



Regional Freight Investments Projects

Name of Project: N/NE Columbia Boulevard ITS

Project Definition

Columbia Blvd is a freight corridor. It is a vital link between North Portland and I-5 for freight traffic. It is classified as a Priority Truck Street in the City's Transportational System Plan (TSP). It functions as the primary route access and circulation between Freight Districts along the Columbia Corridor (i.e, Rivergate and Airport Industrial Districts), and Regional Truckways (i.e, I-5 and I-205). They are designated to accomodate high truck volumes and provide high-quality freight access and mobility. N/NE Columbia Blvd is also a federally designated National Highway System (NHS) intermodal Connector Route which are nationally significant roadways that provide access to major intermodal terminals.

Project Description

Facility. **NNE Columbia Blvd**

The movement of goods along its 10 mile extents is facilitated at intersections through 16 traffic signals at the following intersections:

- NE Columbia Parkway/NE Columbia Boulevard
- NE 82nd Avenue/NE Columbia Boulevard
- NE 80th Avenue/NE Columbia Boulevard
- NE 60th Avenue/NE Columbia Boulevard
- NE 42nd Avenue/NE Columbia Boulevard
- NE Martin Luther King Jr. Boulevard/NE Columbia Boulevard
- N Vancouver Avenue/N Columbia Boulevard
- I-5 Ramp/N Columbia Boulevard
- N Interstate Place/N Columbia Boulevard
- N Argyle Way/N Columbia Boulevard
- N Peninsular Avenue/N Columbia Boulevard
- N Chautauqua Boulevard/N Columbia Boulevard
- N Portsmouth Avenue/N Columbia Boulevard
- N Macrum Avenue/N Columbia Boulevard
- N Upland Drive/N Columbia Boulevard
- N Burgard Road/N Columbia Boulevard

- Beginning facility **NE Columbia Blvd and I-205**
- Ending facility **N Columbia Boulevard at Burgard**

Provide a brief description of the project elements.

This project will identify and evaluate ITS alternatives, including the exploration of emerging data from private sector partners, to determine whether there are new techniques that can be used to deliver freight priority at signalized intersection. The Project will also install ITS infrastructure, including system loops, bike count stations, Bluetooth MAC address matching sensors, CCTV cameras, and communications infrastructure. The project will integrate these ITS devices and the traffic signal controllers along each corridor with the City’s and ODOT’s Transportation Operation Centers.

- City. City of Portland
- County. Multnomah

Base project information

- Corresponding RTP project number for the nominated project.
 - 10342: Columbia Blvd, N/NE (I-205 – Burgard): ITS
- Attach a completed Public Engagement and Non-discrimination checklist (Appendix A).

Purpose and need statement

The purpose of this project is to identify and evaluate ITS alternatives, including the exploration of emerging data from the private sector, to determine whether there are new techniques that can be used to deliver freight and transit priority at signalized intersections. The Project will also install ITS infrastructure, including system loops, bike count stations, Bluetooth MAC address matching sensors, CCTV cameras, and communications infrastructure. The project will integrate these ITS devices and the traffic signal controllers along each corridor with the City’s and ODOT’s Transportation Operation Centers.

Needs addressed by this project include:

- 1) Reducing travel times for trucks and transit travelling along Columbia Boulevard and improving safety along the corridor by implementing intelligent transportation systems (ITS) including signal priority for trucks, traffic monitoring equipment, and other intersection improvements.
- 2) Improving safety and efficiency at multi-modal intersections along Columbia Boulevard. Presently, there is no equipment for monitoring or evaluating the performance of the intersections along the corridor.

Description of post implementation measurement of project effectiveness.

- 1) Installation of hardware to improve the functioning of the intersections along Columbia Boulevard by allowing for trucks and freight to be granted priority, and installation of a variable message signs to warn of vehicle/train conflicts.

2) Installation of closed circuit television cameras and supporting hardware to allow for monitoring and management of traffic along the corridor at four locations:

1. N Columbia Blvd at Burgad/Lombard
2. N Columbia Blvd at Macrum
3. N Columbia Blvd at Peninsular
4. N Columbia Blvd at Interstate
5. N Columbia Blvd at MLK
6. N Columbia Blvd at 42nd/47th and at Columbia Parkway
7. N Columbia Blvd at Columbia Parkway

PROJECT COST AND FUNDING REQUEST SUMMARY

ITEM NO.	ITEMS OF WORK AND MATERIALS	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION	1	LS	\$18,000.00	\$18,000.00
2	TEMPORARY PROTECTION & DIRECTION OF TRAFFIC	1		\$19,500.00	\$19,500.00
3	TEMPORARY SIGNS	500	SQFT	\$20.00	\$10,000.00
4	FLAGGERS	900	HRS	\$50.00	\$45,000.00
5	FIBER OPTIC CABLE	55,000	LF	\$1.25	\$68,750.00
6	FIBER OPTIC SPLICES	1,735	EACH	\$40.00	\$69,400.00
7	FIBER OPTIC INSTALLATION	1	LS	\$270,000.00	\$270,000.00
8	RADAR DETECTION INSSTALLATION	20	EACH	\$2,800.00	\$56,000.00
9	RADAR DETECTION UNITS	20	EACH	\$4,800.00	\$96,000.00
10	BLUETOOTH INSTALLATION	15	EACH	\$2,800.00	\$56,000.00
11	BROADBAND RADIOS	8	EACH	\$4,600.00	\$36,800.00
12	CAMERAS	10	EACH	\$5,000.00	\$50,000.00
13	CAMERA INSTALLATION	10	EACH	\$2,800.00	\$28,000.00
14	RUGGEDCOM 900G	20	EACH	\$1,450.00	\$29,000.00
15	ATC TRAFFIC CONTROLLERS	20	EACH	\$2,200.00	\$44,000.00
16	CONFIGURE AND TEST RUGGEDCOM EQUIPMENT	20	EACH	\$250.00	\$5,000.00
17	PROGRAM AND TEST ATC CONTROLLERS	20	EACH	\$5,000.00	\$100,000.00

TOTAL \$1,001,450.00

- Total project cost : **\$1,000,000**
- RFFA funding request by project phase:
(e.g. Project Development, P.E., Environmental, ROW acquisition, Construction)
 - Project Development **\$100,000**
 - PE **\$250,000**
 - Environmental **\$10,000**
 - Construction **\$650,000**
- Local match or other funds
(minimum match = 10.27% of funds requested + match): **\$102,700**
Other funds **\$400,000**

Project sponsor agency

Contact information (phone # & email) for:

- Application lead staff **Willie Rotich**
- Project Manager (or assigning manager) **Willie Rotich, willie.rotich@portlandoregon.gov**
- Project Engineer (or assigning manager) **Willie Rotich, 503-823-7679**

Describe the agency’s record in delivering federal aid transportation projects on time and budget or whether the lead agency has failed to deliver a federal aid transportation project and if so, why.

The Portland Bureau of Transportation is one of the few local agencies in the state that are fully certified by ODOT to deliver federal aid projects and has extensive experience with delivering such projects – from project development through design engineering and construction. PBOT currently has the staff capable to provide all administrative services related to project management and all technical services related to design engineering and construction management. PBOT staff members are recognized nationally for expertise in ITS topics, including multi-modal traffic signal design, implementation of truck signal priority, and traffic management through ITS.

The following are examples of completed and ongoing ITS projects:

1. NE/SE 82nd Avenue ITS (Completed in 2006)
2. US 26 Adaptive Traffic Signal System (initiated in 2010)
3. Active Corridor Management Project (initiated in 2015)

The following are examples of previously awarded RFFA projects and their status:

- 1) N. Lombard/St. Louis/Ivanhoe/Philadelphia intersection project (Construction Phase completed in 2012)
- 2) N. Portland Rd/Columbia Blvd intersection project (2014/15 RFFA. Planning and Design Phase completed in 2013. Construction Phase funded by STIP and will begin in 2017)

- 3) N. Time Oil Road/Burgard St Intersection Project (2014/15 RFFA. Design Phase 90 percent completed. Construction Phase to begin in late 2016)
- 4) Going to the Island Freight Improvement Project (2014/15 RFFA. Design Phase to be completed in 2017 and Construction completed in 2019)
- 5) South Rivergate Freight improvement Project (2016-18 RFFA. Design Phase to begin in 2016. Project construction will be funded by multiple local and federal funding sources)

Describe how the agency currently has the technical, administrative and budget capacity to deliver the project, with an emphasis on accounting for the process and requirements of federal aid transportation projects.

The bureau currently has the staff capable to provide all the administrative services related to project management and all technical services related to design engineering, and construction management for delivering federal-aid projects. PBOT staff members are recognized nationally for expertise in areas related to the proposed projects including multi-modal traffic signal design, implementation of truck signal priority, and traffic management through ITS

Highest priority criteria

1. **What additional sources of funding, and the amounts, will be leveraged by an investment of regional flexible funds in the proposed project?**

The City of Portland has received a grant from the Oregon Department of Transportation to construct and implement ITS along the Columbia corridor to improve the ability of the City to monitor and control traffic. Funding from the grant will be used to install fiber optic communications between traffic signals equipment and the City's Advanced Traffic Management System (ATMS). Funds will also allow installation of traffic monitoring cameras at signalized intersections. This work will provide the backbone to the Corridor Pilot, and allow for communication between roadside equipment, traffic signal controllers, and the city's central management system – critical elements to implementing and monitoring the freight priority pilot.

2. **Describe the freight vehicle delay problem and how the proposed project will reduce this problem.**

The traffic signals throughout the Columbia corridor are neither connected nor timed for the heavy concentration of truck activity that comprise a growing portion of traffic on the corridor. Additional individual performance characteristics and limitations of freight vehicles (e.g., varying stopping distances and acceleration capabilities) cannot be accounted for in current signal operation systems. As a result, travel into and through the corridor can be unpredictable, affecting the many companies that depend on reliable transportation delivery as part of their business model. This project addresses these issues by deploying advanced communication technologies and system operation techniques that dynamically incorporate the unique performance characteristics of freight vehicles and enable safer and more efficient progression of truck traffic through the corridor.

This project will implement the following arterial operation strategies to improve travel time reliability and reduce crashes:

- **Travel Time** – Provide expected arrival time estimates to major destinations using real-time traffic conditions.
- **Transit Signal Priority (TSP)** – When a bus nears an intersection, a green indication can be displayed earlier than usual or can be extended depending on the estimated arrival time.
- **Truck Signal Priority (TSP)** - Similar to transit signal priority, truck signal priority will be provided to trucks by displaying a green indication earlier or extending a current green phase.
- **Upgraded communication system** – Provide reliable communication between field devices and traffic operation centers. Along the corridor, communications equipment will be upgraded to connect traffic signals to the (existing) regional central traffic signal system.
- **CCTV Cameras** – The corridor will be outfitted with CCTV cameras at key locations to allow remote monitoring from the City of Portland Traffic Operation Center (TOC) and Oregon DOT’s Traffic Operation Center (TMOC). Camera images will also be provided to the public through Oregon DOT’s award-winning TripCheck traveler information system.
- **Traffic signal controller upgrades** – The project will replace the existing traffic signal controllers with the latest advanced transportation controllers. This will provide system managers with signal performance measures, including information about real-time and historical functionality at signalized intersections. Additionally, the new controllers will give system managers the capability to identify operational deficiencies, optimize mobility, and better manage traffic signal timing and maintenance.

3. How will the proposed project increase freight access to industrial lands, employment centers and local businesses, and/or rail facilities for regional shippers?

Improved communications between the corridor’s traffic signals and the central traffic system will maintain better coordination between intersections, providing the following benefits:

- Increase reliability of travel times for regional shippers accessing destinations in the corridor;
 - Reduce delay of freight and transit users;
 - Support efficient movement of goods between adjacent industrial lands, employment centers, and local businesses;
 - Promote proactive arterial management through improved arterial performance.
- 4. How will the proposed project help support economic sectors that are low-carbon and resource efficient? How will the proposed project offer economic opportunities for Environmental Justice or underserved communities?**

The actions and strategies in this project are intended to help Oregon businesses that offer low-wage positions. The project uses technology and optimized system management approaches to reduce crashes and improve freight, transit and general purpose traffic mobility – actions that may reduce time pressures for low-wage workers and result in more jobs for underserved communities. An additional byproduct of improved management of the transportation network and enhanced traveler information is reduced vehicle idling, smoother traffic flows, and fewer incidents – all outcomes that result in reduced fuel consumption and greenhouse gas emissions.

Higher priority criteria

- 5. How will the proposed project improve safety? Describe how conflicts between freight vehicles and active transportation or other modes will be removed or mitigated.**

The project will use advanced technologies to improve safety by reducing crashes in a high-speed corridor. Replacing existing traffic signal controllers with the latest advanced transportation controllers and installing CCTV cameras allows transportation managers to better focus on safety performance measures and identify operational deficiencies that can present safety issues.

- 6. How will the proposed project reduce air toxics or particulate matter in the project area? What is the current air quality condition of the project area? What strategies (e.g. diesel retrofit trucks, engine change outs, etc.) will be used during construction and after the implementation (e.g. diesel retrofit trucks, etc.) of the project to reduce air pollution?**

The project will reduce particulate matter and other airborne pollutants by utilizing ITS to ensure the smoother flow of vehicles along the Columbia Corridor. Emissions from the large volume of freight vehicles travelling along the corridor can be reduced by ensuring that they are not unnecessarily served red indications, which increase emissions from trucks as they slow to a stop, idle, and then accelerate to approximately 40 mph. Reducing the instances of these truck stops will directly reduce these emissions. Additionally, the project will have an indirect, but positive benefit on emissions in the area by ensuring that transit and bike users along the corridor are served as efficiently as possible, thereby reducing the number of private vehicle trips in accordance with the region's modal split goals

- 7. Describe the EJ communities which are in proximity to the proposed project area. How will the project reduce the impacts of freight movement on these communities (e.g. reduced noise, traffic, land use conflicts, emissions, etc.)?**

The primary purpose of this project is to improve freight traffic along the Columbia Boulevard in such a way that it is as environmentally friendly as possible. A key strategy to accomplish this is to utilize ITS solutions to ensure that trucks are moving along the corridor with minimal slowing, idling, and stopping so that the heavy emissions associated with these activities are reduced. This will also slow the pavement degradation along the affected roads, reducing the frequency of necessary roadway maintenance and paving, which are activities that have high emissions associated with them. Further, ensuring that multi-modal intersections that serve trucks, LRT,

bicycles, buses, and pedestrians can accommodate all modes with minimal delays for each group is essential to ensuring continued “greenness” in the freight and shipping industries.

Often the residential areas located closest to industrial areas have higher-than-average populations of low-income and/or minority communities, and this is true of neighborhoods near Columbia corridor. The project is located in North Portland which contains a workforce population with a significantly higher and growing percentage of African-American (12 percent) and Latino populations (24 percent) and lower income households compared with the rest of Multnomah County, which has a 6 percent African-American and 10 percent Latino populations, respectively. Based on U.S. Bureau of Labor Statistics data, the manufacturing, wholesale trade, transportation and construction sectors provide primarily middle-income jobs and play an important equity role in stemming the erosion of middle-income jobs and widening income inequities.

The manufacturing and transportation sectors are a major source of middle-income and upward-mobility jobs for communities of color. In 2008, manufacturing and transportation sectors made up 18% of jobs held by people of color in Multnomah County, compared to 10% of the jobs held by white employees. This project will ensure the continued economic competitiveness of area employers.

8. Describe the freight reliability issues the proposed project is intended to address. What are the anticipated improvements to reliability this project will deliver?

The project will use advanced technologies to improve safety and gain efficiencies in existing infrastructure. Existing signalized intersections will be interconnected to improve reliability, consistency, and improve traffic signal operations for trucks. Truck priority at various signalized intersections will be implemented to facilitate extension of green for approaching trucks, resulting in improved freight reliability

Priority criteria

9. Why may the proposed project not be eligible to receive funding from other potential sources? Is the project of an innovative or unique nature such that it is not eligible or typically funded with large, traditional transportation funding sources such as state trust fund pass through to local agencies, local bridge program, or large state funding programs (Modernization, Bridge, Preservation, etc.), or have any other significant sources of funds?

By leveraging ITS solutions to increase the efficiency of the corridor, this project will increase the effective capacity of an important link for freight and other vehicles without expanding or widening any roads or intersections in this corridor. Additionally, improving the intersections to accommodate demand from other modes such as LRT, buses, and bicycles ensures that alternative modes of transportation remain competitive for travelling through the region.

10. Describe how the proposed project reduces the need to expand highway capacity.

Traditional models for traffic signal control consider all vehicles in a single class and operate in a simplified mode of operation. This mode of operation is a function of the information collected by the detection and

the ability of the traffic signal controller to use advanced data. The use of radar detection presents opportunities for more strategic traffic control decisions for providing preferential treatment for freight vehicles. The most common form of priority is to hold the green for high speed trucks, preventing hard stops and potentially dangerous actions. This detection system also allows for improved indecision zone protection for all vehicles, not just trucks and reduced red-light running. The project will implement truck priority while balancing the impacts to other users. The project will upgrade the controller to the newest traffic control software, fine-tune the operation of radar detection system at the intersection, and explore options and methods to provide improved operation of trucks. Additional monitoring of the intersection operation will be conducted through CCTV camera and special recording device.

11. Describe how the proposed project addresses issues and improves connectivity among multiple freight modes.

Traditional models for traffic signal control consider all vehicles in a single class and operate in a simplified mode of operation. This mode of operation is a function of the information collected by the detection and the ability of the traffic signal controller to use advanced data. The use of radar detection presents opportunities for more strategic traffic control decisions for providing preferential treatment for freight vehicles. The most common form of priority is to hold the green for high speed trucks, preventing hard stops and potentially dangerous actions. This detection system also allows for improved indecision zone protection for all vehicles, not just trucks and reduced red-light running. The project will implement truck priority while balancing the impacts to other users. The project will upgrade the controller to the newest traffic control software, fine-tune the operation of radar detection system at the intersection, and explore options and methods to provide improved operation of trucks. Additional monitoring of the intersection operation will be conducted through CCTV camera and special recording device.

Process

- **Describe the planning process that led to the identification of this project and the process used to identify the project to be put forward for funding consideration. (Answer should demonstrate that the process met minimum public involvement requirements for project applications per Appendix A)**

In the spring of 2014, PBOT staff began the process of forming a Candidate list of Major Projects for inclusion in the Transportation System Plan (TSP). This process began by considering projects that were included in the 2007 TSP, the 2014 TRP, or other plans adopted since 2007. The TSP Major Project List update process included extensive opportunities for public engagement with projects displayed on the 2035 Comprehensive Plan Proposed Draft Map App starting in June 2014. Members of the public were invited to comment directly through the Map App, and there was extensive community outreach at meetings and events. As noted in our certification of Appendix A – the public engagement and non-discrimination certification, PBOT developed and used a thorough public engagement plan which included stakeholder analysis and a focus on efforts to engage underrepresented populations. In order to develop the TSP Major Projects list, projects were also evaluated based on criteria that measures the following: safety, neighborhood access, economic benefit, health, equity, climate, costs effectiveness and community support. This evaluation, along with additional public feedback, helped to determine the final TSP Major Projects List.

The Portland Freight Committee (PFC) was the bureau's review body for evaluating and recommending candidate freight projects for the 2019-21 Regional Flexible Fund Allocation. The PFC is advisory to the Portland City Council on issues related to freight mobility and its membership includes over 30 representatives of freight service providers, shippers, Port, rail, trade associations and businesses directly related to multi-modal freight activities. In June 2016 the PFC initiated the process of reviewing candidate freight projects which resulted in the selection and recommendation of the following two projects to submit 2019-21 RFFA applications:

- 1) Central City Circulation and Safety Project
 - 2) NE Columbia Boulevard ITS Project
- **Describe how you coordinated with regional or other transportation agencies (e.g. Transit, Port, ODOT, Metro, Freight Rail operators, ODOT Region 1, Regional Safety Workgroup, and Utilities if critical to use of right-of-way) and how it impacted the project location and design.**

The project was identified through a collaborative effort that included the PBOT, the Portland Freight Committee, and other agencies. ODOT's motor carrier division recognizes the importance of this corridor as it provides a link between the state's highway system and N Columbia, and other valuable input was received from the Oregon Governor's Office and the Oregon Solutions Project Team in identifying the N Columbia corridor as a crucial link to maintain the state's economic competitiveness.

The project is also recognized as one of significance by the area freight rail operators UP and BNSF and by the Port of Portland.