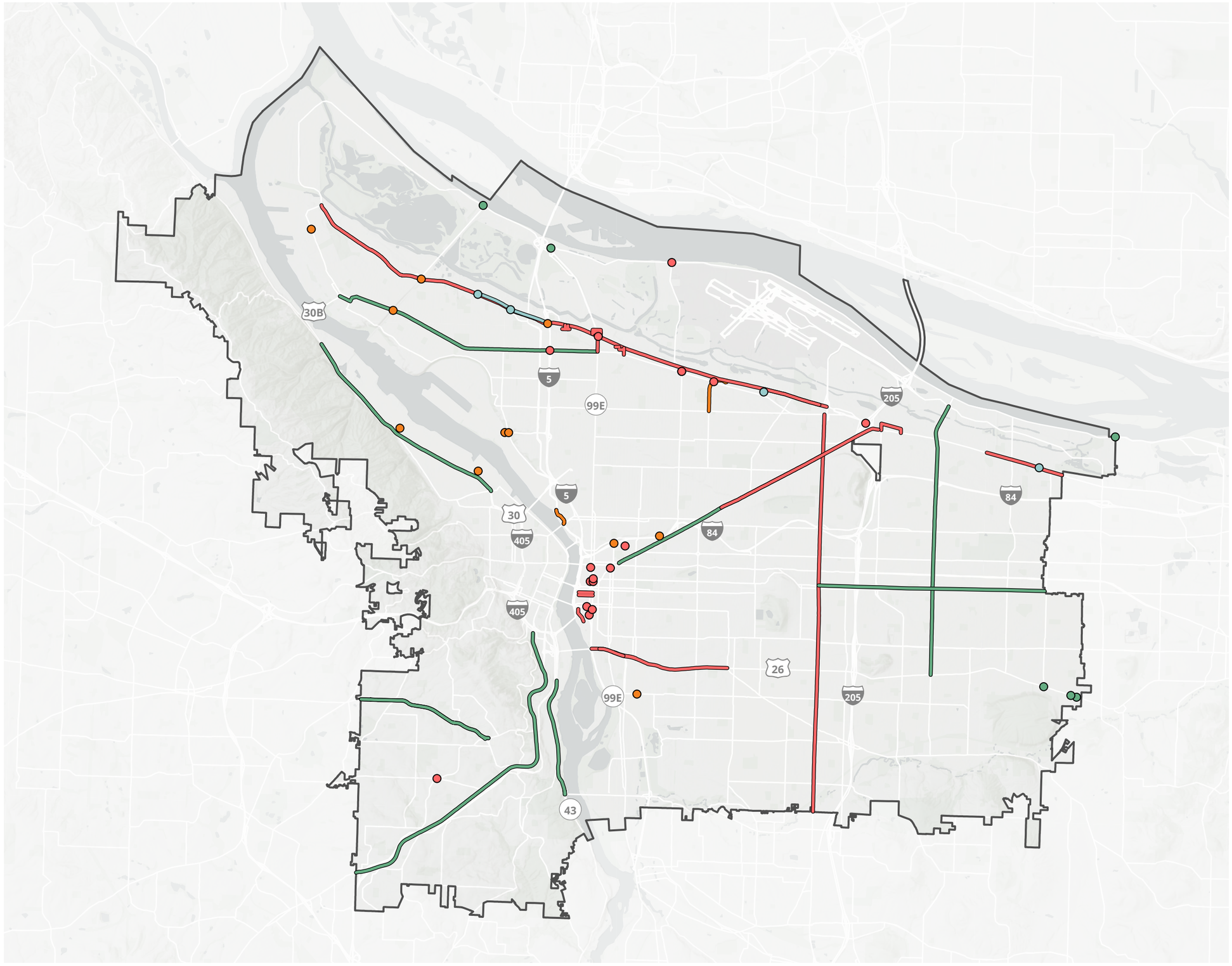
2040Freight Projects
- Bridge
- Highway-Street
- ITS
- Marine Terminal
- Rail

0 0.75 1.5 3 Miles

N

Map 5 – Freight Projects Within PBOT's Jurisdiction, Displayed by Project Type



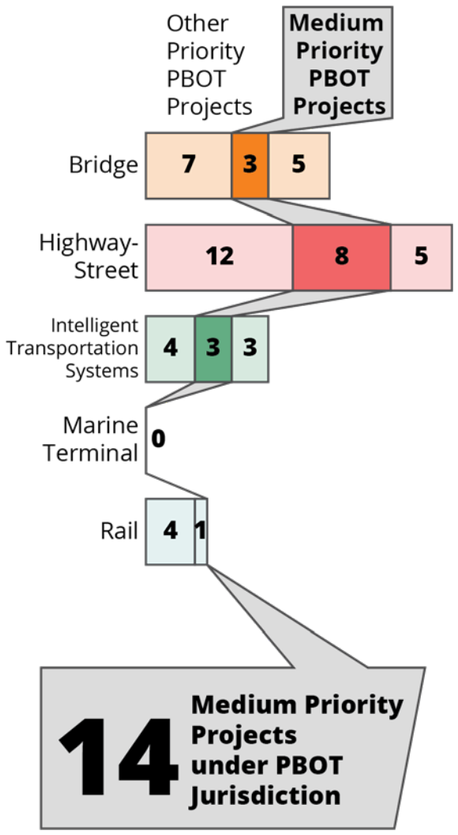


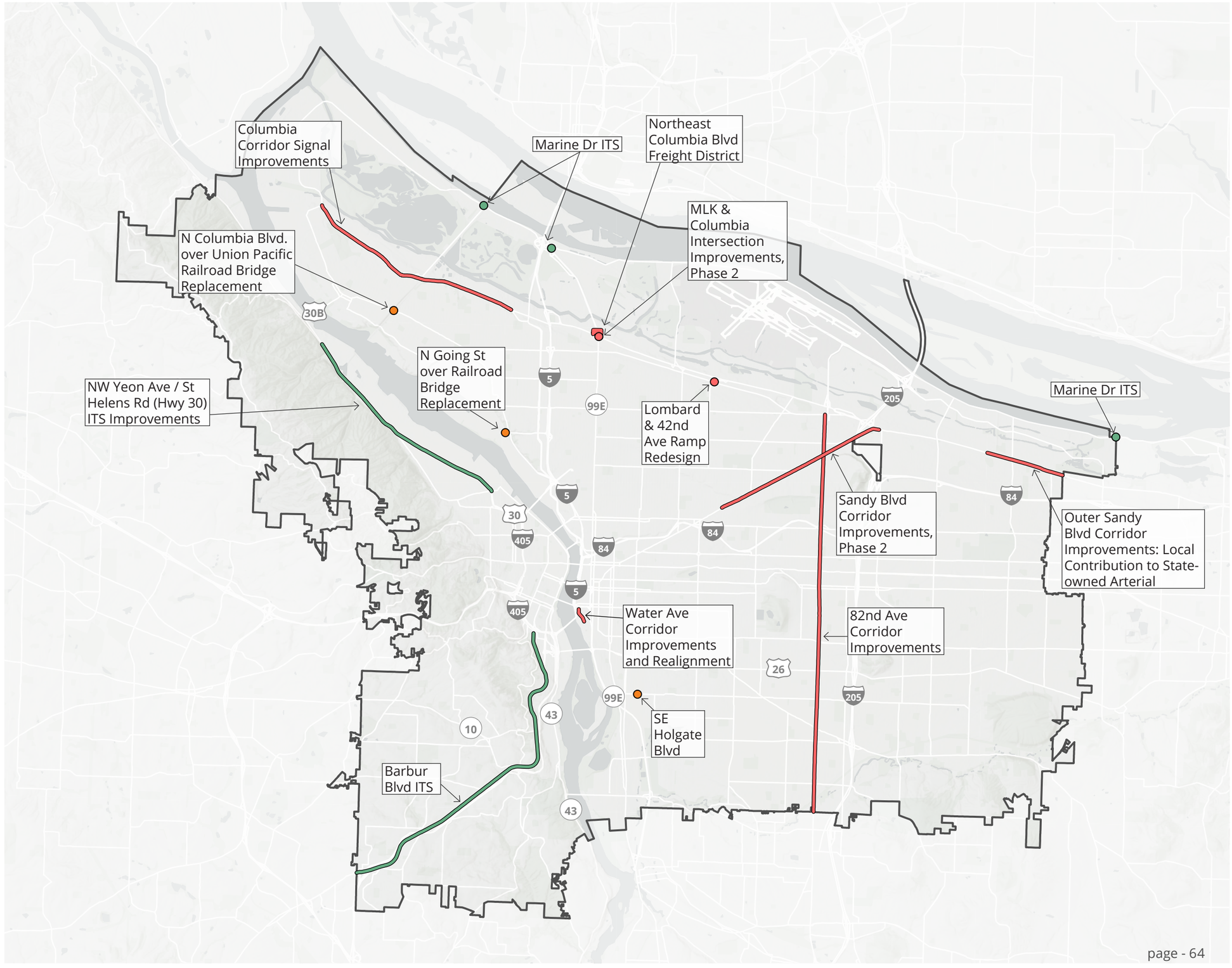
2040Freight Projects
- Bridge
- Highway-Street
- ITS
- Rail

0 0.75 1.5 3 Miles

N

Map 6 – Medium Priority Freight Projects Within PBOT's Jurisdiction





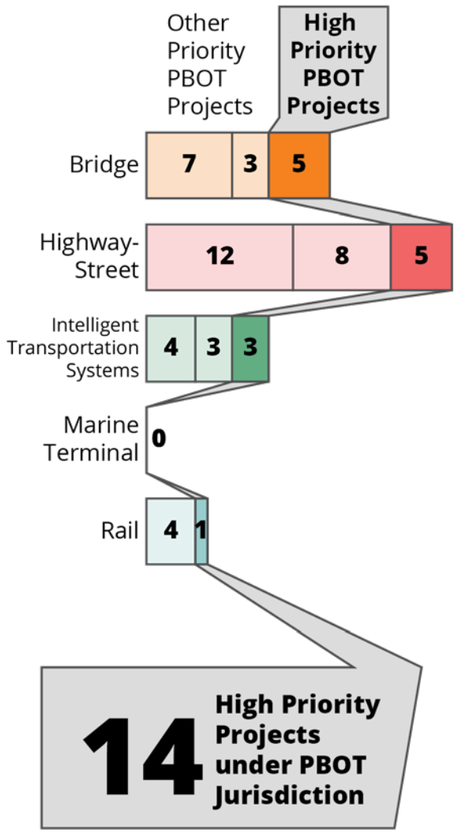
2040Freight Projects

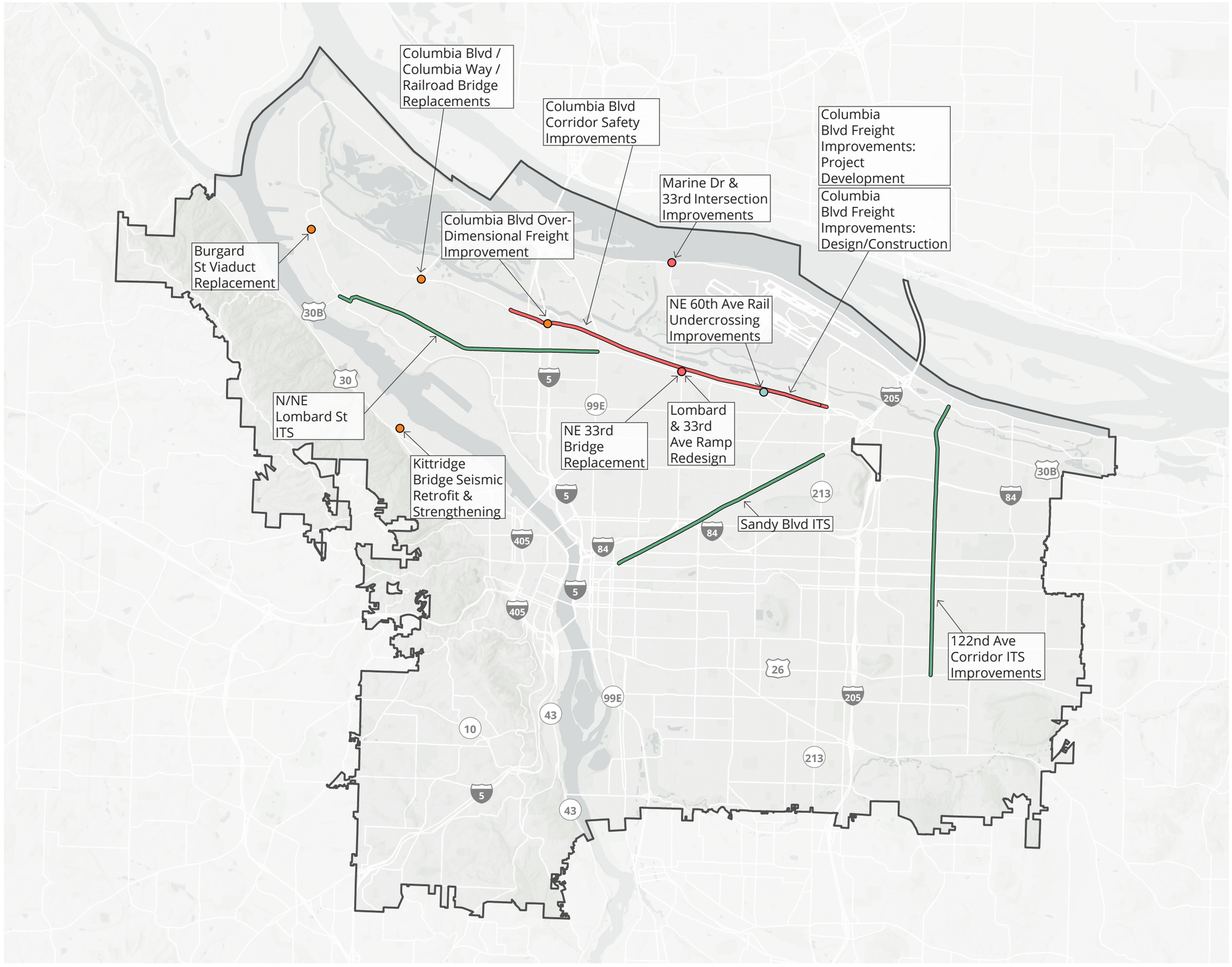
- Bridge
- Highway-Street
- ITS
- Rail

0 0.75 1.5 3 Miles

N

Map 7 – All High Priority Freight Projects within PBOT's Jurisdiction





2040Freight Projects
- Bridge
- Highway-Street
- ITS
- Rail

0 0.75 1.5 3 Miles

N

Table 12 – Bridge Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Burgard St. Viaduct Replacement	Burgard, N (Bridge over UPRR)	Replace the existing N Burgard St Viaduct (#001) over the UPRR tracks. Include pedestrian and bicycle facilities. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$17,500,000	TSP - 30068	High
Columbia Blvd / Columbia Way / Railroad Bridge Replacements	Columbia Blvd, N (bridges over BNSF railroad tracks and Columbia Way)	Replace the existing fracture critical Columbia Blvd bridge (#078) over BNSF railroad tracks with a new structure, and perform seismic upgrades on parallel bridge or replace it (#078A). Replace Columbia Blvd bridge over Columbia Way (#079). Also, address the risk of future weight restriction for the three bridge, if any.	$20,500,000	TSP - 30005 & 30084	High
Columbia Blvd Over-Dimensional Freight Improvement	Columbia - Railroad bridge adjacent to I-5	Increase vertical clearance under railroad bridge to allow a higher percentage of over-dimensional loads to use this segment of Columbia Blvd. Requires replacing rail bridge with a different type of bridge without changing railroad grade.	$20,500,000	New - B9	High
Kittridge Bridge Seismic Retrofit and Strengthening	Kittridge Ave, NW (Front - Yeon)	Retrofit existing seismically vulnerable bridge (#010) across railroad tracks to ensure emergency response and access to petroleum supplies located along the Willamette River in the event of an earthquake. Strengthen bridge structure to carry overweight loads.	$31,000,000	TSP - 60012	High

Table 12 – Bridge Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
NE 33rd Bridge Replacement	33rd Ave, NE (over railroad tracks and Columbia Blvd)	Replace 33rd Ave bridge (009 and 009A) over railroad, 33rd Ave flyover ramp over Columbia Blvd, and Columbia Blvd bridge over 33rd Dr. Reconfigure interchange to improve safety and connectivity for all modes, address seismic resiliency and bridge condition needs on a major emergency and freight route, and simplify traffic operations and wayfinding by providing at-grade signalized intersections instead of ramps and overpasses. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$46,500,000	TSP - 40100	High
N Columbia Blvd. over Union Pacific Railroad Bridge Replacement	Columbia Blvd, N over UPRR	Replace seismically vulnerable bridge (#172) over Union Pacific Railroad in Rivergate area.	$30,000,000	New - B6	Medium
N Going St over Railroad Bridge Replacement	Going St, N (over UP railroad)	Replace Going Street bridge (#012) with a new structure that is not vulnerable to train derailment damage.	$30,000,000	New - B3	Medium
S.E. Holgate Blvd.	S.E. Holgate Blvd.	Replace weight restricted and seismically vulnerable bridge (#044)	$41,000,000	New - B7	Medium
Greeley Ave	Greeley Ave	Replace weight restricted and seismically vulnerable bridge (#013)	$25,000,000	New - B8	Opportunity
"Interstate Semi- viaduct Replacement"	Interstate Ave, N (North of Broadway Bridge)	Replace the existing weight-restricted, poor-condition Interstate Semi-viaduct (Bridge #152).	$10,000,000	TSP - 20065.1	Opportunity

Table 12 – Bridge Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Interstate-Larrabee Overpass	Interstate-Larrabee Ramp, N (Tillamook -Broadway)	Remove the existing weight-restricted, low-clearance, poor-condition Interstate to Larrabee southbound flyover ramp (Bridge #153) and replace with a new overpass including a multi-use path to connect the future N Portland Greenway Trail to the Broadway Bridge. Assess the costs and benefits of providing vehicle access on the new structure as part of project development.	$20,500,000	TSP - 20065.2	Opportunity
NE 12th Avenue Bridge Replacement	12th Avenue, NE Bridge over I-84 (BR# 025)	Replace the existing fracture critical and seismically deficient 12th Ave bridge (Bridge #025) over I-84 and railroad tracks with a new structure. Provide multimodal transportation improvements on the new structure.	$31,000,000	New - B5	Opportunity
NE 42nd/47th Ave Bridge & Corridor Improvements	42nd/47th Ave, NE (Killingsworth - Columbia)	Replace the weight-restricted NE 42nd Ave Bridge (#075) over NE Portland Hwy and the adjacent railway, and add pedestrian and bicycle facilities to the bridge and the roadway from Killingsworth to Columbia. This project will remove the weight restriction, improve vertical clearance for over-dimensional freight, and provide pedestrian and bicycle facilities. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$12,000,000	TSP - 40007	Opportunity
NW 26th Dr Bridge Retrofit/ Strengthening	26th Dr, NW (bridge over railroad)	Retrofit and strengthen the NW 26th Dr bridge (#129) to carry overweight loads.	$30,000,000	New - B4	Opportunity

Table 12 – Bridge Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
NE 28th Ave Bridge Retrofit/ Strengthening	28th Ave, NE (over UP railroad adjacent to I-84)	Replace weight restricted and seismically vulnerable bridge over the UP railroad (#172)	$10,000,000	New - B2	Opportunity

BRIDGE PROJECT SUBTOTALS

High	Medium	Opportunity
$136,000,000	**$101,000,000**	**$138,500,000**

Table 13 – ITS Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
N/NE Lombard St ITS	N Columbia Blvd to NE MLK Jr Blvd	Install ITS infrastructure (communication network, Next-Gen transit signal priority, CCTV cameras, and vehicle/bike/pedestrian detection system) and signal timing improvements for all road users.	$11,500,000	TSP - 30035	High
Sandy Blvd ITS	NE Couch to NE 82nd Ave	Install ITS infrastructure (communication network, Next-Gen transit signal priority, truck priority detection, CCTV cameras, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system consistent with our policies of moving people and goods more effectively.	$4,500,000	TSP - 40069	High

Table 13 – ITS Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
122nd Ave Corridor ITS Improvements	NE Airport Way to SE Powell Blvd	Install ITS infrastructure (communication network, Next-Gen transit signal priority, truck priority detection, CCTV cameras, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system consistent with our policies of moving people and goods more effectively.	$4,500,000	TSP - 50005	High
NW Yeon Ave / St Helens Rd (Hwy 30) ITS Improvements	NW Nicolai St to NW 107th Ave	Install ITS infrastructure (communication network, Next-Gen transit signal priority, CCTV cameras, and vehicle/bike/pedestrian detection system) and signal timing improvements for all road users.	$3,000,000	TSP - 60023	Medium
Barbur Boulevard ITS	Barbur Boulevard, SW (SW Caruthers to Capitol Hwy)	Install intelligent transportation system infrastructure to improve safety and enhance traffic flow.	$2,000,000	TSP - 90014	Medium
Marine Dr ITS	Marine Dr, N/NE (Portland Rd - 185th)	"Install CCTV at N Portland Rd and changeable message signs at Portland Rd, Vancouver and 185th"	$397,000	TSP - 30038	Medium
SE Powell Blvd ITS	West/East Segments	Install needed ITS infrastructure (communication network, new traffic controllers, CCTV cameras, truck priority, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system.	$489,000	New - ITS3	Opportunity

Table 13 – ITS Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Beaverton-Hillsdale Hwy ITS	Beaverton-Hillsdale Hwy, SW	Install needed ITS infrastructure (communication network, new traffic controllers, CCTV cameras, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system.	$1,018,000	TSP - 90019	Opportunity
Macadam ITS	Macadam, SW (Bancroft - Sellwood Br)	Install ITS infrastructure (communication network, Next-Gen transit signal priority, CCTV cameras, and vehicle/bike/pedestrian detection system) and signal timing improvements for all road users.	$2,500,000	TSP - 90046	Opportunity
SE Stark St ITS	SE Stark St (82nd Ave to COG)	Install needed ITS infrastructure (communication network, new traffic controllers, CCTV cameras, truck priority, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system.	$1,617,000	New - ITS1	Opportunity

ITS PROJECT SUBTOTALS

High	Medium	Opportunity
$20,500,000	**$5,397,000**	**$5,624,000**

Table 14 – Rail Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
NE 60th Ave Rail Undercrossing Improvements	60th Ave, NE (Columbia - Lombard)	Improve the NE 60th Ave Rail Undercrossing to improve vertical clearance for freight movement and to provide pedestrian and bicycle facilities.	$31,000,000	New - R5	High
Kenton Quiet Zone	Kenton Line Quiet Zone is along the Kenton rail line at the Kenton neighborhood	Street and rail crossing improvements to allow implementation of a Quiet Zone.	$6,487,000	New - R6	Opportunity
N Argyle Way/N Columbia Blvd Rail Grade Crossing Signal Improvements	N Argyle Way at Columbia Blvd	Reduce delay for vehicles and pedestrians at signalized intersections near highway-rail grade crossings. Being a critical traffic signal, safeguard against power failures with battery back-up power supply (BPS) system. Optimize signal timing and signal performance by connecting controllers with rail island circuits during rail pre-emption.	$20,000	New - R1	Opportunity
NE 158th Ave/ NE Sandy Blvd Rail Crossing Signal Improvements	NE 158th Ave at NE Sandy Blvd	Reduce delay for vehicles and pedestrians at signalized intersections near highway-rail grade crossings. Being a critical traffic signal, safeguard against power failures with battery back-up power supply (BPS) system. Optimize signal timing and signal performance by connecting controllers with rail island circuits during rail pre-emption. Install fiber interconnect communication.	$200,000	New - R2	Opportunity

Table 14 – Rail Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
N Chautauqua Blvd/ N Columbia Blvd Rail Crossing Signal Improvements	N Chautauqua Blvd at N Columbia Blvd	Reduce delay for vehicles and pedestrians at signalized intersections near highway-rail grade crossings. Being a critical traffic signal, safeguard against power failures with battery back-up power supply (BPS) system. Optimize signal timing and signal performance by connecting controllers with rail island circuits during rail pre-emption.	$20,000	New - R3	Opportunity

RAIL PROJECT SUBTOTALS

High	Medium	Opportunity
$31,000,000	**N/A**	**$6,727,000**

Table 15 – Highway-Street Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Columbia Blvd Freight Improvements: Design/ Construction	Columbia Boulevard, NE (60th - 82nd)	Construct street and intersection modifications to improve safety, freight reliability, and access to industrial properties, based on results of project development (RTP ID #12004).	$53,500,000	TSP - 40102	High
Columbia Blvd Corridor Safety Improvements	N/NE Columbia Blvd (Argyle - 60th)	Reconfigure skewed intersections to reduce turning speeds, upgrade aging traffic signals, install speed reader boards/ automated enforcement and add raised medians or rumble strips where feasible.	$8,000,000	New - HS5	High

Table 15 – Highway-Street Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Columbia Blvd Freight Improvements: Project Development	NE Columbia Blvd (60th - 82nd)	Alternatives analysis and project development to identify preferred street and intersection modifications to improve freight reliability and access to industrial properties. Analyze the feasibility and benefits of freight-only lanes to ensure improvements prioritize freight movement.	$2,000,000	New - HS10	High
Marine Dr & 33rd Intersection Improvements	Marine Dr & 33rd Ave, BE	Improve freight operations in the intersection either by construction new traffic signals or a new design roundabout. Widening of 33rd and Marine to accommodate turn lanes and bike/ped facilities	$9,500,000	TSP - 40006	High
Lombard & 33rd Ave Ramp Redesign	NE Lombard St at 33rd	Redesign ramps and intersections from Lombard to 33rd to reduce motor vehicle speeds, address turning conflicts, and consolidate access points. Close one of the two ramps and signalize the remaining ramp. Provide a pedestrian and bicycle connection from Lombard St to 33rd Ave.	$5,000,000	New - HS4	High
Outer Sandy Blvd Corridor Improvements: Local Contribution to State-owned Arterial	Sandy Blvd, NE (141st - City Limits)	Widen street to three lanes with a sidewalk and bike lanes for consistency of the cross section design West of 141st and East of City Limits. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses. Improve safety for all modes in the Parkrose main street segment.	$5,000,000	TSP - 50035	Medium

Table 15 – Highway-Street Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
82nd Ave Corridor Improvements	82nd Ave, NE/ SE, (Lombard - Clatsop)	Design and implement multimodal improvements to sidewalks, crossings, transit stops, striping, and signals to enhance ped/bike safety, access to transit, and transit operations. Address major asset needs including pavement, ADA ramps, and traffic signals.	$150,000,000	TSP - 40013	Medium
Sandy Blvd Corridor Improvements, Phase 2	Sandy Blvd, NE (47th - 101st)	Retrofit existing street with multi-modal street improvements including bicycle facilities, redesign of selected intersections to improve pedestrian crossings, streetscape, and safety improvements. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$6,481,860	TSP - 40068	Medium
Water Ave Corridor Improvements and Realignment	SE Stark to SE Caruthers	From Stark to Clay, remove rails from roadway, repair pavement, build sidewalks, and provide an enhanced bikeway. South of Clay, realign SE Water Ave as shown in the OMSI Master Plan.	$22,500,000	TSP - 20206 & 20075	Medium
Northeast Columbia Blvd Freight District	NE Mallory Ave (Columbia - Halleck); NE Halleck St (Mallory - Grand); NE Kilpatrick St (Mallory - Grand); NE Grand Ave (Columbia - Halleck)	Make needed street improvements (pavement, curbs, sidewalks, stormwater, ped and bike facilities) on Freight District Streets surrounding N Columbia Blvd.	$5,000,000	New - HS8	Medium

Table 15 – Highway-Street Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Columbia Corridor Signal Improvements	Corridor wide	Replace and upgrade aging traffic signals along Columbia Blvd from Argyle to Lombard to improve freight mobility, traffic flow, access to surrounding areas, and safety.	$10,000,000	New - HS9	Medium
MLK & Columbia Intersection Improvements, Phase 2	NE MLK Jr Blvd & Columbia Blvd	Intersection and signalization improvements with a dedicated northbound right turn lane, a second dedicated southbound left turn lane, wider sidewalks adjacent to the roadway, and improvements to the geometry of the existing southbound through/right turn lane.	$15,500,000	TSP - 40113	Medium
Lombard & 42nd Ave Ramp Redesign	NE Lombard St at 42nd	Redesign ramps and intersections from Lombard to 42nd to reduce motor vehicle speeds, address turning conflicts, and consolidate access points. Provide pedestrian and bicycle connection from Lombard St to 42nd Ave.	$5,000,000	New - HS1	Medium
Beaverton-Hillsdale Hwy Corridor Improvements Segment 1	Beaverton-Hillsdale Hwy, SW (Capitol Hwy - 30th)	Build new sidewalks, upgrade bike facilities, improve crossings, and enhance access to transit. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$1,783,511	TSP - 90020	Opportunity
Parkrose Connectivity Improvements	102nd and 109th, NE (Killingsworth - Sandy); Killingsworth, NE (109nd -102nd)	Supplement access route for commercial properties in Parkrose by creating a loop road connection serving truck access functions, pedestrian, and bike connections.	$10,500,000	TSP - 50001	Opportunity

Table 15 – Highway-Street Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Inner Powell Blvd Corridor Improvements	Powell Blvd, SE (Ross Island Bridge - 50th)	Retrofit existing street with multimodal safety improvements including enhanced pedestrian and bicycle crossings, pedestrian and bike activated signals, median islands with trees, redesign of selected intersections and stormwater management facilities. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$9,000,000	TSP - 70045	Opportunity
MLK Jr Blvd Freight Improvements	MLK Jr, NE (Columbia - Lombard)	"Expand roadway to provide better connection between streets for improved freight movement in and through the area and safety improvement (turning movements) for other road users."	$12,605,000	TSP - 40059	Opportunity
Southern Triangle Access Improvements	Powell Blvd, SE (8th - 17th)	Improve traffic access to the Southern Triangle district from eastbound Powell Blvd.	$4,000,000	TSP - 20050	Opportunity
SE Yamhill / Taylor Couplet	Yamhill / Taylor, SE (Water - Grand)	Improve traffic safety and capacity by converting Yamhill and Taylor to couplet operation between Water and Grand Ave, including new traffic signals at Yamhill / MLK, Yamhill / Grand, and Taylor / Water. The potential new signals will be evaluated to determine appropriate operation. As part of the project, reconfigure the ramp from Belmont viaduct to MLK.	$5,000,000	TSP - 20184	Opportunity

Table 15 – Highway-Street Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
11th/Columbia/ Lombard Freight District Street Improvements	NE Baldwin St (10th - 11th) NE Russet St (11th - 13th) NE 13th Ave (Columbia Blvd - Lombard Pl	Make needed street improvements (pavement, curbs, stormwater, ped and bike facilities) on Freight District Streets in the 11th/Columbia/Lombard area. Sidewalks will be contingent on right-of-way dedication. Potentially combine with 11th Avenue Multimodal Improvements project.	$5,000,000	New - HS6	Opportunity
North Columbia Blvd Freight District Street Improvements	N Borthwick Ave (Columbia - Halleck) N Kerby Ave (Columbia - Halleck) N Halleck St (Albina - Congress)	Make needed street improvements (pavement, curbs, sidewalks, stormwater, ped and bike facilities) on Freight District Streets surrounding N Columbia Blvd.	$5,000,000	New - HS7	Opportunity
"Yamhill & Water Traffic Improvements"	Yamhill / Water, SE	Install signal at the SE Yamhill St / SE Water Ave intersection with turn lane and queue detection treatments on the I-5 NB Exit Ramp to reduce queue length and/or provide advanced warning sign of queue on the exit ramp.	$2,000,000	TSP - 20187	Opportunity
Central Eastside Access and Circulation Enhancement Project	Central Eastside	Improve access and circulation in the Central Eastside by adding new signals and crossings at Salmon & Grand, Salmon & MLK, Washington & Grand, Ankeny & Sandy, and 16th & Irving.	$5,500,000	TSP - 20205	Opportunity

Table 15 – Highway-Street Project Prioritization (PBOT Lead)

Project Name	Location	Description	Estimated Cost	Project ID	Priority
Lombard & I-5 Interchange Redesign	N Lombard St at I-5	Redesign freeway interchange to allow for sidewalk to be added to north side of bridge over I-5 and for ramps to be signalized. Analyze feasibility of removing cloverleaf ramps.	$5,000,000	New - HS2	Opportunity
Lombard & I-205 Interchange Safety Improvements	Lombard/ Sandy/I-205 Interchange	Redesign northbound I-205 to westbound Lombard off-ramp to improve safety for westbound bike lane. Redesign I-205 Path connection through the interchange.	$5,000,000	New - HS3	Opportunity

STREET/HIGHWAY PROJECT SUBTOTALS

High	Medium	Opportunity
$78,000,000	**$219,481,860**	**$70,388,511**

QUICK BUILD PROJECTS

To complement the major capital projects list above, the 2040Freight Plan acknowledges that some infrastructure needs may be addressed through small-scale capital projects that will improve freight efficiency, safety, and access. The following seven quick build treatment categories have been defined to address freight needs, including some specific project examples and locations.

A. **Wayfinding signage:** Replace and install outdated and new directional signage in industrial districts in order to improve route decision and reduce undesirable movements. Focus areas may include the Columbia Corridor, Swan Island, NW Industrial District, and the Central Eastside Industrial District (CEID).

B. **Commercial and emergency load/unload infrastructure:** Identify access and design improvements to meet parking and loading/unloading operational needs for large and small freight vehicles and emergency vehicles. These may include reallocation of parking/loading zones, curb extensions, signage and/or striping for additional on-street loading zones in commercial and industrial districts.

C. **Geometric improvements:** Upgrade roadway geometry to support freight movement and safety in industrial areas or along freight corridors. Focus areas may include Brooklyn Yard, CEID, and the Columbia Corridor. Treatments may include:

    a. Truck-only or 'bus and freight' lanes on corridors with high freight volume.
    b. Adding left-turn lanes.
    c. Turning radius improvements.
    d. Mode separation improvements.
    e. Other design solutions.

D. **Vision clearance:** Improve visibility for all travelers by setting on-street vehicle parking away from intersections. Focus areas may include the Central Eastside and Brooklyn Yard areas.

E. **ITS:** Address safety, efficiency, and access needs through ITS applications such as dynamic message signs, and signal priority and detection sensors for both circulation and loading/unloading operations.

F. **Last-mile solutions:** Identify improvements of last-mile deliveries in the commercial districts. This category may include freight consolidation strategies, as well as providing infrastructure and equipment that encourage the adoption of smaller and zero-emission vehicles.

G. **Other Safety Improvements:** Implement quick build projects such as mountable curbs, stop bar realignment, sidewalk improvements, improved pedestrian crossing and speed reduction equipment. Focus areas may include Martin Luther King, Jr. Boulevard, the Central City, the CEID, the Columbia Corridor, Marine Drive, NE/SE 82nd Street, and the Rivergate District.

LOCAL IMPROVEMENT DISTRICT (LID) PROJECTS

Portland's 2035 Comprehensive Plan (Comp Plan) identified a 320-acre shortfall of industrial land supply to meet the forecasted employment growth.[84] Given the City's urban growth boundary, meeting this shortfall of land is predicated on maximizing the utility of existing industrial lands and significant brownfield redevelopment. While there are considerable hurdles to widespread brownfield redevelopment, improving the public right of way infrastructure is a method to support unlocking industrial development and the associated living wage jobs. Doing so would support the 2040Freight goal of Economic Vitality and the City's emission reduction goals by preventing that industrial land being developed farther away from the city in areas not well served by transit, resulting in longer commute times for Portland's underserved populations most served by these living wage jobs.

Roughly 15% of paved streets without curbs in freight districts lack adequate functionality, such as poor pavement conditions, hindering industrial land utilization. There is also a small share freight district streets that are unpaved (2.1%), which are a huge barrier to development and access for freight and employees. Additionally, based on the PFINA analysis ("Priority Freight Infrastructure Needs Assessment" on page 95), about 30% of paved streets inside freight districts are considered to be in poor pavement condition or worse. Street improvements are essential to 1) provide/improve access to properties, 2) shape property development, and 3) safely accommodate the necessary freight movement and the pedestrian or bicycle movement for workers in the area.

PBOT Local Improvement District (LID) Program allows a group of property owners to share the cost of infrastructure improvements. LIDs are used most often to improve unpaved streets and to reconstruct paved streets not built current City engineering standards. LIDs have also been successfully used to provide sanitary sewer, traffic signals, and utility undergrounding improvements in conjunction with street improvements for economies of scale to provide comprehensive and complete infrastructure solutions to neighborhoods. If an LID is formed, the City manages the design and construction of the project, and property owners only pay once the work is complete. Streets can also be improved under a permit job; in which case the project is privately managed and financed up front by property owners.

While reconstructing pavement has always been expensive, it provides an opportunity to add additional street improvements, such as sidewalks and stormwater management assets. Virtually all these projects include infrastructure improvements of assets outside of PBOT's domain, like stormwater management assets which are managed by the Bureau of Environmental Services. Thus, effective coordination and funding partnerships with other City bureaus is key for project success..

PBOT has identified 23 clusters of streets inside freight districts that could be candidates for the LID program based on property owners' inquiries to the City, existing pavement conditions, and the potential for cross-bureau coordination.. These clusters represent challenging areas to design, finance, and construct infrastructure —which may require different approach to the traditional scope of full reconstruction —and property owners who are willing to financially support investments to the public right-of-way. Pooling resources among Bureaus and with property owners financially participating in an LID allows the City to build better infrastructure, fill critical system gaps to support the industrial development, improve neighborhood livability, and reduce the City's infrastructure backlog.

The LID program focuses on local streets that are often not on the regional freight network and not

prioritized for limited capital funding, so it depends on outside funding support. Therefore, we have defined the following criteria to evaluate the relative importance of freight-related LID projects to advance.

PROPOSED PROJECT EVALUATION CRITERIA:

PROJECT AREA CONTEXT
A. Project located in an freight district

+

FINANCIAL CONTEXT
A. Willingness of the property owner to participate in a public-private partnership
B. Potential for cross bureau collaboration

+

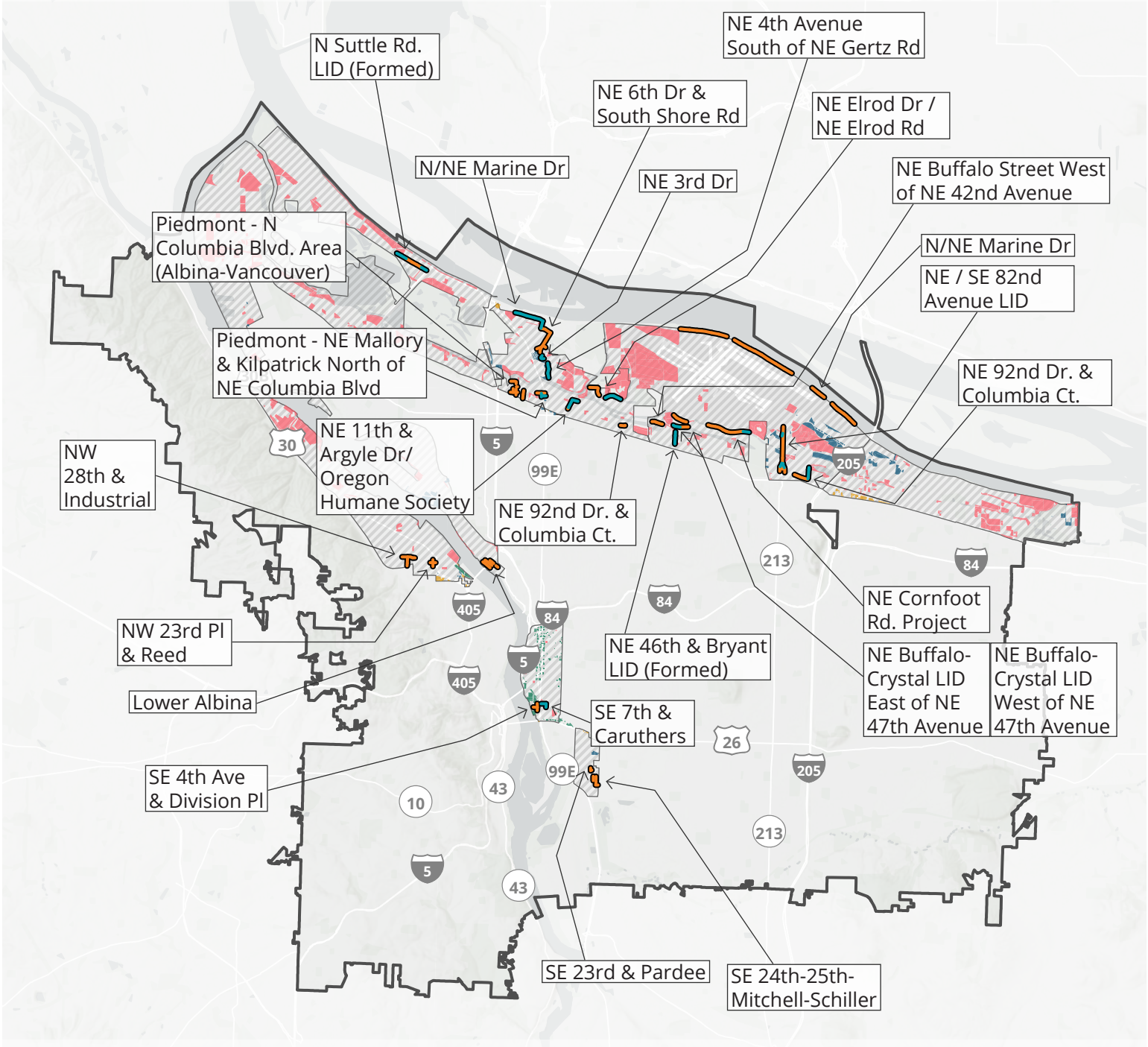
PROJECT OUTCOMES
A. Address multi-modal operational needs,
B. Accomplish stormwater, water main and/or sanity sewer replacement improvements,
C. Achieve two or more of the following objectives aligned with 2040Freight goals:
   a. Enhance streets with poor or very poor pavement condition index (PCI) - [System Condition]
   b. Comply and/or enhance safety needs for both freight and other road users [Safety]
   c. Improve freight vehicle access to key freight origins and destinations [Access]
   d. Support unlocking one or several industrial underdeveloped tax lots [Economic development]
   e. Address environmental concerns in the area [Environment]
   f. Support underserved population working in or living close to industrial areas [Equity]

Table 16 – LID Project Cluster Examples

Project/Cluster Area	Description	Pavement Quality	Freight District Overlap	Within 50' of an Underdeveloped Land Parcel	Freight Designation	CIP Coordination Opportunities
Lower Albina	Full reconstruction; frequent area of complaints; previous N Loring St. LID tabled; includes Materials Testing Lab	Very Poor	Yes	No	Freight District Street	Yes
N Suttle Rd. LID (Formed)	Full reconstruction; add stormwater, new sidewalk	Very Poor	Yes	Yes	Freight District Street	
N/NE Marine Dr	Safety improvements; LID could build curb and sidewalk	Fair	Yes	Yes	Local Service Truck Street	
NE / SE 82nd Avenue LID	Opportunity to provide ped / bike connection from NE Columbia Blvd. to Portland Airport; will be part of NE / SE 82nd Avenue LID analysis.	Poor	Yes	Yes	Freight District Street	
NE 11th & Argyle Dr/ Oregon Humane Society	Full reconstruction of NE Argyle Dr. with ped connection on NE 11th Ave. to access trail to north	Very Poor	Yes	Yes	Freight District Street	
NE 3rd Dr	Unlock land for development in area zoned for General Employment; area of frequent complaints	Very Poor	Yes	Yes	Freight District Street	
NE 46th & Bryant LID (Formed)	Full reconstruction of local streets; new NE Bryant Street connection; new NE 42nd & Columbia traffic signal to support new TriMet bus base	Very Poor	Yes	Yes	Freight District Street	
NE 4th Avenue South of NE Gertz Rd	1,362 centerline feet of mostly unpaved street with vacant lots and nonconforming residential in Mixed Employment zone	Very Poor	Yes	Yes	Freight District Street	
NE 6th Dr & South Shore Rd	TBD: important connection from N Vancouver Way to N Marine Dr	Poor	Yes	Yes	Local Service Truck Street	Yes

Table 16 – LID Project Cluster Examples

Project/Cluster Area	Description	Pavement Quality	Freight District Overlap	Within 50' of an Underdeveloped Land Parcel	Freight Designation	CIP Coordination Opportunities
NE 92nd Dr. & Columbia Ct.	Missing ped/bike gap with NE 92nd Dr. ped/bike bridge to north built by previous LID connecting to Cascade Station	Poor	Yes	Yes	Freight District Street	
NE Buffalo-Crystal LID East of NE 47th Avenue	Full reconstruction; stormwater issues near Columbia Slough; frequent area of complaints; key challenge is narrow right-of-way width	Very Poor	Yes	No	Freight District Street	
NE Buffalo-Crystal LID West of NE 47th Avenue	Full reconstruction; unlock land for industrial development; sanitary sewer extended to area by completed NE 47th Avenue Phase I LID	Very Poor	Yes	Yes	Freight District Street	
NE Buffalo Street West of NE 42nd Avenue	This could be a model similar to the NE 27th & Holland LID and street vacation, in which the Port consolidates taxlots, the west portion of NE Buffalo St. is vacated, with the east portion of NE Buffalo St. fully reconstructed.	Very Poor	Yes	No	Freight District Street	
NE Cornfoot Rd. Project	Pavement repair already budgeted/funded without LID; add ped and bike facilities	Very Poor	Yes	Yes	Priority Truck Street	
NE Elrod Dr / NE Elrod Rd	TBD; intermittent mix of existing paved with curb and paved without curb; Oregon Food Bank + other businesses	Very Poor	Yes	Yes	Freight District Street	
NW 23rd Pl & Reed	Area functions as off-ramp from US 30 connecting to NW Industrial area routing awkward as NW 23rd Pl. has loading docks in the public right-of-way	Very Poor	Yes	No	Freight District Street	
NW 28th & Industrial	Missing curb and sidewalk gaps between NW Industrial St. and NW 31st Ave. near the soon-to-be redeveloped Esco site	Poor	Yes	No	Freight District Street	
Piedmont - N Columbia Blvd. Area (Albina-Vancouver)	Full reconstruction; area flagged by Development Review as logical area LID	Very Poor	Yes	No	Freight District Street	Yes
Piedmont - NE Mallory & Kilpatrick North of NE Columbia Blvd	Full reconstruction; frequent area of complaints, but narrow right-of-way width	Very Poor	Yes	Yes	Freight District Street	Yes
SE 23rd & Pardee	Frequent area of complaints; opportunity for a medium scale LID to pave unpaved streets and reconstruct paved streets without curbs in poor condition	Very Poor	Yes	No	Freight District Street	
SE 24th-25th-Mitchell-Schiller	Frequent area of complaints; opportunity for a large scale LID to pave unpaved streets and reconstruct paved streets without curbs in poor condition	Very Poor	Yes	No	Freight District Street	
SE 4th Ave & Division Pl	Frequent area of complaints; opportunity for a large scale LID to reconstruct paved streets without curbs in poor condition	Poor	Yes	No	Priority Truck Street	
SE 7th & Caruthers	Frequent area of complaints; opportunity for a large scale LID to pave unpaved streets	Very Poor	Yes	Yes	Local Service Truck Street	



Potential LID Projects

- Project Within 50' of an Underdeveloped Land Parcel
- Project NOT Within 50' of an Underdeveloped Land Parcel

Underdeveloped Lands General Zone in Freight Districts

- Central Employment
- Commercial
- General Employment
- Industrial

Freight District

0 1.25 2.5 5 Miles

N

TSP CLASSIFICATION CHANGES

Street network classifications are a standard tool to support the planning, management, and integration of land uses and transportation systems. They are a critical component in helping achieve the City's multiple transportation goals. There are seven classification categories: Traffic, Transit, Pedestrian, Bicycle, Freight, Emergency Response, and Street Design. Portland's Transportation System Plan incorporates these classifications as policy and regularly updates them as part of modal plan updates.

The 2006 Freight Master Plan mapped the Freight Network, which comprises freeways, regional and local streets, rail lines, and freight facilities including marine terminals, intermodal rail yards, airports, and pipeline terminals. Comprehensive Plan Policy 6.9 describes each of the freight system classifications in the hierarchy which correspond to land use activities.

Additionally, the classification system also helps guide professionals in a "design for" and an "accommodate" approach as defined in The City of Portland Freight Design Guide. The "design for" approach should be applied to streets within industrial areas as well as those that provide direct connections between industrial areas and the regional freeway system in order to fully accommodate truck movements without impeding their mobility. Freight Network Street designations that follow a "design for" approach include Regional Truckways, Priority Truck Streets, Major Truck Streets, and Freight District Streets. In the case of Major Truck Streets, the "design for" approach must be balanced with other street design considerations when the streets are also designated as City Walkways or located in Pedestrian Districts; in other words, when there isn't enough room to fully accommodate all modes. The "accommodate" approach should be applied to Truck Access Streets which include two considerations:

A. In mixed-use areas, lane widths and corner radii may be narrowed to compel trucks to travel more slowly in order to provide a streetscape that supports significant pedestrian travel.

B. In residential areas, all vehicle travel is limited to slower speeds, and streets in these areas are intended for just local truck deliveries. Accommodating truck travel in these and other environments requires careful design practices that balance the needs of all users of the street.

Learn More:

Click this box to explore Portland's TSP

When a street is designated as part of the freight network or its designation is changed, that doesn't necessarily mean its overall function, design, or character will change. Instead, the purpose of designating a freight network is to:

- Help guide freight-related traffic management, roadway design, and maintenance requirements based on the nature of the freight flow on the roadway segment and the function it fulfills.
- Underscore the importance of ensuring operations and a street design that can accommodate freight flows safely, efficiently, and sustainably.
- Inform direct freight and safety improvements and investment.
- Ensure freight projects can compete effectively for project development and construction funding.

Therefore, if a key freight corridor/street is not designated, it is challenging to leverage or prioritize the infrastructure investments needed

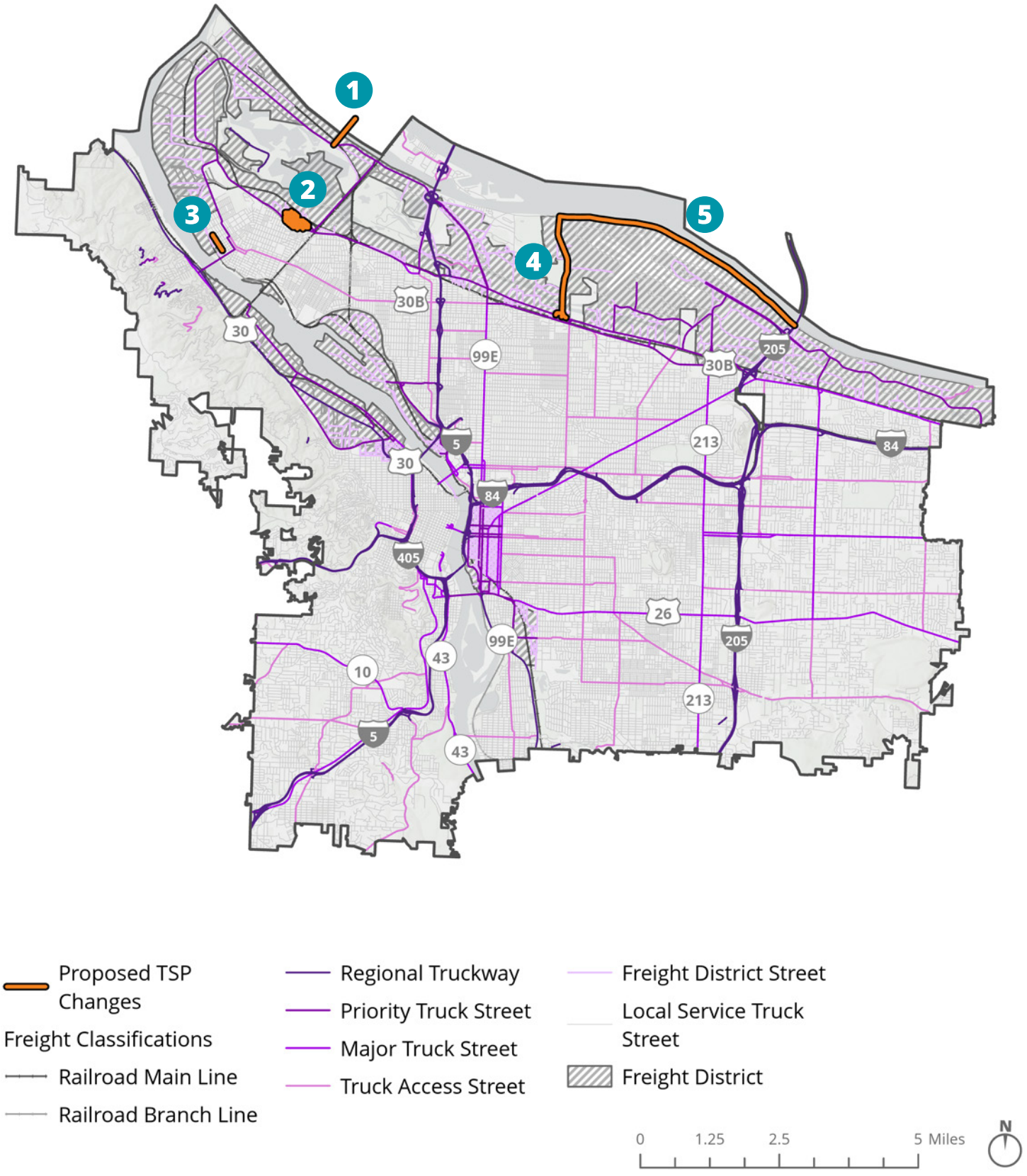
to accommodate the movement of goods and services safely, efficiently, reliably, and sustainably into the future.

As part of 2040Freight, an evaluation of potential changes to the TSP freight classification system based on land use, truck volume, safety, industrial access, other modes classification systems and other considerations was conducted. After this evaluation and engagement of the three 2040Freight advisory committee and community engagement, five freight classification changes were identified as part of this proposed plan ("Table 17 – Proposed TSP Freight Classification Changes" on page 86).

Table 17 – Proposed TSP Freight Classification Changes

ID	Name	Current Designation	Type of Recommendation
1	N Hayden Island Dr.	Priority Truck Street	Update based on latest plans for Hayden Island land use.
2	Residential Area around South Barnes Yard	Freight District	Mapping error. The Comprehensive Plan defines this area as Single-Family Dwelling.
3	Cathedral Park – N Decatur St	Freight District Street	The North Portland Greenway Trail Alignment Plan approved by City Council in October 2013 (Res. No. 37040) identified the need to 'remove the freight designation' on N Decatur Street. More recently, a non-profit organization contacted PBOT with interest in improving the North Portland (NP) Greenway Trail alignment that includes a segment of N Decatur St.
4	NE 33rd Dr. - Between NE Marine Dr. And NE Columbia Blvd.	Freight District Street	This change aims to: a. Recognize the importance of this street for freight movement flow in/ out of key origins/destinations within the Freight District. b. Support efforts to unlock the industrial land development potential.
5	NE Marine Dr. West of 33rd Dr. And East of I-205	Local Service Truck Street	Slightly shift the boundary of the Freight District north to include the roadway on this section of NE Marine Dr. This boundary will not impact the current designation of the Multi Use Path parallel to Marine Drive.

Map 8 – Current TSP Freight Classifications



Map 9 – Proposed TSP Freight Classification Changes: N Hayden Island Dr.

Proposed TSP Street Changes
Existing Freight Districts
Proposed Freight Districts

Existing TSP Freight Classification
Priority Truck Street
Freight District Street

0 0.05 0.1 0.2 Miles

N

Map 10 – Proposed TSP Freight Classification Changes: Residential Area around South Barnes Yard

Proposed TSP Street Changes

Proposed TSP Freight District Changes

Existing Freight Districts

Proposed Freight Districts

Existing TSP Freight Classification

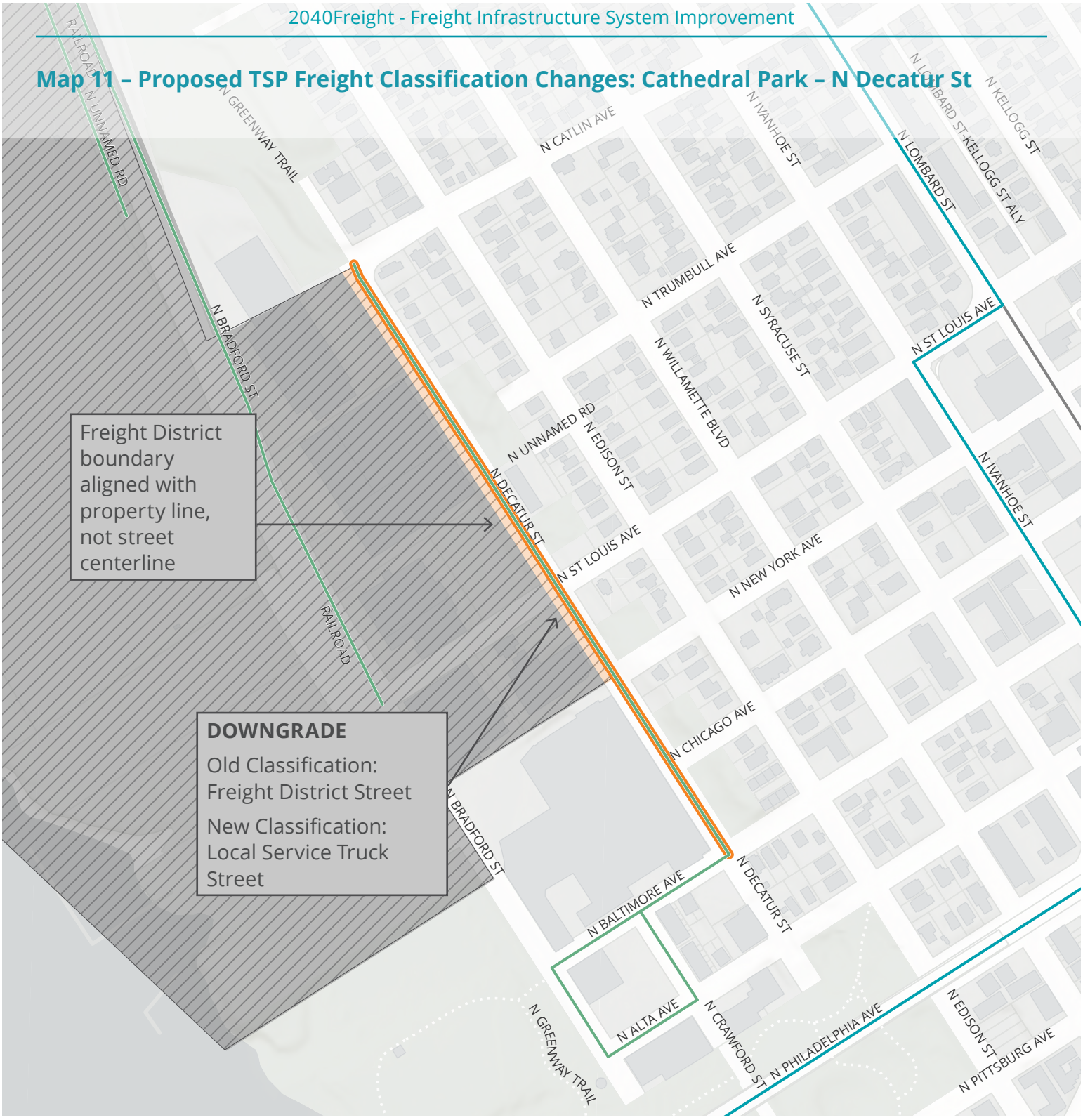
Priority Truck Street

Freight District Street

0 0.05 0.1 0.2 Miles

N

Map 11 – Proposed TSP Freight Classification Changes: Cathedral Park – N Decatur St



Proposed TSP Street Changes

Proposed TSP Freight District Changes

Existing Freight Districts

Proposed Freight Districts

Existing TSP Freight Classification

Priority Truck Street

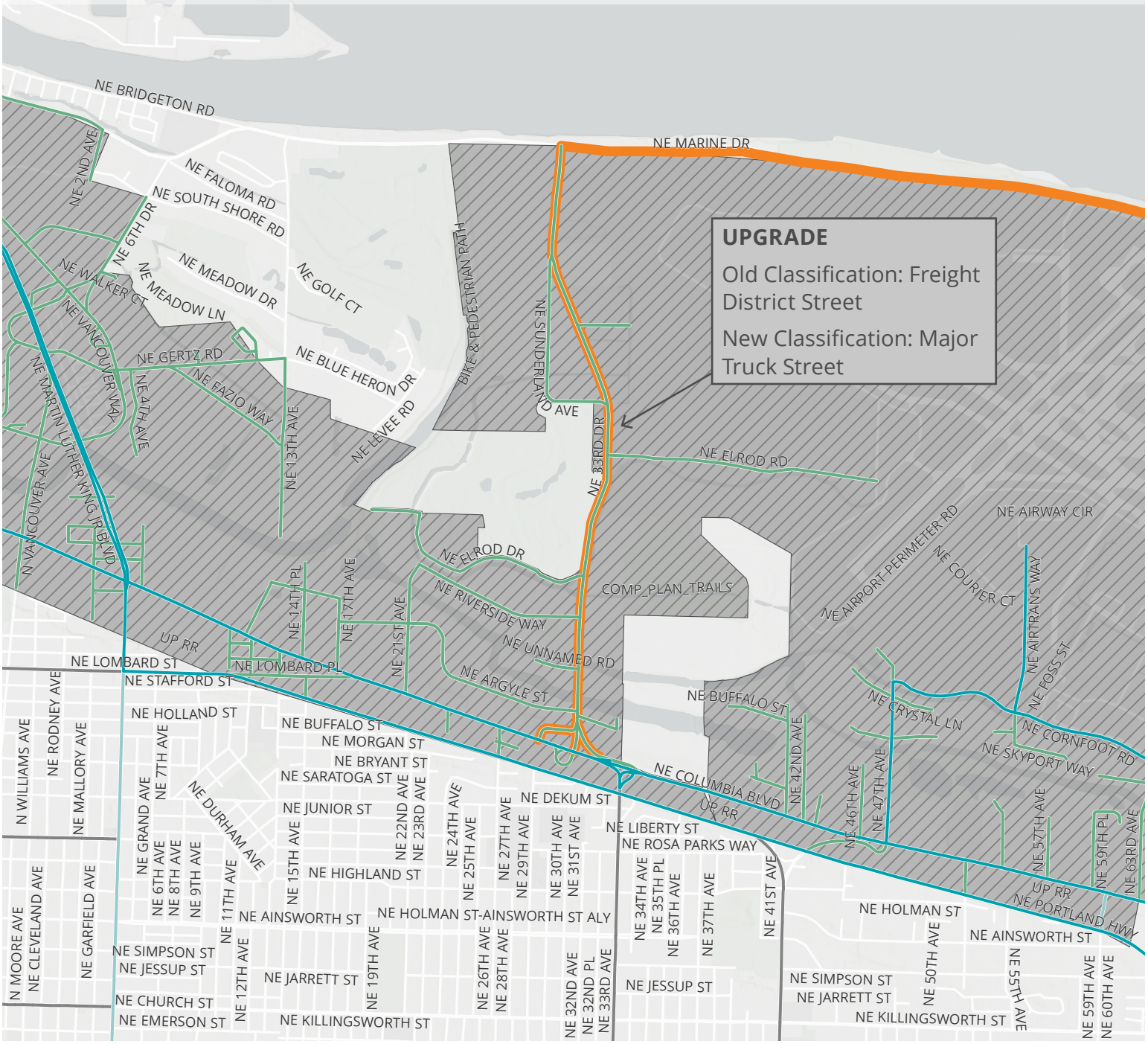
Freight District Street

Truck Access Street

0 0.03 0.07 0.13 Miles

N

Map 12 – Proposed TSP Freight Classification Changes: NE 33rd Dr. - Between NE Marine Dr. And NE Columbia Blvd.



Proposed TSP Street Changes

Existing Freight Districts

Proposed Freight Districts

Existing TSP Freight Classification

Priority Truck Street

Major Truck Street

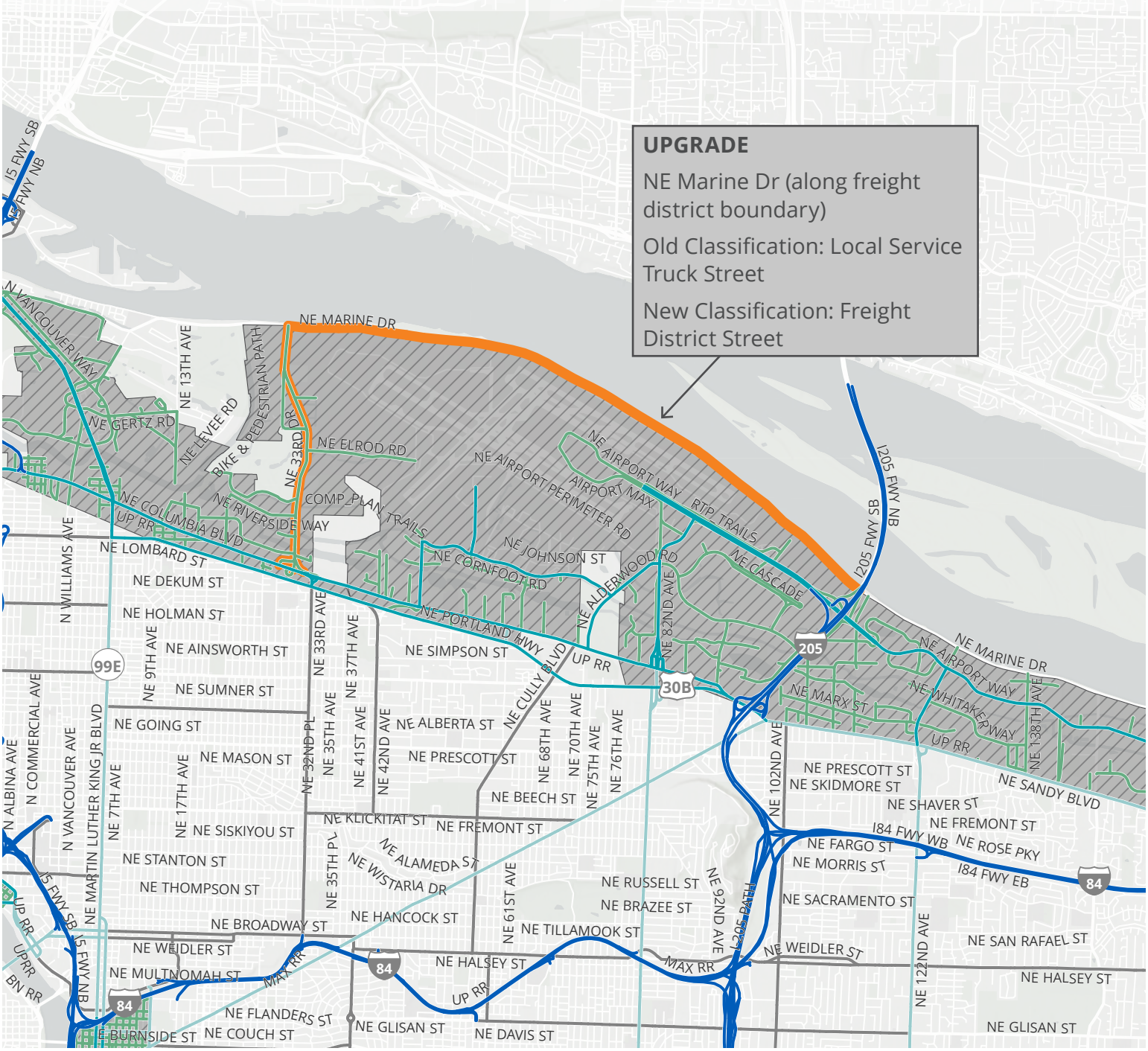
Freight District Street

Truck Access Street

0 0.23 0.45 0.9 Miles

N

Map 13 – Proposed TSP Freight Classification Changes: NE Marine Dr. West of 33rd Dr. And East of I-205



Proposed TSP Street Changes

Existing Freight Districts

Proposed Freight Districts

Existing TSP Freight Classification

- Regional Truckway
- Priority Truck Street
- Major Truck Street
- Freight District Street
- Truck Access Street

0 0.5 1 2 Miles

N

CH. 6: PRIORITIZING FREIGHT-RELATED NEEDS

PRIORITY FREIGHT INFRASTRUCTURE NEEDS ASSESSMENT

The Priority Freight Infrastructure Needs Assessment (PFINA, pronounced "fee-nah") is a data-driven tool that supports dynamic project development over time with integrated consideration of city policy, community, and industry concerns. The PFINA will help identify and prioritize improvements for safety, mobility, access, and maintenance needs on the primary urban routes that move the most goods. This tool reflects freight network needs without being overly prescriptive regarding solutions. Additionally, the identified metrics can be used collectively or in isolation to help match potential projects with funding opportunities.

During the development of 2040Freight this tool helped identify gaps where no projects are planned and evaluate our current infrastructure system. During implementation, this tool will help guide resource allocation and decision making for improvements. Improvements could require infrastructure projects or non-infrastructure solutions, including ITS, demand-management tools, and others. The results of the PFINA will be available as a map application for City agencies to help support project and policy development in areas with high freight-related needs where no projects or city strategies exist. This tool also will help support some of the 2040Freight actions listed in "From Vision to Action" on page 37.

DEVELOPING THE NETWORK

The first step in developing the PFINA was to identify the core network supporting urban freight movement. The network corridors were classified in two categories:

A. **Flow:** supporting through movement of goods and services; and

B. **Access:** providing access and circulation for industrial and commercial pick-up/delivery operations.

Priority Truck Street, Major Truck Streets & Regional Truckway fulfill the flow role; Truck Access Street & Freight District Street, the access & circulation role.

The assessed network includes state and federal routes (that are not limited access interstate highways) and ramps connecting interstate highways to the local street grid. The network also includes corridors identified in the National Highway Freight Network and the Oregon Freight Intermodal Connector System Study (OFICS).

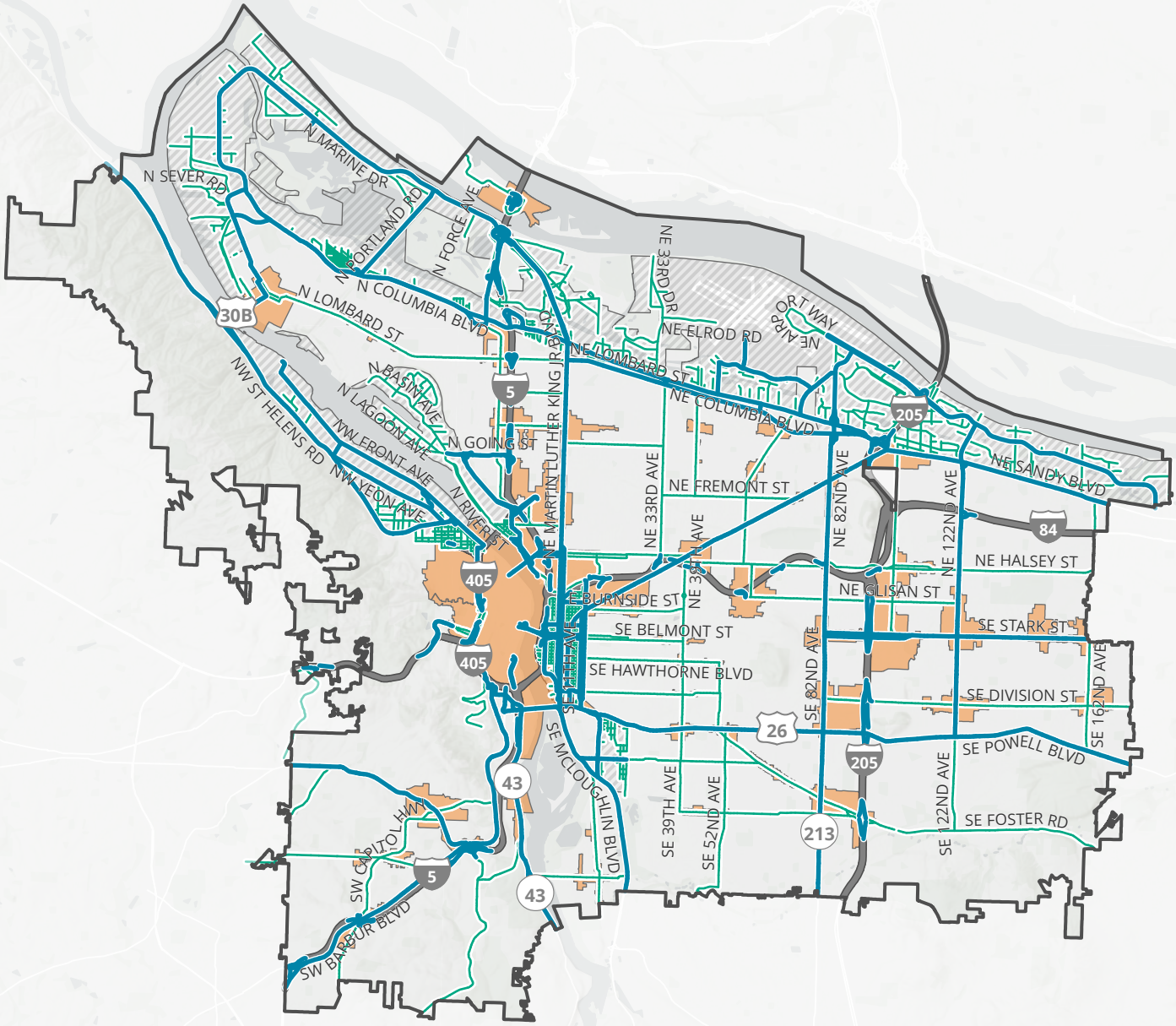
PRIORITIZATION METHODOLOGY

The tool uses Geographic Information Systems (GIS) to evaluate how each segment of the network meets different indicator measures. The measures and methodology were defined by data availability, coverage, and in consultation with the Technical Advisory Committee and Community Advisory Committee.

The prioritization model evaluates the needs of four goals (Safety, System Condition, Access, and Efficiency), with the remaining goals (Economic Vitality & Employment, Environment, Equity, and Partnership & Knowledge) being assessed at the project development stage. The economic vitality goal is captured within the efficiency and access scoring through average daily truck volume and average growth in daily truck volume.

Each measure applies a calibrated scoring scheme based on the spatial relationship of the network segment to the measure being used to assess need. "Figure 9 – Metrics Used to Measure and Assess Identified Needs" on page 97 illustrates how the data inputs can be used to measure adherence with the goal. The next section looks at the scoring methodology and outputs from each goal.

Map 14 – PFINA Network



PFINA Network

- Flow of Goods (Major Truck Streets, Priority Truck Streets, & Regional Truckways)
- Access to Goods (Truck Access Streets & Freight District Streets)
- Interstate Network
- Freight District
- Centers

0 1.25 2.5 5 Miles

N

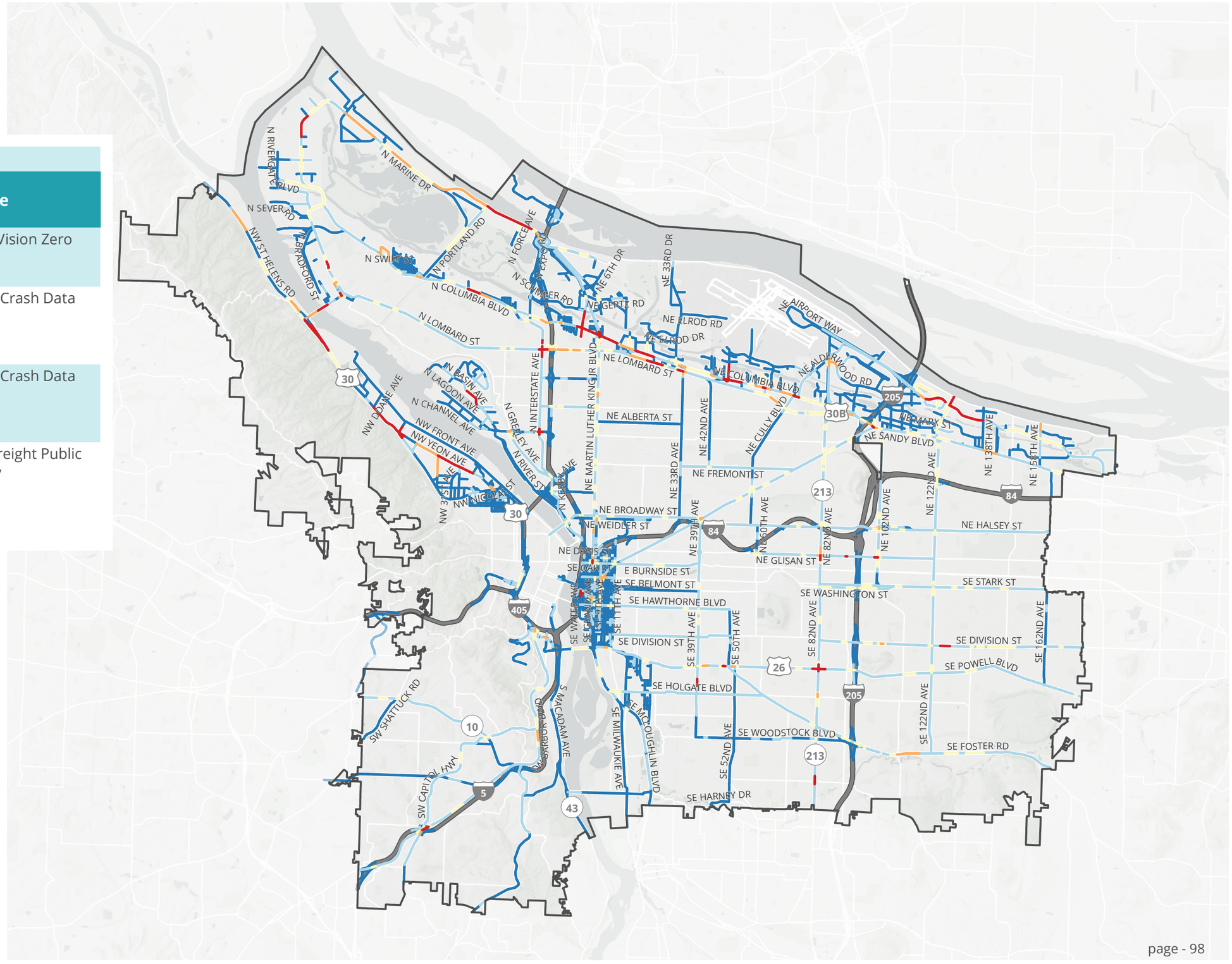
Figure 9 – Metrics Used to Measure and Assess Identified Needs

Need Measured	Data Used to Measure Need
Safety 	High Crash Corridors Non-Highway, Non-Fatal, Truck-Related Crashes Non-Highway, Fatal, Truck-Related Crashes Safety Concerns from 2040Freight Public Comments
System Condition 	Pavement Type and Quality Bridges with a Weight Restriction Regional Emergency Transportation Routes Critical Infrastructure Resiliency Analysis Scores
Access 	Access Feedback from 2040Freight Public Comments
Efficiency 	At-Grade Railroad Crossings Average Daily Truck Volume Average Growth in Daily Truck Volume Efficiency Feedback from 2040Freight Public Comments

Safety

Table 18 – PFINA Scoring: Safety

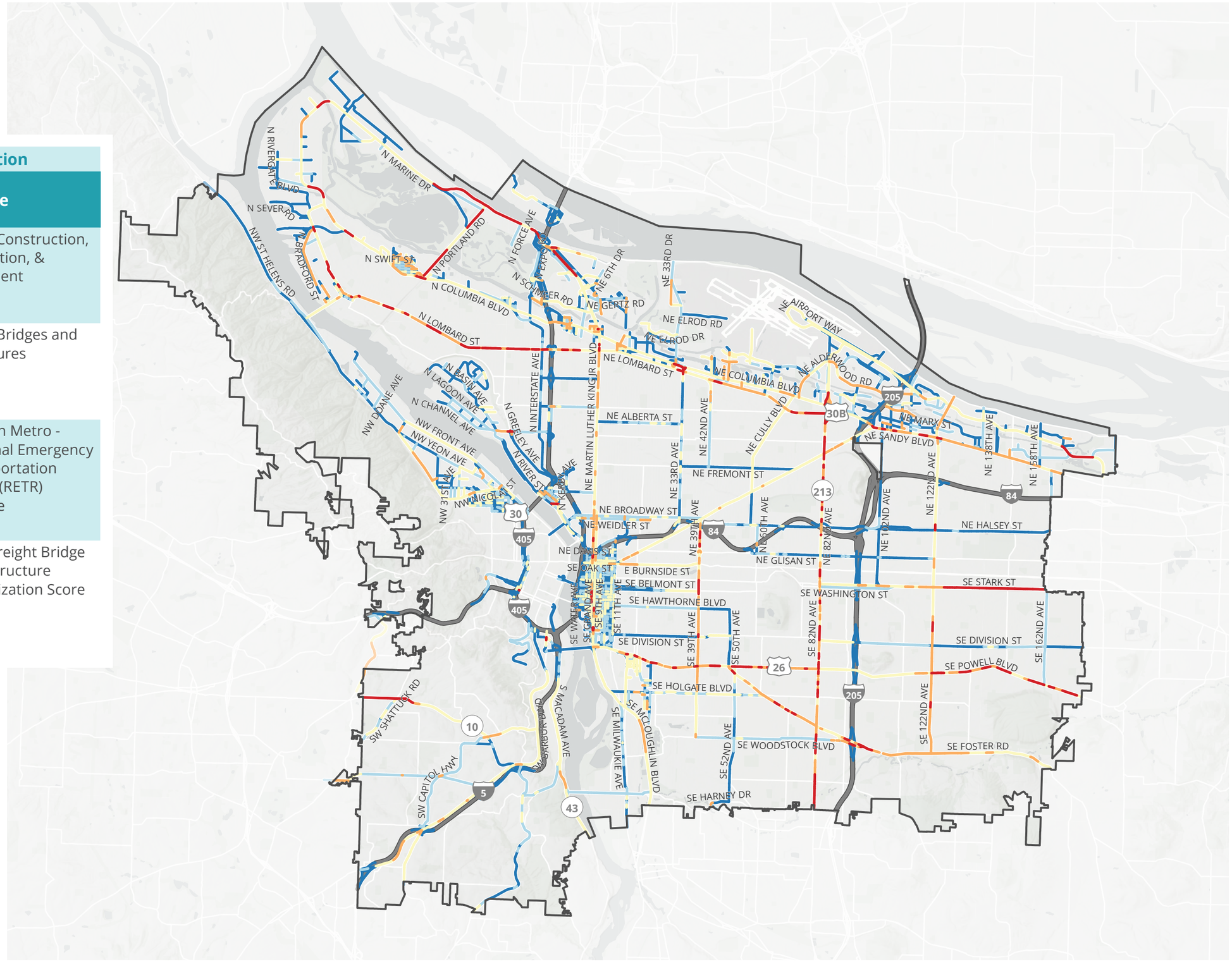
Measure	Scoring Scheme	Source
High Crash Network (HCN) Corridors	1 point if the street segment is along an HCN Corridor	PBOT Vision Zero
Non-Highway, Non-Fatal, Truck-Related Crashes	1 point for each crash of this type along the street segment	ODOT Crash Data
Non-Highway, Fatal, Truck-Related Crashes	5 points for each crash of this type along the street segment	ODOT Crash Data
Safety Concerns from 2040Freight Public Comments	1 point for each comment within 100 feet of the street segment	2040Freight Public Survey



System Condition

Table 19 – PFINA Scoring: System Condition

Measure	Scoring Scheme	Source
Pavement Type and Quality	Gravel Road = 1 PCI 41-55 = 1 PCI 26-40 = 2 PCI 0-25 = 3	PBOT Construction, Inspection, & Pavement
Bridges with a Weight Restriction	1 point for each weight restricted bridge within 50 feet of the street segment	PBOT Bridges and Structures
Regional Emergency Transportation Routes	1 point if segment is along a RETR Alternate Route 3 points if segment is along a RETR Primary Route	Oregon Metro - Regional Emergency Transportation Route (RETR) Update
Critical Infrastructure Resiliency Analysis Scores	1 - 5 points (tiered score of the resiliency analysis) for each street segment within50 feet of a bridge	2040Freight Bridge Infrastructure Prioritization Score



PFINA Needs Tier

- 1 (High Need)
- 2
- 3 (Medium Need)
- 4
- 5 (Low Need)
- Interstate Network

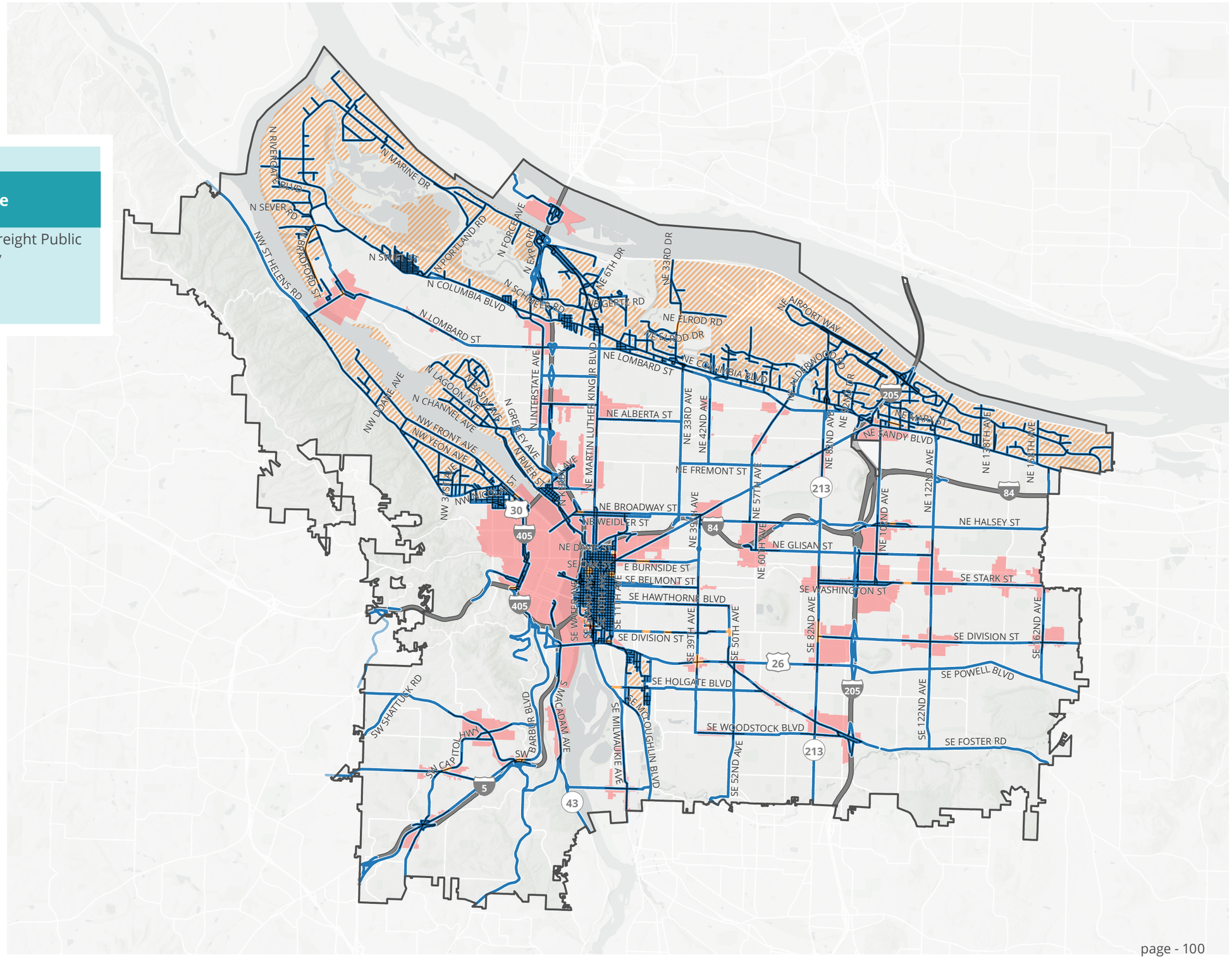
0 0.75 1.5 3 Miles

N

Access

Table 20 – PFINA Scoring: Access

Measure	Scoring Scheme	Source
Access Feedback from 2040Freight Public Comments	1 point for each comment within 100 feet of the street segment	2040Freight Public Survey



Network Segment in Access Priority Areas

PFINA Needs Tier

- 1 (High Need)
- 2
- 5 (Low Need)

Interstate Network

Freight Districts

Comprehensive Plan Centers

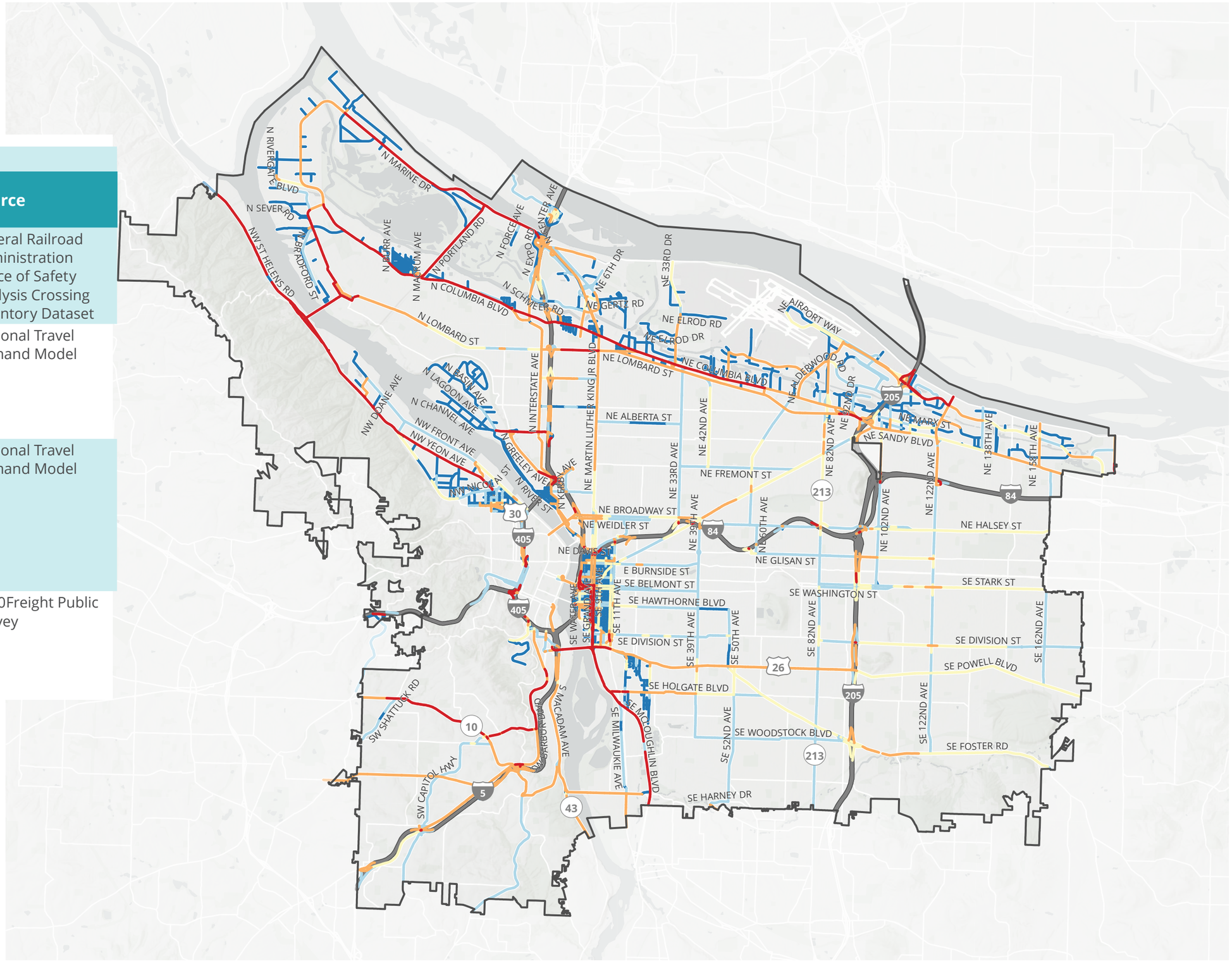
0 0.75 1.5 3 Miles

N

Efficiency

Table 21 – PFINA Scoring: Efficiency

Measure	Scoring Scheme	Source
At-Grade Railroad Crossings	1 point for each at-grade RR crossing within 75 feet of the street segment	Federal Railroad Administration Office of Safety Analysis Crossing Inventory Dataset
Average Daily Truck Volume	Quantile 1-5: 5 points (80th - 100th) 4 points (79th - 60th) 3 points (59th - 40th) 2 points (39th - 20th) 1 point (0 - 20th)	Regional Travel Demand Model
Average Growth in Daily Truck Volume	5 points (=> 2,000) 4 points (1500 - 1999) 3 points (1000 - 1499) 2 points (500 – 999) 1 point (300 – 499) 0 points (299 - 0) -1 (for decline in volume)	Regional Travel Demand Model
Efficiency Feedback from 2040Freight Public Comments	1 point for each comment within 100 feet of the street segment	2040Freight Public Survey



PFINA Needs Tier

- 1 (High Need)
- 2
- 3 (Medium Need)
- 4
- 5 (Low Need)
- Interstate Network

0 0.75 1.5 3 Miles

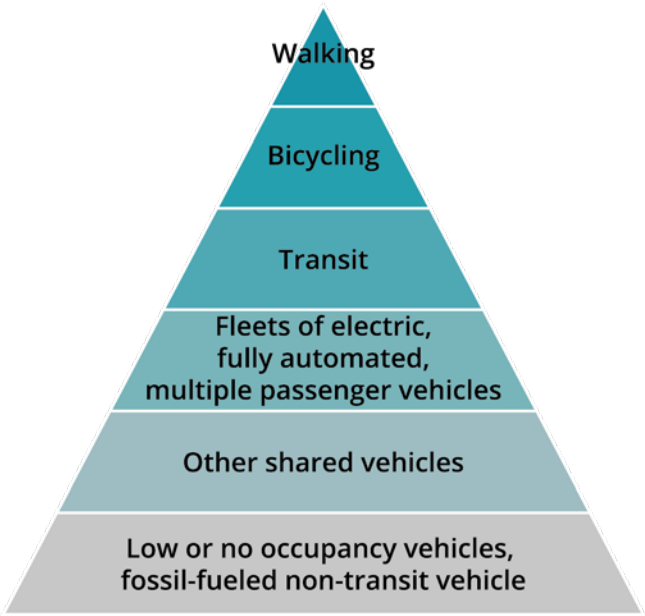
N

TRANSPORTATION STRATEGY FOR MOVING GOODS AND SERVICES

PBOT's Strategic Plan defines "Moving people and goods" as one of the three core goals to help guide the agency's future work. An emphasis on moving people and goods rather than vehicles will help address carbon emissions, congestion, safety, and other efficiency goals (such as VMT reduction). The City of Portland Comprehensive Plan acknowledges the functional differences between people movement and the needs for moving goods and delivering services. The following policies highlight how the City approaches the two:

Policy 9.6 - Transportation Strategy for People Movement: Implement a prioritization of modes for people movement by making transportation system decisions according to the following ordered list:

Figure 10 – Transportation Strategy for People Movement



Policy 9.7 - Moving Goods and Delivering Services: In tandem with people movement, maintain efficient and reliable movement of goods and services as a critical transportation system function. Prioritize freight system reliability improvements over single-occupancy vehicle mobility where there are solutions that distinctly address those different needs.

BUILDING A FRAMEWORK

The purpose of this section is to help better articulate PBOT's priority for how we move goods and services and under which circumstances while acknowledging the diversity of freight modes. The following four factors are important to help articulate and inform a framework for the City's approach to planning for movement of goods and services:

1. FREIGHT IS NOT A MODE. IT IS A MULTIMODAL SYSTEM.

Some interpretations of Portland's Transportation Strategy for People Movement have incorrectly included "freight" in the pyramid, even though the policy does not include freight. Freight is not a mode—it's a system that supports the flow of goods and services.

Goods and services move by many different means, depending on the type of good, the distance it needs to go, its value, handling requirements, fragility, destination, time window for service, and load volume. It relies on a network made up of links (streets, pipelines, waterways) that provide connectivity to key nodes or freight facilities including intermodal terminals, industrial districts, commercial districts, employment centers, and neighborhoods. Often, goods move by several different modes of transportation

before they reach a destination, including pipelines, trucks, airplanes, rail, trucks, vans, and cargo bikes.

The City of Portland Comprehensive Plan policies acknowledge and support this multi-modal system:

- **Policy 9.30 Multimodal Goods Movement.** Develop, maintain, and enhance a multimodal freight transportation system for the safe, reliable, sustainable, and efficient movement of goods within and through the City.
- **Policy 9.32 Multimodal System and Hub.** Maintain Portland's role as a multimodal hub for global and regional movement of goods. Enhance Portland's network of multimodal freight corridors.

2. THE FREIGHT SYSTEM IS HETEROGENEOUS

Although passenger and freight transport share much of the same infrastructure in urban areas, they are two distinct systems with different travel patterns, transportation modes, and infrastructure operational requirements. Not every good or service can move by the same modes or vehicle types, and each has their own specific logistics and operational patterns.

In a city, freight demand is related to a diverse set of activities including restaurants, retail, manufacture, waste removal, construction, residential deliveries, healthcare, employment, and education. Origins and destinations, delivery routes characteristics, vehicle type, load volumes, and commodity types will vary significantly by activity and operation scale. For example, construction cranes need to be moved on oversize load trucks capable of bearing their weight, length, and height, while some foods require refrigeration and special handling. Between distribution to and from freight hubs and manufacturing facilities, home deliveries, transfers of goods from one mode to another, and back haul trips — there is a lot of complexity to how goods move.

3. FLOW AND ACCESS ARE KEY NETWORK ROLES

The urban freight network fulfills both flow (i.e., mobility) and access roles by providing connection and access to key origins and destinations. On one hand, the flow role relates to the ability to support an efficient, reliable, and safe movement of goods and services. On the other hand, street segments inside freight districts and adjacent to commercial districts affect access to the destinations for goods and services by providing infrastructure that supports circulation, loading/unloading operations, delivery/pick up, and other delivery activities. Both roles are addressed in the following policies:

- **Policy 6.30 Truck Mobility.** Develop, manage, and maintain a safe, efficient, and reliable freight street network to serve Freight Districts, commercial areas, and neighborhoods.
- **Policy 6.30—Objective C.** Encourage through truck traffic to use Regional Truckways, Priority Truck Streets, and Major Truck Streets for mobility and Truck Access Streets and Local Service Truck Streets to access and local destinations.
- **Policy 6.42.** Improve truck access to and from intermodal freight facilities, industrial and commercial districts, and the regional freight system.

In particular, Truck Access Streets and Local Service Streets should serve as both access and circulation routes for delivering goods and services to neighborhood-serving commercial and employment land uses while minimizing conflicts with residential land uses and vulnerable road users. Non-local truck trips are discouraged from using Truck Access Streets.

4. REGIONAL VS LOCAL OPERATIONS

In an urban environment, urban freight can be classified into two distinct operations:

A. **Production and Regional Distribution:**

Freight movement for production and regional distribution moves by a combination of modes—truck, rail, air, pipeline, and marine vessel. Origins and destinations within city limits are primarily located in Portland's industrial sanctuaries or major trade gateways (airport, marine ports, and rail yards). A set of key facilities support the production, storage, replenishment, packing, sorting, and distribution at the regional scale including intermodal terminal, factories, regional warehouses, and distribution centers.

Terminal haulage, construction and waste management, and efficient and reliable access to terminal facilities and the regional/interstate freight network are paramount for these operations. Intermodal operations, heavy freight loads, and large-scale heavy and medium truck activity characterize industrial-serving freight movement.

B. **Last-Mile Deliveries:**

This movement is related to the last leg of the supply chain that meets the needs of the commercial, employment, and residential land uses in the city. It relies largely on arterials and local streets for flow and circulation; and load/unload infrastructure (off and on-street) and for access. Key facilities supporting these operations include urban distribution and e-fulfillment centers, as well as the infrastructure that the end costumer uses to receive the goods (e.g., lobby, lockers, mail room). It includes a diverse group of consumer–related activities, which includes but is not limited to retailing, medical supplies, parcels, food, and beverage. Additionally, reverse logistics is an important segment of these operations in the form of the collection of waste, recycling, and returns. City deliveries/pick-ups are typically subject to smaller volumes with time sensitive deliveries necessary to replenish a recurring demand as urban stores that tend to have low inventories and limited storage.[85]

Medium and light trucks, vans, cargo bikes, and other smaller modes comprise most of the fleet used to perform these operations. This fleet tends to spend between 60%- 80% of the route time parked, as several studies have shown.[86] This time is used by the driver to retrieve the goods for delivery, transfer them to the addressee and conduct the delivery/pick-up operation.[87]

A yellow Union Pacific freight train coming towards the camera, moving away from a rural town and mountains.

PRIORITIZATION FRAMEWORK

Seven objectives built on freight-related policies in Portland's 2035 Comprehensive Plan have been identified to develop a framework to guide the City's approach to planning for movement of goods and services:

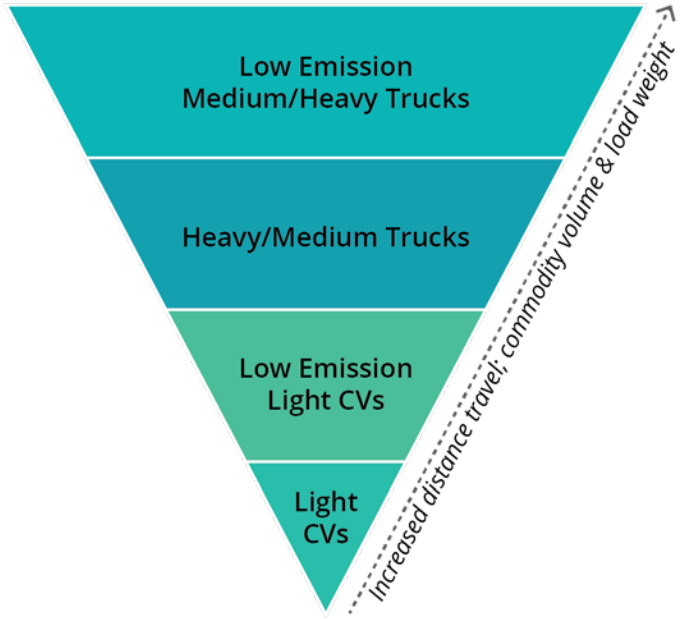
1. PRIORITIZING THE RIGHT SIZE MODES

Many freight vehicles are larger and heavier than passenger vehicles; as a result, they require more space for navigation and parking, produce greater impacts on traffic congestion and infrastructure, and are major generators of air pollutants, greenhouse gases, and noise.

The volume of trucks is extremely important in the selection of a design vehicle and the ultimate configuration of an intersection. Truck-involved crashes are more likely to involve fatalities and serious injuries, though the absolute number of such crashes is much lower than for general motor vehicle traffic. In addition, truck-involved crashes are more often related to turning movements, sideswipe/overtaking, and located on a principal or minor arterial compared to all crashes.

In freight district streets and major freight corridors (production and regional flows), high volumes of trucks are a daily occurrence. For those locations, the preference is to develop a pavement, roadway and intersection design that support heavy and medium freight operations including making their maneuvers easier and reducing conflicts with vulnerable users. In contrast, a tight intersection that is difficult for trucks to negotiate may be acceptable when heavy vehicles are infrequent. 2040Freight actions 1A.1, 1B.1., 3A.1, and 3A.3. are related to this objective.

Figure 11 – Strategy for Goods and Service Movement for Industrial Areas Supporting Regional and Local Industrial, Warehouse and Terminal Haulage Operations.



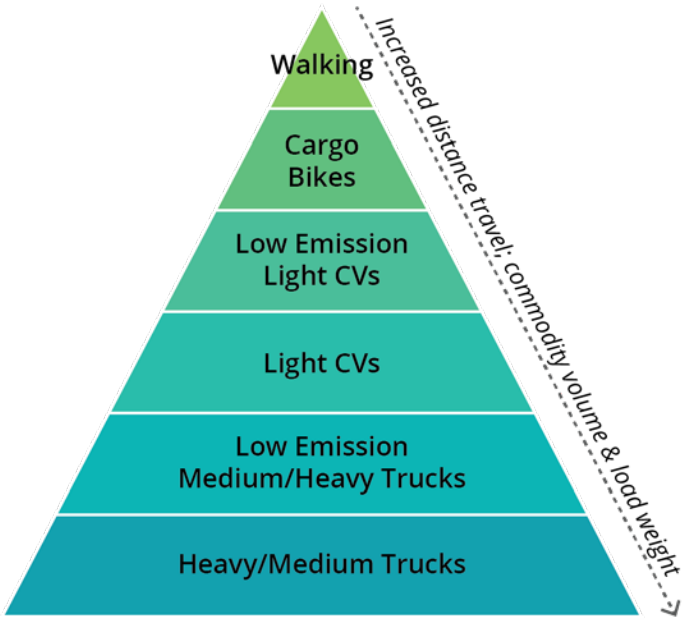
For the main roadways supporting the last-mile operations serving commercial, employment and residential land uses, the priorities should be accommodating goods and services in smaller freight modes to the greatest extent possible. Smaller vehicles require less space for parking, allow tighter intersections and roadway designs, and reduce conflicts with vulnerable users. For those operations that still require the use of medium and heavy vehicles, two tools would be beneficial:

- The promotion and support of safety technology that alerts the driver of obstacles (2040Feight action 1C.1 and 1C.2)
- Implementing an education campaign that aims to educate the wider public on traffic safety in freight districts and along freight corridors (2040Freight action 8C.2)

For last-mile operations, the connection between the load/unload infrastructure and the final delivery is important. A set of non-motorized connection infrastructure supports the movement of goods between the location where the vehicle parked and the end costumer. This includes:

- Infrastructure located in the public right of way (e.g., curb cuts, alleys, sidewalks)
- Infrastructure within the building infrastructure (e.g., elevators, corridors, ramps)

Figure 12 – Strategy for Goods and Service Movement for Commercial and Residential Areas Supporting Last-Mile Operations.



Additionally, the growth of parcel deliveries and online purchases have increased the dwell time of the parking operations, failed deliveries, and package return rates. Recent innovations in the field have improved efficiencies through alternative delivery methods that achieve density and reduce the need for the receiver's presence. These methods include lockers, building mail rooms, and alternative drop-off and pick-up locations (e.g., USPS collection box, UPS Access Points, and UPS drop box). However, regardless of the existence of these new options, some deliveries require customers' signatures or inspections such as perishable items to a restaurant, highly sensitive documents, medical cargo, or liquor delivery.

2. MEETING LOAD/UNLOAD OPERATIONAL NEEDS

Finding an adequate space to park, load, and unload can be a major challenge for freight vehicles in urban areas. Without an available supply of loading zones (on-street and off-street), drivers of commercial vehicles are forced either to spend more time circulating for parking or to park in unauthorized spaces. These parking behaviors reduce the capacity of the roadways, cause conflicts with other road users, and ultimately lead to congestion and safety issues. Providing street access to loading facilities and properties needs to be considered in network and project planning. Balancing curb space and/or scaling loading facilities to match the needs of the facility can increase the efficiency of the system, reduce circulation, and help facilitate adoption of last-mile solutions (consolidation strategies, EV charging infrastructure).

The following policies from the 2035 Comprehensive Plan address the need for load/unload infrastructure:

- **Policy 6.42—Objective D.** Provide adequate off-street loading areas for larger employment, commercial, and multi-family developments
- **Policy 6.42—Objective E.** Manage supply, operations, and demand of on-street truck loading spaces to ensure efficient, reliable, and safe loading and unloading activities

The need for more available and adequate load/unload on- and off-street spaces is a major challenge for last-mile operations, particularly in dense commercial districts. Competition increases when zoning codes may not require builders to provide off-street loading areas or when existing off-street loading areas are not adequate for the nature of the operations. Carriers and service providers might not use the off-street spaces if it increases the stop duration, or the design does not accommodate their operational needs or vehicle size. 2040Freight actions under Strategy 7B are related to this objective.

3. DECARBONIZATION OF FREIGHT VEHICLES

Freight activity is a significant contributor to diesel emissions, which can have numerous negative impacts on human and environmental health. Marginalized and vulnerable populations, such as BIPOC communities and low-income people, are often disproportionately impacted by environmentally harmful activities, including exposure to pollutants from diesel exhaust. The Comprehensive Plan address this issue by stating:

- **Policy 9.34.** Support the efficient delivery of goods and services to businesses and neighborhoods, while also reducing environmental and neighborhood impacts. Encourage the use of energy efficient and clean delivery vehicles and manage on- and off-street loading spaces to ensure adequate access for deliveries to businesses, while maintaining access to homes and businesses.

To support the transition from fossil fuel-based freight vehicles to cleaner and more efficient fleets of vehicles, the public sector can help create the environment for private logistics to capitalize on system efficiencies through a regulatory authority role, and/or an incentive-based policy framework. To create this environment, three tool categories reflected in the 2040Freight actions can be utilized:

A. Promotion of Technology:
    a. Fuel-saving technology
    b. Idling reduction (2040Freight action 2A.2)
    c. Clean technology (Actions related to Strategies 2A.4, 2B.1)

B. Management and Operations efficiency improvements:
    a. Adequate load/unload infrastructure (2040Freight action related to Strategy 7B)
    b. Consolidations solutions (e.g., micro-hubs, lockers, building codes) -2040Freight Actions 4B.1
    c. Address regulatory barriers for the implementation of last-mile solutions (e.g., off-hours, consolidation, cargo bikes) - Actions related to Strategy 2A, Strategy 7A, and Strategy 8A

C. Monitoring & Evaluation:
    a. Improving the existing GHG emission inventory (2040Freight actions 5A.2, 8A.1, and 8B.1)
    b. Adopt performance measures that are tied to specific goals/targets (2040Freight actions 2A.3)
    c. Quantify benefits (2040Freight actions 5A.1)

4. MANAGING DEMAND AND OPERATION TO MEET EFFICIENCY, ECONOMY, AND ENVIRONMENT GOALS

In the last decade, smaller vehicles have been increasingly used to support last-mile operations, including smaller parcel delivery trucks to residential addresses. When defining policies that regulate or encourage certain freight vehicle size, it is important to acknowledge that the freight vehicle size influences trip generation, cost of the delivery, and the external costs (e.g., emission, mode conflicts, traffic disruptions) per vehicle mile of travel. If a truck is too small to carry the load of the delivery route, it may need to transfer portions of its cargo to another truck—generating extra trips, additional VMT, and more emissions. In that case it may be argued that a larger vehicle would be the best option. On the other hand, smaller size vehicles can improve maneuverability on the street and make it easier to find space for loading or unloading. Moreover, bigger vehicles may be much more disruptive to urban quality of life, especially in mixed-use and residential areas.

Consolidating freight loads at strategic geographic stages could have a significant impact on reducing the number of trucks that enter a city, the distances they travel, and time spent dwelling. Urban consolidation can also help reduce emissions by providing a point where freight can be moved onto smaller, more efficient trucks. More efficient delivery vehicles are better suited to operate in dense urban areas.

Another consolidation strategy is the implementation of delivery drop-off facilities such

as delivery lockers and micro-hubs that create demand density and reduce the number of stops for delivery drivers. New residential/ commercial building codes and updates to land use codes to allow for deployment of consolidation strategies adjacent to high volume pedestrian locations, such as transit stations, may help encourage their adoption. Actions related to 2040Freight Strategy 4A, Strategy 4B, and Strategy 7A are related to this objective.

5. ADDRESSING THE DATA GAP

The growth of e-commerce, changes in customer demand, and increased urbanization has disrupted traditional operations, fragmented demand, and placed pressure on the freight system. This has created unprecedented challenges for shippers to meet increased volume and customer expectations for near-instant delivery. Scarce and inadequate databases often limit the ability of municipalities to evaluate and develop suitable strategies that will handle freight operators' diverse and changing operational requirements, especially for last-mile logistics. Addressing the data gap is essential to support effective policies and strategies broadly supporting this plan and the City's goals. Critical data gaps regarding urban freight transportation include but not limited to the following:

- Light goods vehicles activity
- Parking behavior and load/unload infrastructure demand by different adjacent land uses
- Geographical detail regarding urban freight trips O-D, delay, daily patterns, volume, and travel reliability
- E-commerce impact on freight related VMT trip
- Freight-related greenhouse emission and local pollutants
- Residential delivery/pick-up operations

Robust collaboration between the public sector and freight operators is needed to make comprehensive and detailed datasets more available. 2040Freight actions 8A.1, 8B.1, and 8D.1 are related to this objective.

6. ADDRESSING EQUITY AND STRUCTURAL RACISM

Freight is a critical component of achieving the City's equity goals. The equitable movement of goods and services ensures that all the population has access to the things needed to survive and flourish.[88,89] Freight-related equity can include multiple dimensions including:

- Equal access to goods and services for all members of the community (2040Freight action 5A.3)
- Mitigation of the negative impacts of the freight movement (noise, emission and traffic) in areas with high concentration of BIPOC, low-income and other vulnerable communities, especially for those living adjacent to major freight corridors and key freight facilities (2040Freight actions related to Strategy 5A and Strategy 5B)
- New policies, taxes and requirements that may impact small and BIPOC owned fleet operators and businesses
- Supporting high-quality freight jobs that provide mobility, particularly for underserved communities. (2040Freight actions related to Strategy 5B)

7. USING A RESILIENCY EVALUATION LENS

The 2040Freight Plan defines resilience of the Urban Freight System as the ability of the transportation system to withstand a disruption (e.g., natural disasters, fuel supply disruptions, and crashes on critical freight routes). The freight transportation system is vital to the post-event economic and community recovery. Providing a reliable and redundant freight network not only supports the provision of a reliable flow for the local and interstate freight movement but also the flow of essential goods, commodities, and services for emergency response and recovery.

Therefore, it is paramount to identify vulnerabilities within the network and prepare for future events to mitigate their impact and increase the speed of recovery. **2040Freight actions related to Strategy 3B address the need to incorporate resiliency into analysis and planning of the urban freight movement.**

INDUSTRIAL JOB MARKETS NOT SERVED BY TRANSIT

Freight-related jobs are an important source of employment for a large percentage of the Portland workforce, particularly for people with a high-school diploma/GED or less. People living with a disabilities also tend to be more likely to work in transportation and material moving occupations than those living without a disability. Providing safe and accessible transit options for workers in freight and industrial areas aligns with many 2040Freight goals including, economic vitality & employment, access, safety, environment, and equity.

A number of industrial areas in the City are disconnected from existing fixed-route transit services, forcing employees to drive to work and limiting employment opportunities for those unable to access or operate a vehicle.

City policy provides direction for how to consider this issues:

Comprehensive Plan Policy 9.25-Transit equity: In partnership with TriMet, maintain and expand high-quality frequent transit service to all Town Centers, Civic Corridors, Neighborhood Centers, Neighborhood Corridors, and other major concentrations of employment, and improve service to areas with high concentrations of poverty and historically under-served and under-represented communities.

Transportation System Plan Policy 9.25.a: Support a public transit system and regional transportation that address the transportation needs of historically marginalized communities and provide increased mobility options and access.

The 2040Freight Plan has identified four geographic areas within industrial districts that have little to no transit service: the Rivergate Industrial District and Columbia Boulevard West industrial areas in North Portland, and the Columbia Boulevard Central, Columbia Boulevard East in Northeast Portland (see "Map 15 – Transit Deficiency Zones in Industrial Areas" on page 110). Collectively, more than 8,000 people are employed in these areas. Without transit access it can be assumed a large majority of this workforce is commuting by personal vehicle.

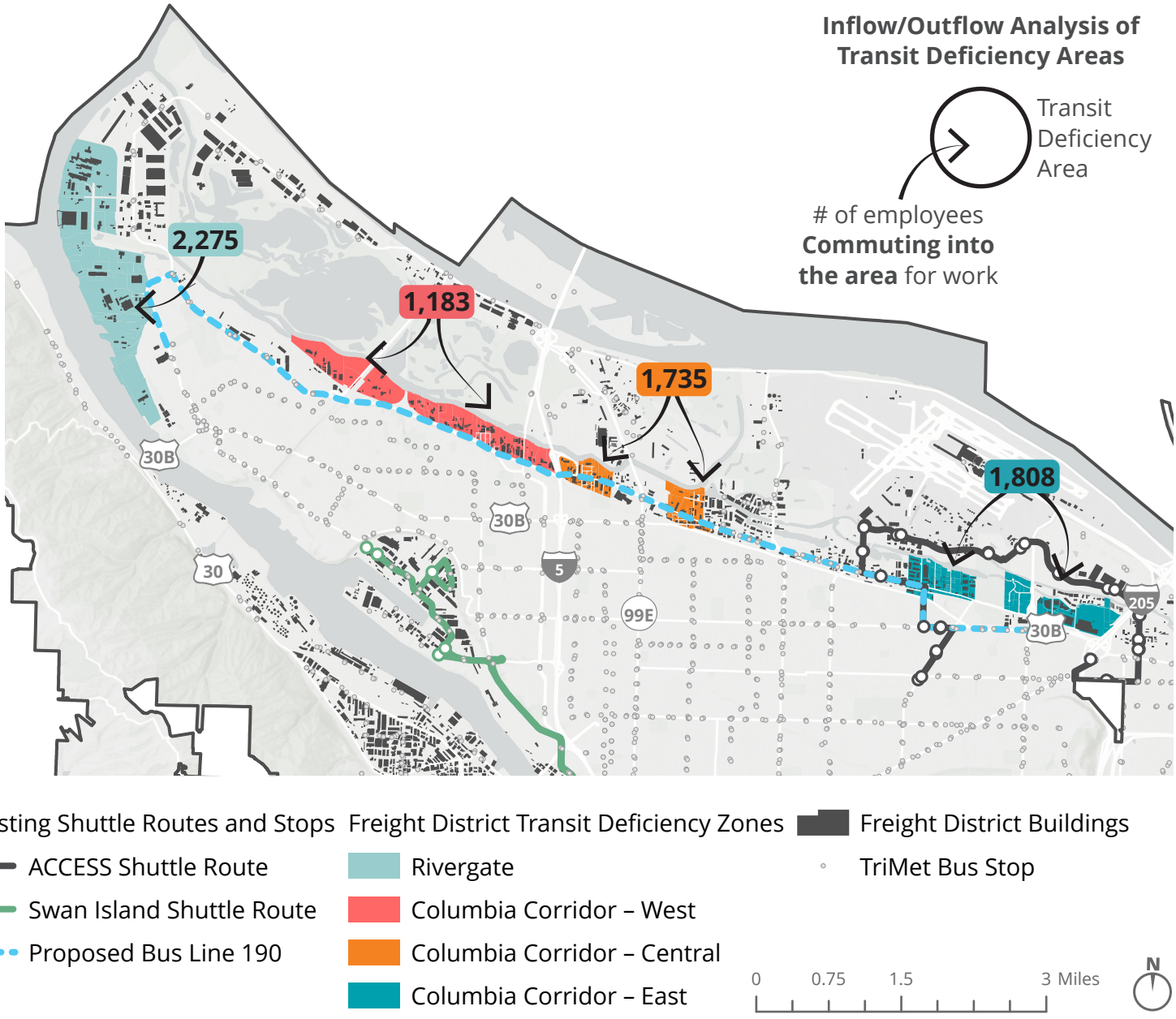
As of publication, TriMet, the region's transit provider is proposing a new bus line (190) that would provide transit service to many of these industrial areas.[90] The proposed route is shown in "Map 15 – Transit Deficiency Zones in Industrial Areas" on page 110. Depending on implementation, such a service expansion could improve access to the Columbia Boulevard West, Central, and East industrial areas.

Some industrial areas cannot feasibly be served by fixed route transit or may need additional service to accommodate 24-hour work shifts. Shuttle services offer a potential solution. Within Multnomah County, there are three existing shuttles that provide first- and last-mile connections to industrial areas at key times, supplementing and complementing existing transit service. The Swan Island Shuttle connects the Rose Quarter Transit Center to the Swan Island Industrial Park during the PM peak travel period, complementing existing bus routes. And the region's newest service, the ACCESS Shuttle, provides a much-needed connection between the Cully neighborhood and Parkrose/Sumner Transit Center during the AM and PM peaks. Micro-transit could also bridge gaps in existing service. Using smaller vehicles and a combination of fixed route

and on-demand services, micro-transit offers a more flexible and responsive option for travelers. Clark County, WA north of Portland recently launched such a service named The Current. This on-demand rideshare service uses multi-passenger shuttle vehicles operating in specific zones to enhance or provide service where there are few or no existing bus routes.

The 2040Freight Plan provides an initial analysis of industrial job markets not served by transit, but each industrial area has different contexts, needs, and challenges. Subsequent studies can identify which mode(s) would be best for individual markets. Whatever the mode, providing more mobility options in industrial areas will enhance equitable and sustainable access to well-paying industrial jobs.

Map 15 – Transit Deficiency Zones in Industrial Areas




2040 PORTLAND
FREIGHT PLAN

The 2040 Freight Plan charts a course for the maintenance, improvement, and further development of a multimodal urban freight system in Portland. The research and analysis within provide a solid understanding of the novel challenges and opportunities facing urban freight. The actions and projects proposed reflect a more equitable and climate conscious approach to urban freight. And the tools and frameworks developed will help guide decision making as the freight network evolves over the next two decades and new issues arise. All in pursuit of a vibrant city and thriving economy with safe, equitable, and efficient urban freight movement.

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APPENDICES

PBOT
PORTLAND BUREAU OF TRANSPORTATION

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APPENDIX A: CITY OF PORTLAND POLICIES SHAPING THIS WORK

RELEVANT COMPREHENSIVE PLAN AND TRANSPORTATION SYSTEM PLAN GOALS AND POLICIES

Portland's Comprehensive Plan and Transportation System Plan—adopted by city council—contain overarching local goals and policies, many of which are relevant to the 2040Freight Plan.

Comprehensive Plan Chapter 3: Urban Form

Connections: Improve corridors as multimodal connections providing transit, pedestrian, bicycle, and motor vehicle access and that serve the freight needs of centers and neighborhood business districts. (Comprehensive Plan Policy 3.45)

Freight: Maintain freight mobility and access on Civic Corridors that are also Major or Priority Truck Streets. (Comprehensive Plan Policy 3.51)

Regional Truck Corridors: Enhance designated streets to accommodate forecast freight growth and support intensified industrial use in nearby freight districts. See Figure 3-7 --- Employment Areas. Designated regional truckways and priority truck streets (Transportation System Plan classifications are shown to illustrate this network). (Comprehensive Plan Policy 3.68)

River transportation: Recognize and enhance the roles of the Willamette and Columbia rivers as part of Portland's historic, current, and future transportation infrastructure, including for freight, commerce, commuting, and other public and private transportation functions. (Comprehensive Plan Policy 3.70)

Industry and port facilities: Enhance the regionally significant economic infrastructure that includes Oregon's largest seaport and largest airport, unique multimodal freight, rail, and harbor access; the region's critical energy hub; and proximity to anchor manufacturing and distribution facilities. (Comprehensive Plan Policy 3.72)

Comprehensive Plan Chapter 8: Public Facilities

Application of Guiding Principles: Plan and invest in public facilities in ways that promote and balance the Guiding Principles established in the Vision and Guiding Principles of this Comprehensive Plan. (Comprehensive Plan Policy 8.31)

Trail system connectivity: Plan, improve, and maintain the citywide trail system so that it connects and improves access to Portland's neighborhoods, commercial areas, employment centers, schools, parks, natural areas, recreational facilities, regional destinations, the regional trail system, and other key places that Portlanders access in their daily lives. (Comprehensive Plan Policy 8.54)

Comprehensive Plan Chapter 9: Transportation

Safety: The City achieves the standard of zero traffic-related fatalities and serious injuries. Transportation safety impacts the livability of a city and the comfort and security of those using City streets. Comprehensive efforts to improve transportation safety through equity, engineering, education, enforcement, and evaluation will be used to eliminate traffic-related fatalities and serious injuries from Portland's transportation system. (Comprehensive Plan Goal 9.A)

Multiple goals: Portland's transportation system is funded and maintained to achieve multiple goals and measurable outcomes for people and the environment. The transportation system is

safe, complete, interconnected, multimodal, and fulfills daily needs for people and businesses. (Comprehensive Plan Goal 9.B)

Environmentally sustainable: The transportation system increasingly uses active transportation, renewable energy, or electricity from renewable sources, achieves adopted carbon reduction targets, and reduces air pollution, water pollution, noise, and Portlanders' reliance on private vehicles. (Comprehensive Plan Goal 9.D)

Opportunities for prosperity: The transportation system supports a strong and diverse economy, enhances the competitiveness of the city and region, and maintains Portland's role as a West Coast trade gateway and freight hub by providing efficient and reliable goods movement, multimodal access to employment areas and educational institutions, as well as enhanced freight access to industrial areas and intermodal freight facilities. The transportation system helps people and businesses reduce spending and keep money in the local economy by providing affordable alternatives to driving. (Comprehensive Plan Goal 9.G)

Mode share goals and vehicle miles traveled (VMT) reduction: Increase the share of trips made using active and low-carbon transportation modes. Reduce VMT to achieve targets set in the most current Climate Action Plan and Transportation System Plan, and meet or exceed Metro's mode share and VMT targets. (Comprehensive Plan Policy 9.5)

Transportation strategy for people movement: Implement a prioritization of modes for people movement by making transportation system decisions according to the following ordered list:

1. Walking
2. Bicycling
3. Transit
4. Fleets of electric, fully automated, multiple passenger vehicles
5. Other shared vehicles
6. Low or no occupancy vehicles, fossil-fueled non-transit vehicles

When implementing this prioritization, ensure that:

- The needs and safety of each group of users are considered, and changes do not make existing conditions worse for the most vulnerable users higher on the ordered list.
- All users' needs are balanced with the intent of optimizing the right of way for multiple modes on the same street.
- When necessary to ensure safety, accommodate some users on parallel streets as part of a multi-street corridor.
- Land use and system plans, network functionality for all modes, other street functions, and complete street policies, are maintained.
- Policy-based rationale is provided if modes lower in the ordered list are prioritized.

(Comprehensive Plan Policy 9.6)

Moving goods and delivering services: In tandem with people movement, maintain efficient and reliable movement of goods and services as a critical transportation system function. Prioritize freight system reliability improvements over single-occupancy vehicle mobility where there are solutions that distinctly address those different needs. (Comprehensive Plan Policy 9.7)

Transit equity: In partnership with TriMet, maintain and expand high-quality frequent transit service to all Town Centers, Civic Corridors, Neighborhood Centers, Neighborhood Corridors, and other major concentrations of employment, and improve service to areas with high concentrations of poverty and historically under-served and under-represented communities. (Comprehensive Plan Policy 9.25)

a. Support a public transit system and regional transportation that address the transportation needs of historically marginalized communities and provide increased mobility options and access. (TRANSPORTATION SYSTEM PLAN Policy 9.25.a)

Multimodal goods movement: Develop, maintain, and enhance a multimodal freight transportation system for the safe, reliable, sustainable, and efficient movement of goods within and through the city. (Comprehensive Plan Policy 9.30)

Economic development and industrial lands: Ensure that the transportation system supports traded sector economic development plans and full utilization of prime industrial land, including brownfield redevelopment. (Comprehensive Plan Policy 9.31)

Multimodal system and hub: Maintain Portland's role as a multimodal hub for global and regional movement of goods. Enhance Portland's network of multimodal freight corridors. (Comprehensive Plan Policy 9.32)

Freight network: Develop, manage, and maintain a safe, efficient, and reliable freight street network to provide freight access to and from intermodal freight facilities, industrial and commercial districts, and the regional transportation system. Invest to accommodate forecasted growth of interregional freight volumes and provide access to truck, marine, rail, and air transportation systems. Ensure designated routes and facilities are adequate for over-dimensional trucks and emergency equipment. (Comprehensive Plan Policy 9.33)

Sustainable freight system: Support the efficient delivery of goods and services to businesses and neighborhoods, while also reducing environmental and neighborhood impacts. Encourage the use of energy efficient and clean delivery vehicles, and manage on- and off-street loading spaces to ensure adequate access for deliveries to businesses, while maintaining access to homes and businesses. (Comprehensive Plan Policy 9.34)

Freight rail network: Coordinate with stakeholders and regional partners to support continued reinvestment in, and modernization of, the freight rail network. (Comprehensive Plan Policy 9.35)

Portland Harbor: Coordinate with the Port of Portland, private stakeholders, and regional partners to improve and maintain access to marine terminals and related river-dependent uses in Portland Harbor. (Comprehensive Plan Policy 9.36)

b. Support continued reinvestment in, and modernization of, marine terminals in Portland Harbor. (Comprehensive Plan Policy 9.36.a)

c. Facilitate continued maintenance of the shipping channels in Portland Harbor and the Columbia River. (Comprehensive Plan Policy 9.36.b)

d. Support shifting more long-distance, high-volume movement of goods to river and oceangoing ships and rail. (Comprehensive Plan Policy 9.36.c)

Airport investments: Ensure that new development and redevelopment of airport facilities supports the City's and the Port's sustainability goals and policies, and is in accordance with Figure 9-3 — Portland International Airport. Allow the Port flexibility in configuring airport facilities to preserve future development options, minimize environmental impacts, use land resources efficiently, maximize operational efficiency, ensure development can be effectively phased, and address Federal Aviation Administration's airport design criteria. (Comprehensive Plan Policy 9.44)

System management: Give preference to transportation improvements that use existing roadway capacity efficiently and that improve the safety of the system for all users. (Comprehensive Plan Policy 9.45)

a. Support regional equity measures for transportation system evaluation. (Comprehensive Plan Policy 9.45.a)

Traffic management: Evaluate and encourage traffic speed and volume to be consistent with street classifications and desired land uses to improve safety, preserve and enhance neighborhood livability, and meet system goals of calming vehicle traffic through a combination of enforcement, engineering, and education efforts. (Comprehensive Plan Policy 9.46)

Technology: Encourage the use of emerging vehicle and parking technology to improve real-time management of the transportation network and to manage and allocate parking supply and demand. (Comprehensive Plan Policy 9.48)

On-street parking: Manage parking and loading demand, supply, and operations in the public

right-of-way to achieve mode share objectives, and to encourage safety, economic vitality, and livability. Use transportation demand management and pricing of parking in areas with high parking demand. (Comprehensive Plan Policy 9.57)

Central City 2035, Vol. 2B: TSP Amendments

Loading: Support the delivery of goods in the Central City. Pursue strategies that bring new ways of delivering goods to the Central City in a way that optimizes loading and freight access and makes efficient use of limited urban space. (Central City 2035 TSP Policy 9.55)

FREIGHT CLASSIFICATION DESCRIPTIONS (ADOPTED 2007)

Designate a system of truck streets, railroad lines, and intermodal freight facilities. That support local, national, and international distribution of goods and services.

FREIGHT DISTRICTS

Freight Districts are intended to provide safe and convenient truck mobility and access in industrial and employment areas serving high levels of truck traffic and to accommodate the needs of intermodal freight movement.

Land Use: Support locating industrial and employment land uses that rely on multimodal freight movement in Freight Districts.

Function: Freight District streets provide local truck access and circulation to industrial and employment land uses.

Connections: In Freight Districts, streets not classified as Regional Truckways or Priority Truck Streets are classified as Freight District streets. Freight Districts connect individual properties to Priority Truck Streets.

Design: Freight District streets should be designed to facilitate the movement of all truck types and over-dimensional loads, as practicable.

Explanation: Within Freight Districts, only Regional Truckways, Priority Truck Streets and Major Truck Streets are mapped. All streets within Freight Districts should be designed to accommodate truck movement. Streets with multiple designations should be designed to accommodate trucks and the other designated modes.

REGIONAL TRUCKWAYS

Regional Truckways are intended to facilitate interregional and movement of freight.

Land Use: Support locating industrial and employment land uses with high levels of truck activity near Regional Truckway interchanges.

Function: Provide for safe and efficient continuous-flow operation for trucks.

Connections: Provide Regional Truckway interchanges that directly serve Freight Districts and connect to Priority Truck Streets and other streets with high levels of truck activity. A ramp that connects to a Regional Truck Street is classified as a Regional Truck Street up to its intersection with a lower-classified street.

Design: Design Regional Truckways to be limited access facilities and to standards that facilitate the movement of all types of trucks.

PRIORITY TRUCK STREETS

Priority Truck Streets are intended to serve as the primary route for access and circulation in Freight Districts, and between Freight Districts and Regional Truckways.

Land Use: Support locating industrial and employment uses that generate high truck activity on corridors served by Priority Truck Streets.

Function: Priority Truck Streets accommodate high truck volumes and provide high-quality mobility and access.

Connections: Priority Truck Streets connect Freight Districts to Regional Truckways.

Design: Priority Truck Streets should be designed to facilitate the movement of all truck classes and over-dimensional loads, as practicable. Buffer adjacent residential uses from noise impacts, where warranted.

MAJOR TRUCK STREETS

Major Truck Streets are intended to serve as principal routes for trucks in a Transportation District.

Land Use: Commercial and employment land uses that generate high levels of truck activity should locate along Major Truck Streets.

Function: Major Truck Streets provide truck mobility within a Transportation District and access to commercial and employment uses along the corridor.

Connections: Major Truck Streets connect Transportation district-level truck trips to Regional Truckways. Trucks with no trip ends within a Transportation District should be discouraged from using Major Truck Streets.

Design: Major Truck Streets should accommodate all truck types, as practicable.

TRUCK ACCESS STREETS

Truck Access Streets are intended to serve as access and circulation routes for delivery of goods and services to neighborhood-serving commercial and employment uses.

Land Use: Support locating commercial land uses that generate lower volumes of truck trips on Truck Access Streets.

Function: Truck Access Streets provide access and circulation to land uses within a Transportation District. Non-local truck trips are discouraged from using Truck Access Streets.

Connections: Truck Access Streets should distribute truck trips from Major Truck Streets to neighborhood-serving destinations.

Design: Design Truck Access Streets to accommodate truck needs in balance with other modal needs of the street.

LOCAL SERVICE TRUCK STREETS

Local Service Truck Streets are intended to serve local truck circulation and access.

Land Use: Local Service Truck Streets provide for goods and service delivery to individual commercial, employment, and residential locations outside of Freight Districts.

Function: Local Service Truck Streets should provide local truck access and circulation only.

Connections: All streets, outside of Freight Districts, not classified as Regional Truckways, Priority Truck Streets, Major Truck Streets, or Truck Access Streets are classified as Local Service Truck Streets. Local Service Truck Streets with a higher Traffic classification are the preferred routes for local access and circulation.

Design: Local Service Truck Streets should give preference to accessing individual properties and the specific needs of property owners and residents along the street. Use of restrictive signage and operational accommodation are appropriate for Local Service Truck Streets.

RAILROAD MAIN LINES

Railroad Main Lines transport freight cargo and passengers over long distances as part of a railway network.

RAILROAD BRANCH LINES

Railroad Branch Lines transport freight cargo over short distances on local rail lines that are not part of a rail network and distribute cargo to and from main line railroads.

FREIGHT FACILITIES

Freight Facilities include the major shipping and marine, air, rail, and pipeline terminals that facilitate the local, national, and international movement of freight.

PASSENGER INTERMODAL FACILITIES
(Transit Classification)

Passenger Intermodal Facilities serve as the hub for various passenger modes and the transfer point between modes.

Connections: Passenger Intermodal Facilities connect inter-urban passenger service with urban public transportation service and are highly accessible by all modes.

INDUSTRIAL ROADS
(Street Design Classification)

Industrial Roads are designed to emphasize freight mobility while also accommodating other modes and providing local access.

Land Use: Industrial Roads typically serve industrial areas and freight intermodal sites, with a significant percentage of trips being made by trucks. Adjacent land uses sometimes orient to the Industrial Road.

Lanes: Industrial Road design typically includes two to four vehicle lanes, with additional turning lanes as needed. Dedicated freight-only lanes or turn pockets may be provided as needed to support roadway efficiency.

Function: Industrial Roads emphasize freight mobility while accommodating other modes and providing access to industrial sites and freight districts.

Curb zone: The curb zone along Industrial Roads primarily serves mobility functions such as vehicle lanes or bike lanes. The curb zone may be used for access functions such as parking and loading at limited locations if needed to support adjacent land use.

Separation: Industrial Roads have limited street connections that may occur at the same grade or separate grades. Pedestrian and bicycle crossings should be grade-separated or signalized, and pedestrian and bicycle facilities should be separated from motor vehicle traffic.

Design Elements: Industrial Road design typically includes vehicle lanes, medians or center turn lanes where needed, limited driveway access, pullouts for bus stops, transit priority treatments, separated pedestrian and bicycle facilities, and improved pedestrian crossings located on overpasses, underpasses, or signalized at-grade intersections. Industrial Roads may also include design treatments that improve freight mobility, such as freight-only lanes, freight signal priority, and a wider turning radius at intersections.

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APPENDIX B: PROPOSED REGIONAL AND LOCAL FREIGHT-RELATED INFRASTRUCTURE IMPROVEMENTS

Table 1 – Bridge Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID	Priority	Lead Agency
Bridge	Burgard St. Viaduct Replacement	Burgard, N (Bridge over UPRR)	Replace the existing N Burgard St Viaduct (#001) over the UPRR tracks. Include pedestrian and bicycle facilities. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$17,500,000	TSP - 30068	High	PBOT
Bridge	Columbia Blvd / Columbia Way / Railroad Bridge Replacements	Columbia Blvd, N (bridges over BNSF railroad tracks and Columbia Way)	Replace the existing fracture critical Columbia Blvd bridge (#078) over BNSF railroad tracks with a new structure, and perform seismic upgrades on parallel bridge or replace it (#078A). Replace Columbia Blvd bridge over Columbia Way (#079). Also, address the risk of future weight restriction for the three bridge, if any.	$20,500,000	TSP - 30005 & 30084	High	PBOT
Bridge	Columbia Blvd Over-Dimensional Freight Improvement	Columbia - Railroad bridge adjacent to I-5	Increase vertical clearance under railroad bridge to allow a higher percentage of over-dimensional loads to use this segment of Columbia Blvd. Requires replacing rail bridge with a different type of bridge without changing railroad grade.	$20,500,000	New - B9	High	PBOT
Bridge	Kittridge Bridge Seismic Retrofit and Strengthening	Kittridge Ave, NW (Front - Yeon)	Retrofit existing seismically vulnerable bridge (#010) across railroad tracks to ensure emergency response and access to petroleum supplies located along the Willamette River in the event of an earthquake. Strengthen bridge structure to carry overweight loads.	$31,000,000	TSP - 60012	High	PBOT
Bridge	NE 33rd Bridge Replacement	33rd Ave, NE (over railroad tracks and Columbia Blvd)	Replace 33rd Ave bridge (009 and 009A) over railroad, 33rd Ave flyover ramp over Columbia Blvd, and Columbia Blvd bridge over 33rd Dr. Reconfigure interchange to improve safety and connectivity for all modes, address seismic resiliency and bridge condition needs on a major emergency and freight route, and simplify traffic operations and wayfinding by providing at-grade signalized intersections instead of ramps and overpasses. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$46,500,000	TSP - 40100	High	PBOT
Bridge	N Columbia Blvd. over Union Pacific Railroad Bridge Replacement	Columbia Blvd, N over UPRR	Replace seismically vulnerable bridge (#172) over Union Pacific Railroad in Rivergate area.	$30,000,000	New - B6	Medium	PBOT
Bridge	N Going St over Railroad Bridge Replacement	Going St, N (over UP railroad)	Replace Going Street bridge (#012) with a new structure that is not vulnerable to train derailment damage.	$30,000,000	New - B3	Medium	PBOT
Bridge	S.E. Holgate Blvd.	S.E. Holgate Blvd.	Replace weight restricted and seismically vulnerable bridge (#044)	$41,000,000	New - B7	Medium	PBOT
Bridge	Greeley Ave	Greeley Ave	Replace weight restricted and seismically vulnerable bridge (#013)	$25,000,000	New - B8	Opportunity	PBOT
Bridge	"Interstate Semi-viaduct Replacement"	Interstate Ave, N (North of Broadway Bridge)	Replace the existing weight-restricted, poor-condition Interstate Semi-viaduct (Bridge #152).	$10,000,000	TSP - 20065.1	Opportunity	PBOT
Bridge	Interstate-Larrabee Overpass	Interstate- Larrabee Ramp, N (Tillamook -Broadway)	Remove the existing weight-restricted, low-clearance, poor-condition Interstate to Larrabee southbound flyover ramp (Bridge #153) and replace with a new overpass including a multi-use path to connect the future N Portland Greenway Trail to the Broadway Bridge. Assess the costs and benefits of providing vehicle access on the new structure as part of project development.	$20,500,000	TSP - 20065.2	Opportunity	PBOT

Table 1 – Bridge Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID	Priority	Lead Agency
Bridge	NE 12th Avenue Bridge Replacement	12th Avenue, NE Bridge over I-84 (BR# 025)	Replace the existing fracture critical and seismically deficient 12th Ave bridge (Bridge #025) over I-84 and railroad tracks with a new structure. Provide multimodal transportation improvements on the new structure.	$31,000,000	New - B5	Opportunity	PBOT
Bridge	NE 28th Ave Bridge Retrofit/Strengthening	28th Ave, NE (over UP railroad adjacent to I-84)	Replace weight restricted and seismically vulnerable bridge over the UP railroad (#172)	$10,000,000	New - B2	Opportunity	PBOT
Bridge	NE 42nd/47th Ave Bridge & Corridor Improvements	42nd/47th Ave, NE (Killingsworth - Columbia)	Replace the weight-restricted NE 42nd Ave Bridge (#075) over NE Portland Hwy and the adjacent railway, and add pedestrian and bicycle facilities to the bridge and the roadway from Killingsworth to Columbia. This project will remove the weight restriction, improve vertical clearance for over-dimensional freight, and provide pedestrian and bicycle facilities. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$12,000,000	TSP - 40007	Opportunity	PBOT
Bridge	NW 26th Dr Bridge Retrofit/Strengthening	26th Dr, NW (bridge over railroad)	Retrofit and strengthen the NW 26th Dr bridge (#129) to carry overweight loads.	$30,000,000	New - B4	Opportunity	PBOT
Bridge	Broadway Bridge Rehabilitation	Broadway Bridge	Rehabilitation Broadway Bridge Rehabilitate mechanical system, approach structure, corrosion control, phase 1 seismic.	$22,700,000	TSP - 20010		Multnomah County
Bridge	Columbia River Rail Bridge Improvements	BNSF Rail Bridge (over Columbia River)	Replace existing swing span with lift span and relocate position to mid-river channel. Project creates wider and quicker opening, reduces I-5 lifts, eases river navigation, and could accommodate a third rail track.	$35,548,800	TSP - 30076		Port
Bridge	Columbia Slough Rail Bridge	Terminal 6 - South Rivergate (across Columbia Slough)	Construct a rail bridge across Columbia Slough to provide rail connection to South Rivergate from Terminal 6.	$10,840,000	TSP - 30069		Port
Bridge	I-5 Delta Park, Phase 3	Denver Ave, N (Argyle-Schmeer)	Construct highest priority improvements consistent with the Delta-Lombard Environmental Assessment. Replace Denver Viaducts over Columbia Slough and Columbia Blvd / UPRR	$30,000,000	TSP - 30103		ODOT
Bridge	Interstate Bridge Replacement Program (IBR)	I-5, N (Victory Blvd - Washington border)	Replace the I-5 bridge over the Columbia River and I-5 bridge over the Columbia Harbor with a modern, earthquake resilient and multimodal structure. Replace or improve I-5 interchanges at Marine Drive and Hayden Island, extend new Light Rail Transit to Hayden Island and Vancouver, add a local access bridge to Hayden Island, and improve active transportation facilities in the Bridge Influence Area.	$3,200,000,000 - $4,800,000,000	TSP - 30020		ODOT
Bridge	N Fessenden St Bridge Replacement	Fessenden St, N (over railroad cut)	Replace existing structurally-deficient, weight-restricted bridge (owned by BNSF) over railroad cut.	$30,000,000	TSP - 30094		PBOT/Rail

Table 2 – Highway-Street Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID	Priority	Lead Agency
Highway-Street	Columbia Blvd Corridor Safety Improvements	N/NE Columbia Blvd (Argyle - 60th)	Reconfigure skewed intersections to reduce turning speeds, upgrade aging traffic signals, install speed reader boards/automated enforcement and add raised medians or rumble strips where feasible.	$8,000,000	New - HS5	High	PBOT
Highway-Street	Columbia Blvd Freight Improvements: Design/ Construction	Columbia Boulevard, NE (60th - 82nd)	Construct street and intersection modifications to improve safety, freight reliability, and access to industrial properties, based on results of project development (RTP ID #12004).	$53,500,000	TSP - 40102	High	PBOT
Highway-Street	Columbia Blvd Freight Improvements: Project Development	NE Columbia Blvd (60th - 82nd)	Alternatives analysis and project development to identify preferred street and intersection modifications to improve freight reliability and access to industrial properties. Analyze the feasibility and benefits of freight-only lanes to ensure improvements prioritize freight movement.	$2,000,000	New - HS10	High	PBOT
Highway-Street	Lombard & 33rd Ave Ramp Redesign	NE Lombard St at 33rd	Redesign ramps and intersections from Lombard to 33rd to reduce motor vehicle speeds, address turning conflicts, and consolidate access points. Close one of the two ramps and signalize the remaining ramp. Provide a pedestrian and bicycle connection from Lombard St to 33rd Ave.	$5,000,000	New - HS4	High	PBOT
Highway-Street	Marine Dr & 33rd Intersection Improvements	Marine Dr & 33rd Ave, BE	Improve freight operations in the intersection either by construction new traffic signals or a new design roundabout. Widening of 33rd and Marine to accommodate turn lanes and bike/ped facilities	$9,500,000	TSP - 40006	High	PBOT
Highway-Street	82nd Ave Corridor Improvements	82nd Ave, NE/SE, (Lombard - Clatsop)	Design and implement multimodal improvements to sidewalks, crossings, transit stops, striping, and signals to enhance ped/bike safety, access to transit, and transit operations. Address major asset needs including pavement, ADA ramps, and traffic signals.	$150,000,000	TSP - 40013	Medium	PBOT
Highway-Street	Columbia Corridor Signal Improvements	Corridor wide	Replace and upgrade aging traffic signals along Columbia Blvd from Argyle to Lombard to improve freight mobility, traffic flow, access to surrounding areas, and safety.	$10,000,000	New - HS9	Medium	PBOT
Highway-Street	Lombard & 42nd Ave Ramp Redesign	NE Lombard St at 42nd	Redesign ramps and intersections from Lombard to 42nd to reduce motor vehicle speeds, address turning conflicts, and consolidate access points. Provide pedestrian and bicycle connection from Lombard St to 42nd Ave.	$5,000,000	New - HS1	Medium	PBOT
Highway-Street	MLK & Columbia Intersection Improvements, Phase 2	NE MLK Jr Blvd & Columbia Blvd	Intersection and signalization improvements with a dedicated northbound right turn lane, a second dedicated southbound left turn lane, wider sidewalks adjacent to the roadway, and improvements to the geometry of the existing southbound through/right turn lane.	$15,500,000	TSP - 40113	Medium	PBOT
Highway-Street	Northeast Columbia Blvd Freight District	NE Mallory Ave (Columbia - Halleck); NE Halleck St (Mallory - Grand); NE Kilpatrick St (Mallory - Grand); NE Grand Ave (Columbia - Halleck)	Make needed street improvements (pavement, curbs, sidewalks, stormwater, ped and bike facilities) on Freight District Streets surrounding N Columbia Blvd.	$5,000,000	New - HS8	Medium	PBOT

Table 2 – Highway-Street Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID	Priority	Lead Agency
Highway-Street	Outer Sandy Blvd Corridor Improvements: Local Contribution to State-owned Arterial	Sandy Blvd, NE (141st - City Limits)	Widen street to three lanes with a sidewalk and bike lanes for consistency of the cross section design West of 141st and East of City Limits. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses. Improve safety for all modes in the Parkrose main street segment.	$5,000,000	TSP - 50035	Medium	PBOT
Highway-Street	Sandy Blvd Corridor Improvements, Phase 2	Sandy Blvd, NE (47th - 101st)	Retrofit existing street with multi-modal street improvements including bicycle facilities, redesign of selected intersections to improve pedestrian crossings, streetscape, and safety improvements. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$6,481,860	TSP - 40068	Medium	PBOT
Highway-Street	Water Ave Corridor Improvements and Realignment	SE Stark to SE Caruthers	From Stark to Clay, remove rails from roadway, repair pavement, build sidewalks, and provide an enhanced bikeway. South of Clay, realign SE Water Ave as shown in the OMSI Master Plan.	$22,500,000	TSP - 20206 & 20075	Medium	PBOT
Highway-Street	11th/Columbia/ Lombard Freight District Street Improvements	NE Baldwin St (10th - 11th) NE Russet St (11th - 13th) NE 13th Ave (Columbia Blvd - Lombard Pl	Make needed street improvements (pavement, curbs, stormwater, ped and bike facilities) on Freight District Streets in the 11th/Columbia/ Lombard area. Sidewalks will be contingent on right-of-way dedication. Potentially combine with 11th Avenue Multimodal Improvements project.	$5,000,000	New - HS6	Opportunity	PBOT
Highway-Street	Beaverton-Hillsdale Hwy Corridor Improvements Segment 1	Beaverton- Hillsdale Hwy, SW (Capitol Hwy - 30th)	Build new sidewalks, upgrade bike facilities, improve crossings, and enhance access to transit. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$1,783,511	TSP - 90020	Opportunity	PBOT
Highway-Street	Central Eastside Access and Circulation Enhancement Project	Central Eastside	Improve access and circulation in the Central Eastside by adding new signals and crossings at Salmon & Grand, Salmon & MLK, Washington & Grand, Ankeny & Sandy, and 16th & Irving.	$5,500,000	TSP - 20205	Opportunity	PBOT
Highway-Street	Inner Powell Blvd Corridor Improvements	Powell Blvd, SE (Ross Island Bridge - 50th)	Retrofit existing street with multimodal safety improvements including enhanced pedestrian and bicycle crossings, pedestrian and bike activated signals, median islands with trees, redesign of selected intersections and stormwater management facilities. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$9,000,000	TSP - 70045	Opportunity	PBOT
Highway-Street	Lombard & I-205 Interchange Safety Improvements	Lombard/ Sandy/I-205 Interchange	Redesign northbound I-205 to westbound Lombard off-ramp to improve safety for westbound bike lane. Redesign I-205 Path connection through the interchange.	$5,000,000	New - HS3	Opportunity	PBOT
Highway-Street	Lombard & I-5 Interchange Redesign	N Lombard St at I-5	Redesign freeway interchange to allow for sidewalk to be added to north side of bridge over I-5 and for ramps to be signalized. Analyze feasibility of removing cloverleaf ramps.	$5,000,000	New - HS2	Opportunity	PBOT
Highway-Street	MLK Jr Blvd Freight Improvements	MLK Jr, NE (Columbia - Lombard)	"Expand roadway to provide better connection between streets for improved freight movement in and through the area and safety improvement (turning movements) for other road users."	$12,605,000	TSP - 40059	Opportunity	PBOT

Table 2 – Highway-Street Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID	Priority	Lead Agency
Highway-Street	North Columbia Blvd Freight District Street Improvements	N Borthwick Ave (Columbia - Halleck) N Kerby Ave (Columbia - Halleck) N Halleck St (Albina - Congress)	Make needed street improvements (pavement, curbs, sidewalks, stormwater, ped and bike facilities) on Freight District Streets surrounding N Columbia Blvd.	$5,000,000	New - HS7	Opportunity	PBOT
Highway-Street	Parkrose Connectivity Improvements	102nd and 109th, NE (Killingsworth - Sandy); Killingsworth, NE (109nd -102nd)	Supplement access route for commercial properties in Parkrose by creating a loop road connection serving truck access functions, pedestrian, and bike connections.	$10,500,000	TSP - 50001	Opportunity	PBOT
Highway-Street	SE Yamhill / Taylor Couplet	Yamhill / Taylor, SE (Water - Grand)	Improve traffic safety and capacity by converting Yamhill and Taylor to couplet operation between Water and Grand Ave, including new traffic signals at Yamhill / MLK, Yamhill / Grand, and Taylor / Water. The potential new signals will be evaluated to determine appropriate operation. As part of the project, reconfigure the ramp from Belmont viaduct to MLK.	$5,000,000	TSP - 20184	Opportunity	PBOT
Highway-Street	Southern Triangle Access Improvements	Powell Blvd, SE (8th - 17th)	Improve traffic access to the Southern Triangle district from eastbound Powell Blvd.	$4,000,000	TSP - 20050	Opportunity	PBOT
Highway-Street	"Yamhill & Water Traffic Improvements"	Yamhill / Water, SE	Install signal at the SE Yamhill St / SE Water Ave intersection with turn lane and queue detection treatments on the I-5 NB Exit Ramp to reduce queue length and/or provide advanced warning sign of queue on the exit ramp.	$2,000,000	TSP - 20187	Opportunity	PBOT
Highway-Street	Airport Way Braided Ramps	Airport Way, NE (I 205 - Mt Hood Ave)	Construct braided ramps between I-205 interchange and Mt Hood interchange.	$59,000,000	TSP - 40097		Port
Highway-Street	Airport Way, NE: Access Road	Airport Way, NE: Access Road	Construct Airport Way East Terminal access link roadway. Facilitates direct East Terminal Access, preventing failure of Main Terminal	$19,000,000	TSP - 40023		Port
Highway-Street	Airtrans/Cornfoot Intersection Improvements	Airtrans/Cornfoot, NE	Add signals and improve turn lanes or construct a roundabout at AirTrans Way / Cornfoot Rd	$3,000,000	TSP - 40093		Port
Highway-Street	Broadway / Weidler Interchange Area Multimodal Improvements	Broadway / Weidler / I-5	Construct multimodal transportation improvements supporting the ODOT Broadway / Weidler (Rose Quarter) Interchange Project, including enhancements of surface streets, lids over the freeway.	$10,000,000	TSP - 20204		PBOT / ODOT
Highway-Street	Broadway/Weidler Interchange Construction	Interstate5, N/NE (I-405 - I-84)	Construct improvements to enhance safety and operations on I-5, connection between I-84 and I-5, and access to the Lloyd District and Rose Quarter. Project includes expanded highway covers with development parcels and restored local street grid over I-5.	$127,000,000	TSP - 20121		ODOT
Highway-Street	Broadway/Weidler Planning and PE	Interstate5, N/NE (I-405 - I-84)	Conduct planning, preliminary engineering and environmental work to improve safety and operations on I-5, connection between I-84 and I-5, and access to the Lloyd District and Rose Quarter.	$44,400,000	TSP - 20119		ODOT
Highway-Street	Broadway/Weidler Right-of-Way	Interstate5, N/NE (I-405 - I-84)	Acquire right-of-way to improve safety and operations on I-5, connection between I-84 and I-5, and access to the Lloyd District and Rose Quarter.	$40,500,000	TSP - 20120		ODOT

Table 2 – Highway-Street Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID Priority	Lead Agency
Highway-Street	Columbia/Alderwood Intersection Improvements	Columbia/Alderwood, NE	Reconstruct intersections to provide left turn pockets, enhance turning radii, and improve circulation for trucks serving expanding air cargo facilities south of Portland. Improve traffic operations and freight mobility on Columbia Blvd between Cully and Alderwood.	$11,000,000	TSP - 40032	Port
Highway-Street	Cornfoot Rd Multi-use Path	Cornfoot Rd, NE (47th - Alderwood)	Construct a multi-use path on the north side of Cornfoot Rd and connect to 47th Ave protected bike lanes and sidewalks. Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$7,465,000	TSP - 40036	PBOT/ Port
Highway-Street	SE McLoughlin Blvd Roadway Improvements	McLoughlin Blvd, SE (Ross Island Bridge - Tacoma)	Provide access management, operational improvements, and safety improvements from Ross Island Bridge to Harold. Widen to six lanes from Harold to Tacoma and construct pedestrian and bike facilities.	$96,500,000	TSP - 70030	ODOT
Highway-Street	SW Quad Access	Southwest Quad, NE (at 33rd)	Provide street access from NE 33rd Ave into the SW Quad property.	$5,917,500	TSP - 40073	Port
Highway-Street	Time Oil Road Reconstruction	Time Oil Rd, N (Lombard - Rivergate)	Reconstruct Time Oil Road	$9,000,000	TSP - 30106	Port

Table 3 – ITS Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID	Priority	Lead Agency
ITS	122nd Ave Corridor ITS Improvements	NE Airport Way to SE Powell Blvd	Install ITS infrastructure (communication network, Next-Gen transit signal priority, truck priority detection, CCTV cameras, and vehicle / pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system consistent with our policies of moving people and goods more effectively.	$4,500,000	TSP - 50005	High	PBOT
ITS	N/NE Lombard St ITS	N Columbia Blvd to NE MLK Jr Blvd	Install ITS infrastructure (communication network, Next-Gen transit signal priority, CCTV cameras, and vehicle/bike/pedestrian detection system) and signal timing improvements for all road users.	$11,500,000	TSP - 30035	High	PBOT
ITS	Sandy Blvd ITS	NE Couch to NE 82nd Ave	Install ITS infrastructure (communication network, Next-Gen transit signal priority, truck priority detection, CCTV cameras, and vehicle / pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system consistent with our policies of moving people and goods more effectively.	$4,500,000	TSP - 40069	High	PBOT
ITS	Barbur Boulevard ITS	Barbur Boulevard, SW (SW Caruthers to Capitol Hwy)	Install intelligent transportation system infrastructure to improve safety and enhance traffic flow.	$2,000,000	TSP - 90014	Medium	PBOT
ITS	Marine Dr ITS	Marine Dr, N/NE (Portland Rd - 185th)	"Install CCTV at N Portland Rd and changeable message signs at Portland Rd, Vancouver and 185th"	$397,000	TSP - 30038	Medium	PBOT
ITS	NW Yeon Ave / St Helens Rd (Hwy 30) ITS Improvements	NW Nicolai St to NW 107th Ave	Install ITS infrastructure (communication network, Next-Gen transit signal priority, CCTV cameras, and vehicle/bike/pedestrian detection system) and signal timing improvements for all road users.	$3,000,000	TSP - 60023	Medium	PBOT
ITS	SE Powell Blvd ITS	West/East Segments	Install needed ITS infrastructure (communication network, new traffic controllers, CCTV cameras, truck priority, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system.	$489,000	New - ITS3	Opportunity	PBOT
ITS	Beaverton-Hillsdale Hwy ITS	Beaverton- Hillsdale Hwy, SW	Install needed ITS infrastructure (communication network, new traffic controllers, CCTV cameras, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system.	$1,018,000	TSP - 90019	Opportunity	PBOT
ITS	Macadam ITS	Macadam, SW (Bancroft - Sellwood Br)	Install ITS infrastructure (communication network, Next-Gen transit signal priority, CCTV cameras, and vehicle/bike/pedestrian detection system) and signal timing improvements for all road users.	$2,500,000	TSP - 90046	Opportunity	PBOT
ITS	SE Stark St ITS	SE Stark St (82nd Ave to COG)	Install needed ITS infrastructure (communication network, new traffic controllers, CCTV cameras, truck priority, and vehicle /pedestrian detectors). These ITS devices allow us to provide more efficient and safe operation of our traffic signal system.	$1,617,000	New - ITS1	Opportunity	PBOT
ITS	Terminal 6 - Queue Warning System	Terminal 6 - Queue Warning System		$250,000	New - ITS2		

Table 4 – Marine Terminal Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID Priority	Lead Agency
Marine Terminal	T4 Modernization	Terminal 4	Renovate operation areas at T4 to create intermodal processing areas. Rail spur relocation and expansion, gran elevator demolition, wharf removal.	$15,850,000	TSP - 30099	Port
Marine Terminal	T6 Internal Overcrossing	Marine Dr - Terminal 6, N	Construct an elevated roadway between Marine Dr and Terminal 6.	$3,649,084	TSP - 30097	Port
Marine Terminal	T6 Second Entrance from Marine Drive	Terminal 6	Construct 2nd entrance from Marine Drive and internal rail overcrossing to Terminal 6.	$12,000,000	TSP - 30100	Port
Marine Terminal	T6 Suttle Road entrance	Terminal 6	Access to T6 off the terminus of Suttle Road, improvements to existing Suttle Road.	$3,000,000	TSP - 30101	Port
Marine Terminal	Terminal 6 Rail Support Yard Improvements	Terminal 6, N	Increase Terminal 6 rail capacity	$10,000,000	TSP - 30102	Port
Marine Terminal	Willamette River Channel Deepening	Willamette River	Deepen the portions of the Willamette River with deep draft infrastructure to ~43' where appropriate. Allow Willamette River terminals to also benefit from the Columbia River's new controlling depth.	$200,000,000	TSP - 30109	Port

Table 5 – Rail Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID	Priority	Lead Agency
Rail	NE 60th Ave Rail Undercrossing Improvements	60th Ave, NE (Columbia - Lombard)	Improve the NE 60th Ave Rail Undercrossing to improve vertical clearance for freight movement and to provide pedestrian and bicycle facilities.	$31,000,000	New - R5	High	PBOT
Rail	Kenton Quiet Zone	Kenton Line Quiet Zone is along the Kenton rail line at the Kenton neighborhood	Street and rail crossing improvements to allow implementation of a Quiet Zone.	$6,487,000	New - R6	Opportunity	PBOT
Rail	N Argyle Way/N Columbia Blvd Rail Grade Crossing Signal Improvements	N Argyle Way at Columbia Blvd	Reduce delay for vehicles and pedestrians at signalized intersections near highway-rail grade crossings. Being a critical traffic signal, safeguard against power failures with battery back-up power supply (BPS) system. Optimize signal timing and signal performance by connecting controllers with rail island circuits during rail pre-emption.	$20,000	New - R1	Opportunity	PBOT
Rail	N Chautauqua Blvd/ N Columbia Blvd Rail Crossing Signal Improvements	N Chautauqua Blvd at N Columbia Blvd	Reduce delay for vehicles and pedestrians at signalized intersections near highway-rail grade crossings. Being a critical traffic signal, safeguard against power failures with battery back-up power supply (BPS) system. Optimize signal timing and signal performance by connecting controllers with rail island circuits during rail pre-emption.	$20,000	New - R3	Opportunity	PBOT
Rail	NE 158th Ave/ NE Sandy Blvd Rail Crossing Signal Improvements	NE 158th Ave at NE Sandy Blvd	Reduce delay for vehicles and pedestrians at signalized intersections near highway-rail grade crossings. Being a critical traffic signal, safeguard against power failures with battery back-up power supply (BPS) system. Optimize signal timing and signal performance by connecting controllers with rail island circuits during rail pre-emption. Install fiber interconnect communication.	$200,000	New - R2	Opportunity	PBOT
Rail	82nd/Airport Way, NE - Grade Separation	82nd Ave & Airport Way, NE	Construct a grade-separated overcrossing to allow for uninterrupted flow along Eastbound Airport Way over 82nd Ave.; including grade separated LRT from 82nd Ave	$75,000,000	TSP - 40025		Port
Rail	"Barnes Yard to Terminal 4 Rail Access"	Barnes Yard - Terminal 4, N	Add dedicated track for Terminal 4 through Barnes Yard and add new track from Barnes Yard to Terminal 4	$3,000,000	TSP - 30077		Port
Rail	Bonneville Rail Yard Build Out	Bonneville Rail Yard	Construct two interior yard tracks at Bonneville Yard and complete the double track lead from the wye at the east end of the yard to UP Barnes Yard. Add rail staging capacity for South Rivergate.	$3,600,000	TSP - 30104		Port
Rail	Cathedral Park Quiet Zone	Cathedral Park UPRR Tracks, N	Address rail switching noise related to the Toyota operations at T-4 by improving multiple public rail crossings in the St. Johns Cathedral Park area.	$9,324,497	TSP - 30107		PBOT/ Port
Rail	Columbia Blvd Rail Overcrossing	Columbia Blvd & Peninsula Junction, N	Grade separate Columbia Blvd at Penn Junction to eliminate three at-grade rail crossings.	$28,935,000	TSP - 30066		PBOT
Rail	Kenton Rail Line Upgrade	Kenton Line, N/NE	Upgrade existing track to second main track with new double track from Peninsula Junction to I-205 and increase track speeds between North Portland, Peninsula Junction, to Reynolds on UP's Kenton Line. Part of triangle project with ODOT.	48165537	TSP - 40085		METRO

Table 5 – Rail Projects

Project Category	Project Name	Project Location	Project Description	Estimated Cost	Project ID Priority	Lead Agency
Rail	Marine Dr. Rail Overcrossing	Marine Dr, N (at Rivergate West)	Reroute rail tracks and construct an above-grade rail crossing at Rivergate West entrance to improve safety and reduce vehicle and rail traffic conflicts.	$13,644,000	TSP - 30039	Port
Rail	NE 82nd Ave/ NE Airport Way Rail Crossing Signal Improvements	NE 82nd Ave at NE Airport Way	Being a critical traffic signal, safeguard against power failures with battery back-up power supply (BPS) system.	$20,000	New - R4	PBOT / Port
Rail	North Portland Junction Crossover Improvements	North Portland Junction, N	Eliminate the at-grade crossing of UPRR and BNSF tracks	$33,600,000	TSP - 30065	Port
Rail	North Portland Junction: Undoing the "X"	North Portland Junction, N	Eliminate the at-grade crossing of UPRR and BNSF tracks at North Portland Junction.	$33,598,000	TSP - 30055	Port
Rail	Railroad Bridge and Track Improvements	BNSF Mainline at Willamette and Columbia River Bridges, N	Improve rail track conditions on approaches to Willametter River and Columbia River bridges to increase railroad speed and capacity	$10,751,000	TSP - 30063	Port
Rail	Ramsey Yard Utilization	Ramsey Yard	Connect the existing set out track along the west side of the main lead with the industrial lead near the south end to provide a location to store a unit train.	$1,700,000	TSP - 30105	Port
Rail	Willbridge Industrial Area Rail Overcrossing	Willbridge Industrial Area, NW (St Helens Rd - Front Ave)	Provide an alternative crossing of the BNSF Railroad to improve connectivity and safety between US 30 and the industrial properties served by NW Front Avenue in the Willbridge area of the NW Industrial District.	$23,113,022	TSP - 60018	Port

APPENDIX C: CRITICAL INFRASTRUCTURE RESILIENCY EVALUATION

PURPOSE AND NEEDS

Natural or human-caused disasters can produce considerable damage to transportation infrastructure that results in direct economic losses due to post-event repair and retrofitting, as well as indirect losses due to abnormal operation and traffic disruptions. In cases of natural events damaging urban transportation systems, the interdependency between safety and road functionality further amplifies the induced loss, as the affected communities require a secure flow of people, goods, and services to address the immediate, medium, and long term needs during the recovery process.

The 2040Freight Plan defines resilience of the Urban Freight System as the ability of the transportation system to withstand a disruption (e.g., natural disasters, fuel supply disruptions, and crashes on critical freight routes). The freight transportation system is vital to the post-event economic and community recovery. Providing a reliable and redundant freight network not only supports the provision of a reliable flow for the local and interstate freight movement but also the flow of essential goods, commodities, and services for emergency response and recovery.

Therefore, it is paramount to identify vulnerabilities within the network and prepare for future events to mitigate their impact and increase the speed of recovery. To address this challenge, 2040Freight develops a high-level resiliency assessment framework to evaluate urban freight infrastructure to include a resiliency lens to support informed decision-making and resource allocation. This analysis identifies the bridges located in major Urban Freight corridors that are vulnerable to hazards, such as earthquakes, collision impacts, flooding, and fire. This information helps prioritize bridges with the highest scores (least resilient) to inform the 2040Freight major infrastructure improvements, either by modifying existing projects or adding projects that will address this need.

PROCESS

The Critical Infrastructure Evaluation was developed by a unification of existing datasets, using metrics to evaluate both value to the network and level of vulnerability. The datasets that were pulled from include the Bridge Inventory Risk Assessment, Seismic Retrofit Program Report, as well as TSP classifications and freight district boundaries. The methodology of the 2040Freight Critical Infrastructure Evaluation was developed in close coordination with PBOT's Bridge and Structure division.

This analysis aimed to address the resiliency component of one of the eight goals outlined in 2040Freight: System Condition (i.e. maintain and improve the freight transportation infrastructure, to lower its life cycle cost, and enhance the resilience of critical infrastructure). The results are included as part of the 2040Freight Priority Freight Infrastructure Network Assessment (PFINA) analysis, for which Access, Efficiency, System Condition, Safety, and Economic Vitality metrics are integrated.

PRE-SELECTION OF BRIDGES

Bridges were only considered if they are owned by PBOT (at least partially) and are located on or are crossing facilities classified as Regional Truckways, Priority Truck Streets, Major Truck Streets, Main Railroads, or Branch Railroads in the TSP. Although the analysis is mostly identical, the group of bridges was divided by those carrying vs those crossing the TSP classification types listed above. This separation provides more clarity in the maps and allows for quicker assessment of network needs.

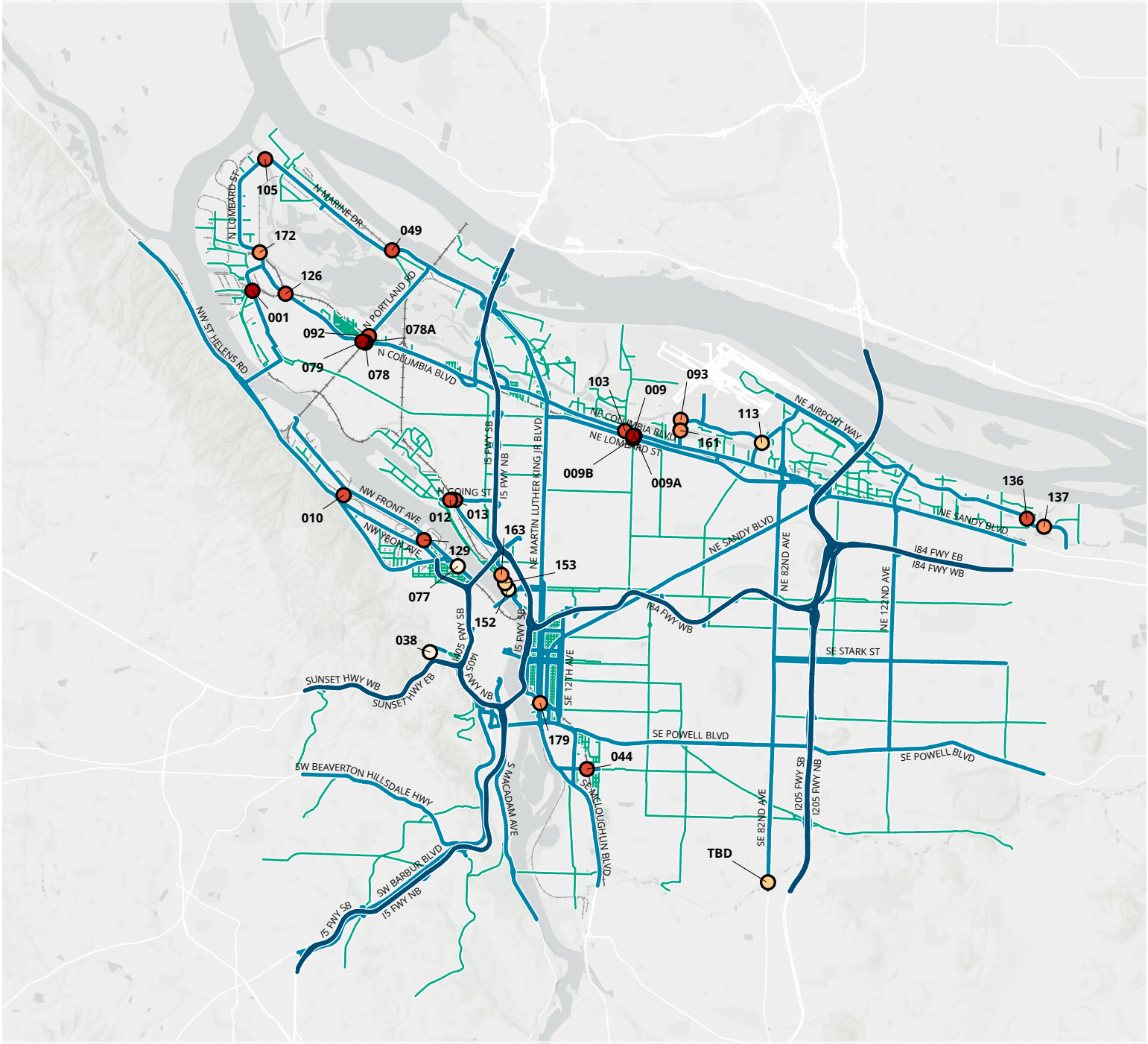
SCORING

Ten indicator metrics were used in the analysis to identify various vulnerabilities, conditions, and value or impact to the freight network. The scores were balanced to most accurately reflect the impact of the measure. The table below highlights the measures used, sources of the data, and unique scoring system.

Table 6 – Critical Infrastructure Evaluation Scoring Scheme

Measure	Source	Scoring Schema
Seismic Vulnerability	Bridge Inventory Risk Assessment - PBOT Bridges and Structures	Less Vulnerable = 0 Vulnerable = 3 More Vulnerable = 5
Sufficiency Rating	Bridge Inventory Risk Assessment - PBOT Bridges and Structures	Eligible for Rehabilitation (50-79) = 3 Eligible for Replacement (49-0) = 5
EER/ERT Designation	Seismic Retrofit Program Report - PBOT Bridge Seismic Resilience Assessment and Prioritization Program	Custom Score on a 1 - 5 scale
Utility Dependency	Seismic Retrofit Program Report - PBOT Bridge Seismic Resilience Assessment and Prioritization Program	Custom Score on a 1 - 5 scale
Fracture Critical Status	Bridge Inventory Risk Assessment - PBOT Bridges and Structures	No (0) = 0 Yes (10) = 3
Scour Vulnerability	Bridge Inventory Risk Assessment - PBOT Bridges and Structures	No = 0 Unknown = 1 Yes = 3
PBOT Bridge Condition Rating	Seismic Retrofit Program Report - PBOT Bridge Seismic Resilience Assessment and Prioritization Program	Custom Score on a 1 - 4 scale
TSP Freight Classification [Carrying or Crossing]	TSP Freight Classification	Major Truck Street = 2 Priority Truck Street = 3 Carrying Main Railroad = 4 Regional Truckway = 5
Risk of Bridge Strike	Bridge Inventory Risk Assessment - PBOT Bridges and Structures + TSP Freight Classification	If carrying bridge: TSP designation [of segment crossed] + Underclearance Vulnerability (reclassed by equal interval to 1-5 score) If crossing bridge: Underclearance Vulnerability (reclassed by equal interval to 1-5 score)
Freight District	Freight District Boundaries	Not in Freight District = 0 In Freight District = 5
Maximum Potential Score = 45		

Map 1 – Critical Infrastructure Resiliency Analysis of PBOT Bridges on the Freight Network



Critical Infrastructure Resiliency Score

- 32 - 35
- 29 - 31
- 25 - 28
- 22 - 24
- 17 - 21

Priority Freight Infrastructure Network

- Interstate Network
- Flow of Goods
- Access to Goods
- Railroad Main Line
- Railroad Branch Line

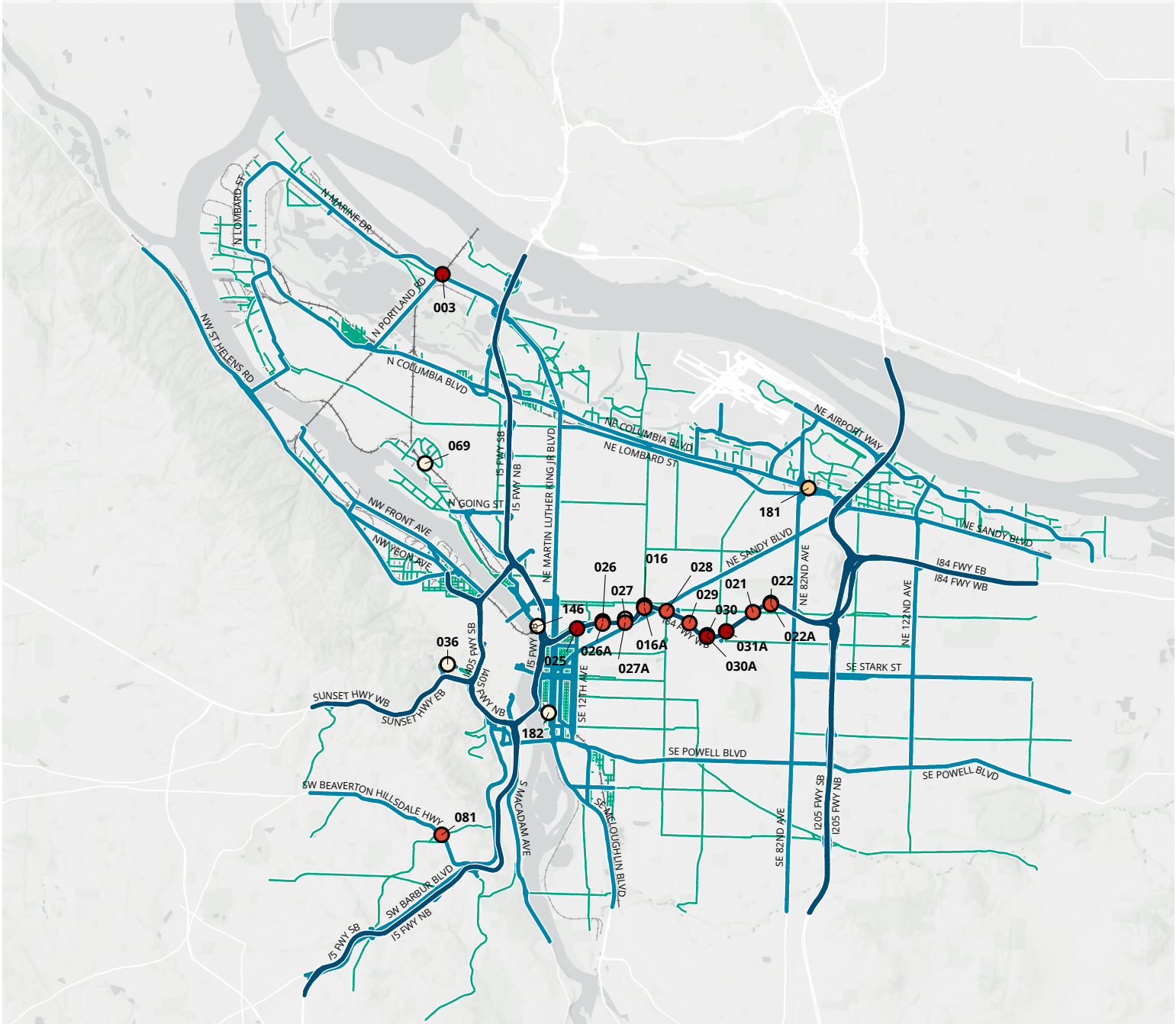
0 1.25 2.5 5 Miles

N

Table 7 – Critical Infrastructure Resiliency Analysis of PBOT Bridges on the Freight Network

Bridge Number	Bridge Type	Location	Location Description	Final Score
009A	Vehicular	N.E. 33RD AVE. RAMP	NORTHBOUND TO N.E. COLUMBIA BLVD	35
009	Vehicular	N.E. 33RD AVE.	BETWEEN N.E. COLUMBIA BLVD AND N.E. LOMBARD ST	34
001	Vehicular	N. BURGARD ST. VIADUCT	OVER RR	32
078	Vehicular	N. COLUMBIA BLVD.	TRAIL OVER RR	32
078A	Vehicular	N. COLUMBIA BLVD.	ROAD OVER RR	32
079	Vehicular	N. COLUMBIA BLVD.	OVER N. COLUMBIA WAY	32
103	Vehicular	N.E. COLUMBIA BLVD.	OVER N.E. 33RD DR RAMP	31
010	Vehicular	N.W. KITTRIDGE AVE.	OVER RR	30
044	Vehicular	S.E. HOLGATE BLVD.	OVER RR	30
126	Vehicular	N. COLUMBIA BLVD.	OVER RR	29
013	Vehicular	N. GREELEY AVE.	OVER N. GOING ST	29
129	Vehicular	N.W. 26TH AVE.	OVER RR	29
049	Vehicular	N MARINE DR	OVER RR	28
105	Vehicular	N. MARINE DR.-N. LOMBARD ST. CONN.	OVER WATER	28
092	Vehicular	N. PORTLAND RD.	OVER RR	28
012	Vehicular	N. GOING ST. - SWAN ISLAND	OVER RR	28
136	Vehicular	N.E. AIRPORT WAY - BRIDGE A	OVER WATER	28
137	Vehicular	N.E. AIRPORT WAY - BRIDGE B	OVER WATER	27
172	Vehicular	N. LOMBARD ST. (S. RIVERGATE CONNECTOR)	OVER RR	27
179	Vehicular	MLK VIADUCT	OVER RR, S.E. TILIKUM WAY, S.E. CARUTHERS ST, AND S.E. DIVISION PL	27
009B	Vehicular	N.E. 33rd AVE.	OVER N.E. LOMBARD ST	26
093	Vehicular	N.E. 47TH AVE.	OVER WATER	25
161	Vehicular	N.E. 47TH AVE.	OVER WATER	25
163	Vehicular	N. ALBINA ST.	OVER RR, N. ALBINA AVE	25
153	Vehicular	N. INTERSTATE AVE. RAMP - M.P. 1.06	OVER RR, N. INTERSTATE AVE	24
113	Vehicular	N.E. ALDERWOOD RD.	OVER WATER	24
	Vehicular	S.E. 82ND AVE	OVER WATER	24
077	Vehicular	N.W. FRONT AVE. SEMI-VIADUCT	OVER WATER	20
152	Vehicular	N. INTERSTATE AVE. SEMI-VIADUCT-M.P.1.00	OVER RR	18
038	Vehicular	S.W. CANYON RD.	OVER S.W. JEFFERSON RD	17

Map 2 – Critical Infrastructure Resiliency Analysis of PBOT Bridges Crossing the Freight Network



Critical Infrastructure Resiliency Score

- 30 - 32
- 26 - 29
- 23 - 25
- 19 - 22
- 15 - 18

Priority Freight Infrastructure Network

- Interstate Network
- Flow of Goods
- Access to Goods
- Railroad Main Line
- Railroad Branch Line

The following bridges were removed due to data constraints: N Leadbetter Rd (BR-177) and NE 42nd Ave (BR-075).

0 1.25 2.5 5 Miles

N

Table 8 – Critical Infrastructure Resiliency Analysis of PBOT Bridges Crossing the Freight Network

Bridge Number	Bridge Type	Location	Location Description	Final Score
031A	Vehicular	N.E. 60TH AVE.	OVER I-84/RR	32
025	Vehicular	N.E. 12TH AVE.	OVER I-84/RR	31
030A	Vehicular	N.E. 53RD AVE.	OVER I-84/RR	31
003	Rail	B.N.R.R. BRIDGE SUBSTRUCTURE	OVER N. MARINE DR	29
029	Vehicular	N.E. 47TH AVE.	OVER I-84/RR	28
021	Vehicular	N.E. HALSEY ST.	OVER I-84/RR	28
027A	Vehicular	N.E. 28TH AVE.	OVER I-84/RR	27
022A	Vehicular	N.E. 74TH AVE.	OVER I-84/RR	27
081	Vehicular	S.W. CAPITOL HIGHWAY	OVER S.W. BERTHA BLVD	26
026A	Vehicular	N.E. 21ST AVE.	OVER I-84/RR	26
016A	Vehicular	N.E. 33RD AVE.	OVER I-84/RR	26
028	Vehicular	N.E. 39TH AVE.	OVER I-84/RR	26
016	Vehicular	N.E. 33RD AVE.	OVER I-84/RR	23
030	Vehicular	N.E. 53RD AVE.	OVER I-84/RR	22
181	Rail	EAST COLUMBIA TO LOMBARD CONNECTOR	OVER I-84/RR	21
146	Vehicular	STEEL BRIDGE - E SIDE RAMP (From Interstate)	OVER I-84/RR	18
026	Vehicular	N.E. 21ST AVE.	OVER I-84/RR	18
027	Vehicular	N.E. 28TH AVE.	OVER I-84/RR	17
036	Vehicular	S.W. VISTA AVE.	OVER RR, S.W. JEFFERSON ST	17
069	Vehicular	N. LEVERMAN ST.	OVER RR	16
022	Vehicular	N.E. 74TH AVE.	OVER I-84/RR	16
182	Rail	EASTSIDE STREETCAR	OVER RR, S.E. 2ND PL, S.E. WATER AVE, S.E. DIVISON ST	15

APPENDIX D: FINANCING OPTIONS FOR FREIGHT INFRASTRUCTURE IMPROVEMENTS

PURPOSE AND NEED

PBOT has a significant funding gap for its unmet need of $4.4 billion. Of the $4.4 billion, the most significant unfunded portion of the deficit is mainly between three major asset classes of paving ($3.36 billion), bridges ($244 million), and signals and streetlights ($82 million)—all of which are assets that benefit goods movement. Yet there is a finite amount of funding to address these unmet needs. The City must prioritize investments with a reasonable and optimistic vision of funding potential for urban freight.

PBOT FINANCIAL CONTEXT

The following information is provided for the purpose of contextualizing opportunities for implementing projects and addressing needs identified by the Priority Freight Infrastructure Needs Assessment (PFINA) within PBOT's financial resources.

PBOT's annual budget is about $568 million, roughly 8% of the city's total budget of $5.4 billion. Approximately 75% of PBOT's funding comes from restricted sources which means they are dedicated to particular programs, projects, and/or services. These sources include grants for specific projects or programs, such as the Regional Flexible Funds program, revenue from the Fixing Our Streets voter-approved 10-cent gas tax, cannabis taxes, transportation system development charges on development, and others.

The remaining 25% of PBOT's funding is more discretionary. These revenues come mostly from two sources: the Oregon State Highway Fund (60% of the 25%), and parking fees (40% of the 25%). This discretionary funding is called General Transportation Revenue, or "GTR."

The Oregon State Highway Fund is split approximately 50/30/20 between the Oregon Department of Transportation (ODOT), Oregon counties (apportioned based on the number of registered vehicles), and cities (based on population). These funds can only be used for the creation, preservation, and maintenance of Oregon's public highways, streets, and roadside rest areas.

Parking revenue funds go primarily to the cost of parking operations. Revenue beyond that is spent on items not eligible for gas tax funds, such as Portland Streetcar operations. Furthermore, 51% of net revenue from meter districts outside of downtown must stay within those districts. PBOT may use the remaining funds for transportation services citywide. For example, in Northwest Portland, funds from district parking meters were spent on new trash cans, pedestrian lighting, Northwest in Motion planning and implementation, and over 3,500 Transportation Wallets since the program launched.

Unfortunately, these funding sources have systemic challenges which have been exacerbated during the pandemic. For example, Portland's share of State Highway funds has been falling since 2019. Additionally, Portland's population vehicle registration are dropping, meaning that the bureau's FY22-23 revenues are projected to be $7 million lower than forecast. Parking demand and revenue is way down and has been slower to recover than the conservative forecast. Most areas with metered parking have 30% less demand or more.

Revenues considered to be potential freight project funding sources include federal and state grants, regional flexible funds, Port of Portland contributions to City-led freight projects, a share of Transportation System Development Charge and Statewide Transportation Improvement Program (STIP) funds, and City grant match funds. This revenue does not include substantial revenue for freight projects led by the Port of Portland, ODOT, and other agencies.

With these parameters in mind, PBOT works carefully with the Bureau & Budget Advisory Committee (BBAC) and Financial Services team to ensure appropriate spending of restricted and discretionary dollars. This is accomplished while balancing the bureau budget for the short term and long term. In the FY 2022-23 budget that meant setting aside $16.8 million of the $568.1 million in total expenditures for balancing future years. PBOT is continuously tracking opportunities to fund projects in the Transportation System Plan, including sources that are eligible for freight projects. The City will continue to pursue grant opportunities to enhance the citywide freight system and prepare for new federal and state grants that might emerge in the future.

Portland's FY 2022-23 Adopted Budget is available online here. Click on Volume 1 and go to page 487 for PBOT's budget.

APPENDIX E: ENGAGEMENT AND ITERATION PROCESS

ENGAGEMENT AND ITERATION

Throughout its development, the 2040Freight Plan was iteratively refined through advice and comments received from the 2040Freight Community Advisory Committee and Technical Advisory Committee, responses to the Plan's on-line survey, and at meetings of the Portland Freight Committee, Bicycle Advisory Committee, and Pedestrian Advisory Committee. In addition, focus groups were held with the Black Food Sovereignty Coalition, disability/ accessibility community, Spanish, Russian, Chinese, and Vietnamese-speakers who live in/ near industrial or heavy freight areas and/or work in transportation or warehousing. Finally, input was gathered from interviews with community leaders, industry leaders, and policymakers early in the Plan's development. PBOT staff then drafted goals and objectives from the themes of those discussions for iterative review by the 2040Freight Technical Advisory Committee and Community Advisory Committee.

For more details, please refer to the 2040 Freight Public Engagement Report.

The goal refinement process utilized three engagement paths: appreciative inquiry and the "be, do, have" framework for creative and positive thinking, and review/ reflection. The 2040Freight Technical Advisory Committee and Community Advisory Committee participated in all three activities, as did 45 participants—who were personally interviewed, including policy makers and leaders from the community and freight industry—and the Portland Freight Committee. Online survey and focus group participants provided review/ reflection feedback in the iterative process.

Appreciative inquiry

Appreciative inquiry is an organizational change model that when applied to planning, helps communities find common ground by taking stock of what is and using it as a platform to support future directions. Instead of focusing public feedback around the problems associated with freight movement in Portland, appreciative inquiry looks first to strengths and successes, which is particularly valuable for aligning positive direction that shapes a motivating future.

The appreciative inquiry question used to refine the goals, and initiate development of objectives, strategies, and actions of the 2040Freight Plan was simply, "when you think about 'freight' in Portland, what do you appreciate or value?"

Be, do, have framework

The "be, do, have" model is most known as a personal development coaching tool, however it is used in this planning process to encourage development of vision, goals, objectives, strategies, and actions that are positive and actionable. The 2040Freight Technical Advisory Committee and Community Advisory Committee utilized Jamboard (Google's virtual whiteboard) to contribute sticky-note responses to fill in the blanks in a series of "be, do, have '' sentence prompts for each of the goal areas. Participants were invited to think beyond using the be, do, have model to use other sentence-starters if they were already experienced in participating in positive brainstorming.

Be, do, have prompts:

- Freight in Portland should BE _____ to embody true and best [GOAL]
- Freight in Portland should DO _____ to embody true and best [GOAL]
- Freight in Portland should HAVE _____ to embody true and best [GOAL]

Review/ reflection

Through the previous processes, the list of goals and their objectives statements were refined as shown in Table 10/11.

Table 9 – 2040Freight Goals and Objectives Development Process

Initial Goal & Objective	Refined goal & objective for additional review/reflection	Public review draft goal & objective
	Notes on initial changes	*Notes on subsequent changes*
Economic prosperity Support a low-carbon economy and foster employment growth, competitiveness, and equitably distributed household prosperity.	**Economic vitality and employment** Foster a thriving and competitive economy, and employment growth for Portland and the region's industrial districts, businesses, and communities. *So much of a vital economy is related to the importance of adding middle-income jobs that provide access to self-sufficiency for people with less than a college degree and a means of closing the wage distribution gap for BIPOC workers.*	**Economic vitality** Foster a thriving, competitive economy and employment growth for Portland's industrial districts, businesses, and communities. *The question of "who prospers and who pays burdens?" raises equity concerns and considerations newly integrated into the strategies and actions of this section and the Equity section. Focuses on the areas of impact for the plan.*
Resilience Reduce risk and improve the ability of individuals, communities, economic systems, and the natural and built environments to withstand, recover from, and adapt to changes from natural hazards, human-made disasters, climate change, and economic shifts.	**Resilience** Reduce risk and improve the ability of the freight network to withstand a disruption (e.g., natural disaster, fuel supply disruptions, and crashes on critical freight routes). *Emphasis on the focus of the freight network and the particular risks of concern to freight movement.*	**System conditions** Maintain and improve the freight transportation infrastructure to lower its life cycle cost and improve resilience of critical infrastructure. *Resilience for freight, for the role of the transportation bureau, is largely balanced on the need for critical infrastructure and a maintained system.*

Table 9 – 2040Freight Goals and Objectives Development Process

Initial Goal & Objective	Refined goal & objective for additional review/reflection	Public review draft goal & objective
	Notes on initial changes	*Notes on subsequent changes*
Safety Make Portland streets safe for everyone.	**Safety** Improve the safety of freight movement to decrease impacts to people walking, riding bicycles, using mobility devices, and driving automobiles and commercial vehicles, through infrastructure investments. *Emphasis on who the safety is for and how it would be provided.*	**Safety of freight movement** Improve freight movement to address safety needs for freight drivers and people walking, riding bicycles, scooting, and driving automobiles *Emphasis added on addressing needs for the safety of all road users.*
Moving people and goods Provide transportation options for a growing city.	**Mobility + Access** Mobility: Promote efficient movement of goods to, from, and within the city. Access: Provide and improve access for freight vehicles to key freight origins and destinations (access to the curb or other loading, unloading, and parking facilities). *Moving people and goods, from a freight plan perspective, inherently respects the "moving people" part, while particularly focusing mobility and access of the goods movement.*	**Efficiency + Access** Efficiency: Provide and improve travel reliability and efficiency of the movement of goods to, from, and within the city. Access: Provide and improve freight vehicle access to key freight origins and destinations (access to the curb or other loading/ unloading and parking facilities). *Mobility was a confusing term for some so emphasis was placed on the efficient movement of goods, which is not the same as congestion removal, which is what some said they think of when they think of "efficiency". To clarify, emphasis on travel reliability is articulated. Access remains the same.*

Table 9 – 2040Freight Goals and Objectives Development Process

Initial Goal & Objective	Refined goal & objective for additional review/reflection	Public review draft goal & objective
	Notes on initial changes	*Notes on subsequent changes*
Human health Avoid or minimize negative health impacts and improve opportunities for Portlanders to lead healthy, active lives. **Environmental health** Weave nature into the city and foster a healthy environment that sustains people, neighborhoods, and fish and wildlife. Recognize the intrinsic value of nature and sustain the ecosystem services of Portland's air, water, and land.	**Environment** Strive for environmental sustainability of urban goods movement to preserve resources, reduce diesel and climate pollution, minimize noise, and foster healthy communities. *The focus on dismantling structural racism and reducing carbon emissions illuminated the substantial connection between human and environmental health when it comes to freight. Human health is particularly elevated in the Equity section as well.*	**Environment** Improve environmental sustainability of urban goods movement to preserve resources and minimize carbon emissions, stormwater runoff, air quality impacts, noise, and visual intrusion, while fostering healthy communities. *More specific on the sustainability aims.*
Equity Promote equity and environmental justice by reducing disparities, minimizing burdens, extending community benefits, increasing the amount of affordable housing, affirmatively furthering fair housing, proactively fighting displacement, and improving socio-economic opportunities for under-represented populations. Intentionally engage under-served and under-represented populations in decisions that affect them. Specifically recognize, address, and prevent repetition of the injustices suffered by communities of color throughout Portland's history.	**Racial equity** Support and propose freight investments that address historic racial, social, environmental, and economic injustice suffered by communities of color, including fostering the physical, mental, and social well-being of communities living and working in Portland. *The City is committed to racial equity as a means of impacting the greatest results in beneficial outcomes for all with equity needs. This change utilizes the City's definition.*	**Equity** Develop and implement freight investments that address injustice suffered by communities of color, low-income, people with disability and other vulnerable communities including fostering the physical, mental, and social well-being of communities living and working in Portland. *Refocused specifically to the work of the freight plan.*

Table 9 – 2040Freight Goals and Objectives Development Process

Initial Goal & Objective	Refined goal & objective for additional review/reflection	Public review draft goal & objective
	Notes on initial changes	*Notes on subsequent changes*
Asset management Deliver smart investments to maintain our transportation system.	**Maintenance** Maintain and repair roads and bridges that are part of the freight network. *Specific emphasis on the investments critical to goods movement.*	**System conditions** Maintain and improve the freight transportation infrastructure to lower its life cycle cost and improve resilience of critical infrastructure. *Shown in the second row as an iteration for "Resilience", System conditions consolidates asset management/ maintenance with resilience.*
NEW	**Partnership & Knowledge** Work with external and internal partners to advance freight priorities and grow public knowledge and awareness about freight. *The Community Advisory Committee noted that this was a gap in the goals and this goal was added to reflect that feedback.*	**Partnership & Knowledge** Work with external and internal partners to advance freight priorities and grow public knowledge and awareness about freight. *No further refinement required.*

PBOT

PORTLAND BUREAU OF TRANSPORTATION