

Seattle Department of Transportation

EAST MARGINAL WAY CORRIDOR IMPROVEMENT PROJECT

Project Narrative



Prepared for
US Department of Transportation
FY 2021 RAISE Grant Application

Submitted by



Seattle
Department of
Transportation



CITY OF SEATTLE

July 5, 2021

The Honorable Pete Buttigieg, Secretary
U.S. Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590

Re: City of Seattle East Marginal Way Corridor Improvement Project RAISE grant application

Dear Secretary Buttigieg:

The City of Seattle is proud to present the East Marginal Way Corridor Improvement Project for consideration for a RAISE grant award.

East Marginal Way is one of the City's most important transportation corridors with regard to equitable health and access opportunities, not to mention the region's economic resilience. The corridor runs the length of the SODO Qualified Opportunity Zone, through the center of our industrial jobs base, connecting seven Port of Seattle terminals and hundreds of manufacturing, warehousing and commercial businesses to freight rail yards and the national highway system, including Interstate 5 and the western terminus of I-90. With the level of significant freight volumes being moved along East Marginal, this roadway is in critical need of investment to support continued growth of freight activity and safe travel by all users.

East Marginal Way serves as a critical last-mile connector and vital route for oversized trucks and those carrying flammable cargo and, at the same time, is an important corridor for many of the people who work or need to access goods in the manufacturing and maritime center by car, bike or on foot. The City of Seattle has developed this project to address the full range of these uses, specifically designing it to meet state Heavy Haul freight standards while also incorporating a protected bike facility.

The East Marginal Way Corridor Improvement Project was identified as a priority by Seattle voters when they approved the 2015 Transportation Levy to Move Seattle. Through this property tax measure, Seattle residents are setting aside \$7.1 million for the project. They have committed nearly \$1 million more in utility payments to cover associated drainage costs, while the Port of Seattle is contributing more than \$5 million to ensure the reconstructed roadway is built to the highest freight standards. Contributions from state and regional entities, including the state's Freight Mobility Strategic Investment Board, bring another \$6 million to the project. These commitments reflect the importance of this project to our economy, to family wage job creation and to improved safety in the corridor.

East Marginal Way traverses the Duwamish Manufacturing and Industrial Center, the state's largest concentration of industrial and maritime jobs. East Marginal Way is also the only option

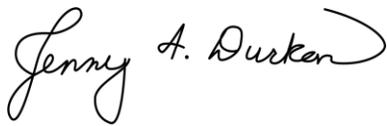
for nearly 1000 bicyclists traveling on an average weekday to downtown and other major employment sites from West Seattle residential neighborhoods. For years, both truck drivers and bicyclists have sought to redesign the roadway to safely separate the two modes. In addition to Port and other marine facilities, the route also provides access to major employment sites such as the Starbucks corporate headquarters, the US Coast Guard's expanding base for Puget Sound operations and hundreds of manufacturing and craft makers, not to mention NFL and MLB stadiums that regularly attract fans from Alaska, Idaho, Montana and Oregon, as well as Washington state.

The City of Seattle, the Port of Seattle and the State of Washington have prioritized funding for this project. A RAISE grant in \$20 million requested will provide the critical last dollars in to ensure we can reconstruct East Marginal Way to sustain and add new family wage jobs.

We are proud to be standing with so many other regional partners who wish to see this transportation need realized, including: the State of Washington, the Northwest Seaport Alliance, the South Downtown Business Alliance (including Starbucks and approximately seventy other businesses), the Manufacturing and Industrial Council, Puget Sound Regional Council, King County, Cascade Bike Club and many, many others.

Thank you in advance for your consideration of this critical transportation project. We urge your support for the City of Seattle's East Marginal Way Corridor Project for a RAISE award.

Sincerely



Mayor Jenny A. Durkan



Council President Lorena González



Councilmember Lisa Herbold



Councilmember Debora Juarez



Councilmember Andrew J. Lewis



Councilmember Tammy J. Morales



Councilmember Teresa Mosqueda



Councilmember Alex Pedersen



Councilmember Kshama Sawant



Councilmember Dan Strauss

CC:

Senator Patty Murray

Senator Maria Cantwell

Governor Jay Inslee

Congresswoman Pramila Jayapal

Congressman Adam Smith

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1. PROJECT DESCRIPTION

1.1 Introduction

The [East Marginal Way Corridor Improvement Project](#) (RAISE Project) will support a more economically competitive Northwest by improving safety and mobility on East Marginal Way S. This critical corridor connects a residential population of nearly 200,000 to almost 75,000 industrial and maritime jobs in Seattle's Duwamish Manufacturing/Industrial Center. East Marginal Way S serves freight movement between three marine container terminals and two intermodal rail yards while also carrying nearly 1,000 bicycle commuters each weekday into Downtown Seattle. The roadway has deteriorated beyond its useful life and is in dire need of state of good repair road rehabilitation, Intelligent Transportation System upgrades, and life-saving safety improvements. The project will remove conflicts and provide for separate and predictable travel for people walking, biking, and driving in cars as well as freight trucks to access jobs and essential services.

This project, which competed for a FY 2020 BUILD grant and was rated "highly recommended," is a partnership between local, state, and

regional agencies and the Port of Seattle. The Seattle Department of Transportation (SDOT) is respectfully requesting FY 2021 Rebuilding American Infrastructure with Sustainability and Equity (RAISE) funds to take advantage of the enormous opportunity to construct this Project as presented in the application while timing allows.

If the City is not awarded RAISE funds, we will be forced to complete this Project using a phased approach to meet funding obligations tied to some of the committed matching funds discussed in this application. This inefficient phased approach is expected to result in six additional months of severely interrupted traffic patterns (restricting East Marginal Way to one-way traffic) for commuters, freight truck drivers, and people on bikes who will need to be largely rerouted to 1st Avenue. Inefficient project delivery would also result in significant additional costs to the City. As evidenced by the letters of support attached to this application, many different constituencies are passionate about the City's ability to deliver this RAISE Project as cost-effectively and quickly as possible. This RAISE award will ensure we can achieve that goal.

Double Whammy: COVID-19 and West Seattle Bridge

The [East Marginal Way Corridor Improvement Project](#) has been significantly affected by two major global and regional events:

The [COVID-19](#) pandemic has impacted much of the world and reduced trips in the Seattle area by as much as 80% on some key routes. The pandemic is likely to change long-term travel behavior, and one such change is mode shift from transit to driving, walking, and biking due to reluctance to use public transit out of fear of contracting the virus. In addition, the pandemic has impacted the regional and national economy, which could reduce funding sources for local transportation projects.

On March 24, 2020, the [West Seattle Bridge](#) was suddenly closed to vehicular traffic due to cracking, and its reopening is not expected until approximately 2022. The bridge handled approximately 84,000 vehicle trips per day prior to the COVID-19 pandemic. One of the key alternative routes to the West Seattle Bridge is the lower bridge on Spokane St, which feeds directly into East Marginal Way S. The Spokane St route is also the location of the West Seattle Bridge bike trail, which is part of a regional bicycle route extending to communities south of Seattle. Since the closure of the bridge, bike trips have appeared to rebound to close to 80% of pre-COVID levels compared to 23% for general vehicle trips. On weekends, bike trips have increased 110% compared with the same period in 2019.



East Marginal Way S is a strategically located, highly traveled, multimodal corridor (Figure 1) with even more pronounced regional significance from short- and long-term traffic impacts resulting from the COVID-19 pandemic and the recent emergency closure of the West Seattle Bridge (see text box on previous page). This application will emphasize how the RAISE Project was designed and developed with a focus on sustainability and equity, illustrating how we have shown a continued dedication to these critical goals through the use of our Racial Equity Toolkit during the planning of this RAISE Project, our inclusive public engagement efforts, and the proposed use of city-wide hiring initiatives tied to the construction of this project.

To better realize the East Marginal Way S corridor's potential as a safe, reliable connector between jobs and housing, farms and foreign markets, and marine terminals and manufacturing, we are requesting \$20 million in Fiscal Year (FY) 2021 RAISE funds to complete the RAISE Project. The proposed improvements would immediately support existing Port of Seattle tenants and occupants, BNSF Railway Company (BNSF) freight carriers, the U.S. Coast Guard (USCG), and people in cars and on bikes. Seattle and the Northwest region have a long economic history founded on the strength of maritime and industrial jobs. The industries served by this corridor have been a source of resiliency in the wake of past economic cataclysms, from the 1889 Seattle fire to the Great Depression to the Boeing Bust of the early 1970s and the Great Recession of the last decade. This RAISE grant can help foster the same kind of economic stabilization, recovery, and growth of commerce needed to allow our region to rebound from the aftermath of COVID-19.

1.2 Project Overview

As shown in Figure 2, the RAISE Project will improve operational and safety deficiencies by:

- Reconstructing the East Marginal Way S roadway and upgrading the route to Heavy Haul Network standards along a 1.1-mile segment from a point south of

S Massachusetts St to S Spokane St to enhance efficient freight flow and reduce operations and maintenance (O&M) costs for shippers and others in the supply chain

- Removing conflicts between motorists and non-motorists, and constructing a 2-way protected bike lane along a 1.4-mile segment between S Atlantic St and S Spokane St to eliminate fatalities, increase visibility, and protect the approximately 1,000 bicycle riders that use this corridor each day
- Constructing adaptive traffic signals working dynamically together using Split Cycle Offset Optimization Technique (SCOOT) technology to enhance safety and improve traffic flow at several of the City's busiest freight intersections
- Relocating or removing railroad tracks to provide more space between truck traffic and the bicycle facility
- Rebuilding the sidewalk on the west side of East Marginal Way S adjacent to the roadway reconstruction to provide a safe, accessible route for people walking
- Installing adequate lighting and appropriate landscaping along the corridor to improve safety and the environment
- Adding a Dynamic Message Sign (DMS) just north of S Alaska St to provide a means of informing motorists about traffic conditions and direct them to the RAISE Project corridor on East Marginal Way S

The total estimated benefits of the RAISE Project are \$53 million with a benefit cost ratio of 1.57 (at a 7% discounted rate) as shown in the Benefit-Cost Analysis (BCA) performed for this grant application (Appendix A). Key benefits/highlights of the RAISE Project include the following:

1. Safety

The RAISE Project will widen lanes for trucks and construct a separated two-way protected bike lane on the east side of the street, which will remove bicyclists from the west side of the street where the majority of terminal entrances and other conflict points are located. The BCA found a reduction of 83 crashes, including 2 fatalities, from the RAISE Project over the 24-year analysis

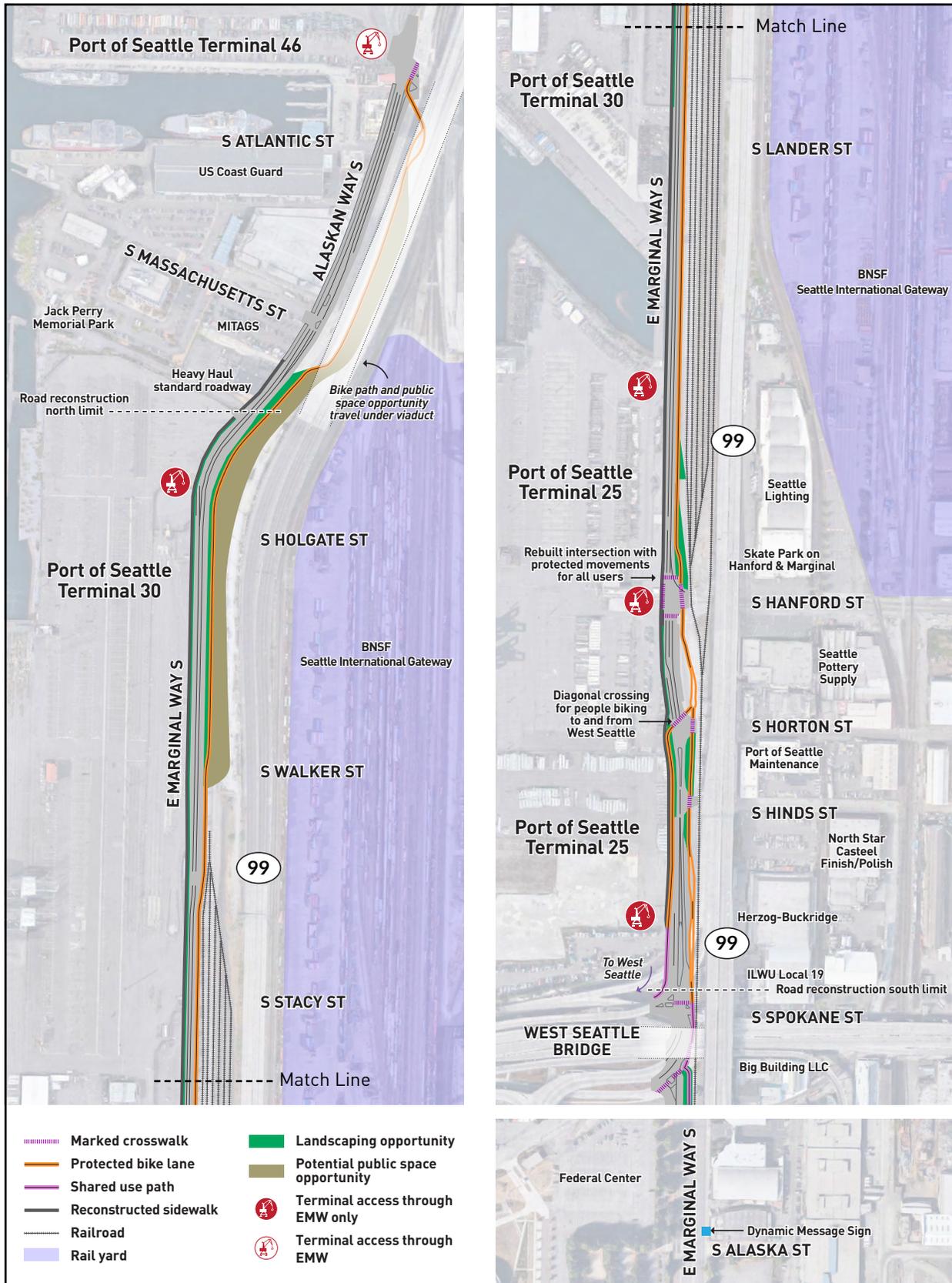


Figure 2: Project Map

period, for an accident cost reduction of \$14.8 million (at a 7% discounted rate), as detailed in Section 6 and the BCA.

2. State of Good Repair

The RAISE Project will dramatically rehabilitate the deteriorated roadway by removing damaged and inconsistently placed asphalt, concrete, and brick sections and replacing them with new, full-depth (15-inch) concrete over 6 inches of mineral aggregate. This new pavement will be constructed to Heavy Haul Network standards, resulting in a 50-year useful life and \$113,900 (at a 7% discounted rate) in reduced vehicle maintenance costs for drivers, O&M costs for SDOT, and residual value of the new roadway at the end of the analysis period, as detailed in Section 6 and the BCA.

3. Economic Competitiveness

The RAISE Project will improve the condition and functionality of East Marginal Way S, a critical freight corridor that provides the sole access or primary access for several major port terminals, two major railyards, and a US Coast Guard (USCG) facility. The corridor is important for commuters driving and biking to work, rural farmers dependent on port access, and industrial workers relying on shipments of technical parts to keep production moving. The BCA found a reduction of 211,196 hours in auto and truck travel time savings from the RAISE Project over the 24-year operational evaluation period, for \$1.9 million savings (at a 7% discounted rate), as detailed in Section 6 and the BCA. The RAISE Project will also support 533 direct, indirect, and induced jobs during construction, and is located within a Qualified Opportunity Zone.

4. Environmental Sustainability

By encouraging people to ride bikes as an alternative to driving personal vehicles, and also reducing idling times from vehicles and trucks stuck in current congestion, the RAISE Project will reduce harmful emissions and healthcare costs. The BCA found a reduction of 1,548 tons of emissions from the RAISE Project, resulting in \$64,000 benefits (at a 7% discounted rate), as detailed in Section 6 and the BCA. The RAISE Project will also add infiltrating bioretention areas

and accompanying planting areas to provide a means of managing stormwater that falls on impervious surfaces and carries toxic substances into the Puget Sound with impacts on Orcas and other endangered species.

5. Quality of Life

The RAISE Project will provide the region with additional active transportation choices by way of walking or biking for the diverse populations in the surrounding areas. Our Racial Equity Toolkit found that 26% of the directly affected population is below 200% of the poverty level and 47% are people of color. These non-motorized transportation options and safer crossings will enhance our residents' quality of life and provide access to nearby neighborhoods for education and employment opportunities. The BCA found that the RAISE Project will add an average of 5,601 new commuter cyclists per year, 238,000 hours of commuter bicycling per year, and 3,290 new recreational cyclists per year over the 24-year analysis period, for a combined \$31.5 million in benefits (at a 7% discounted rate), as detailed in Section 6 and the BCA.

6. Innovation

- Adaptive signal control technologies will adjust the timing of red, yellow, and green lights based on actual traffic conditions in order to ease traffic congestion. In addition, SCOOT technology, an innovative, dynamic, online, real-time method of signal control that continuously measures traffic demand on all approaches to intersections in a network, will optimize the signal timings at each intersection to minimize delays and stops.
- Virtual Public Involvement and online surveys have accelerated project delivery by securing public buy-in and quickly alerting the public on progress.
- Warm mix asphalt will be used on the protected bike lane to reduce paving costs, extend the paving season, improve asphalt compaction, allow the mix to be hauled longer distances, and reduce workers' exposure to emissions, fumes, and odors.
- The RAISE Project is funded through the 9-year Levy to Move Seattle, a voter-

approved source of local funds dedicated to improving transportation infrastructure, and a contribution from the Port of Seattle.

7. Partnership

A coordinated effort by the [City of Seattle](#), [Port of Seattle](#), [State of Washington](#), and [public advocacy groups](#), the RAISE Project is a priority for the region and state.

1.3 How the Project Will Address Transportation Challenges

The RAISE Project will address three primary transportation challenges that affect freight movement and safe travel along the corridor: 1) safety, 2) mobility and increasing demand, and 3) deterioration of pavement.

Safety

The RAISE Project will result in significant safety benefits for bicyclists, including the approximately 1,000 people who use East Marginal Way S to commute by bicycle to and from Downtown Seattle, on average, every day (before COVID-19). These cyclists will be served by a fully protected, separated bike lane and protected intersection crossings along the corridor. For bicyclists, East Marginal Way S is often the only connection between their homes in West Seattle and SW King County and their jobs in Downtown Seattle or the Duwamish Manufacturing/Industrial Center (MIC). For truck drivers, East Marginal Way S provides the only direct access – or in many cases the only access – to their destinations at one of the many Port of Seattle terminals located along the corridor. As shown in Figure 3, bicycle commuters mix with heavy, faster-moving freight and auto traffic, causing unpredictable traffic patterns and turning conflicts, which results in congestion and delays.

Traffic fatalities on Seattle streets have been declining, but pedestrians and bicyclists comprise a disproportionate percentage of all traffic fatalities. Throughout the city, vulnerable roadway users on bikes or on foot are involved in slightly less than 10% of all crashes but their risk of a



Figure 3: Existing Conditions of a Bicyclist Traveling Amidst Freight Traffic



Figure 4: Officer at Scene of Fatal Cyclist Crash along Project Corridor

fatality or serious injury is exponentially higher. Crashes on East Marginal Way consistently follow this disturbing trend. Over a 10-year analysis period (2010 to 2019),¹ bicyclists and pedestrians along East Marginal Way were involved in 17.2% of all crashes, nearly three times the share of such crashes citywide (Figure 4). In fact, 15 crashes involving bicyclists occurred between S Spokane St and S Atlantic St during this 10-year period that resulted in injuries, and in one case, the fatality of an employee at Expeditors, a global freight firm based in Seattle (Figure 4).

In total, there were 105 crashes over a 10-year period along the East Marginal Way S corridor from 2010 to 2019. Of these crashes, 35 were classified as injury crashes (Figure 5), resulting in 42 people injured and 3 people killed. About a third of the crashes were sideswipe collisions (27), but also included a relatively high number of turning-related (5 left-turn and 5 right-turn) and rear-end collisions (12) (Figure 5).

1. This application chose to use pre-COVID data to reflect the typical conditions in the corridor

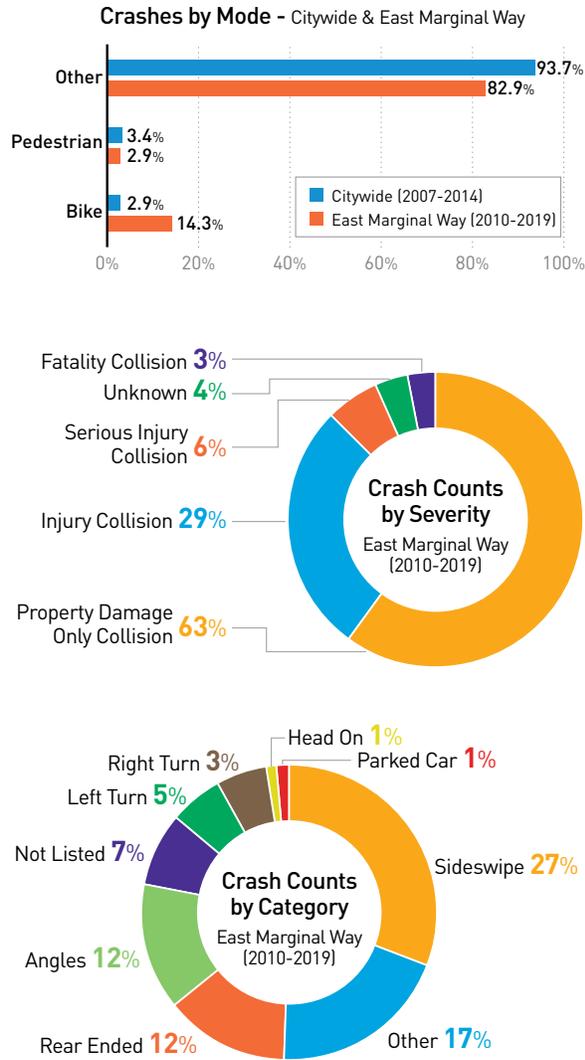


Figure 5: Crashes by Mode, Severity, and Category

To improve safety on East Marginal Way S, the RAISE Project will:

- Repave the roadway to eliminate weaving and sudden stops due to pothole and puddle avoidance and debris in the bike lane
- Install a concrete barrier to separate bicycle traffic from heavy vehicular traffic and protected signal movements to enhance predictability for all modes
- Install adaptive signals to create smooth-flowing traffic "platoons," which typically reduce crashes for all users by an average of approximately 17%²
- Construct a two-way separated bike lane on the east side of the street that is protected from vehicular traffic, while maintaining the west sidewalk for pedestrians and widening lanes for trucks (Figure 6).

The two-way protected bike lane on the east side of the street was chosen after much consideration and input from project partners and the community. By removing bicyclists from the west side of the street where the majority of terminal entrances are located, it is the option that best prioritizes the efficiency of freight movement and the safety of bicyclists who have grown in number due to the extended closure of the West Seattle Bridge. This east side solution removes the conflict points between freight trucks and bicyclists at all but one of the port terminal driveways, significantly reducing the possibility

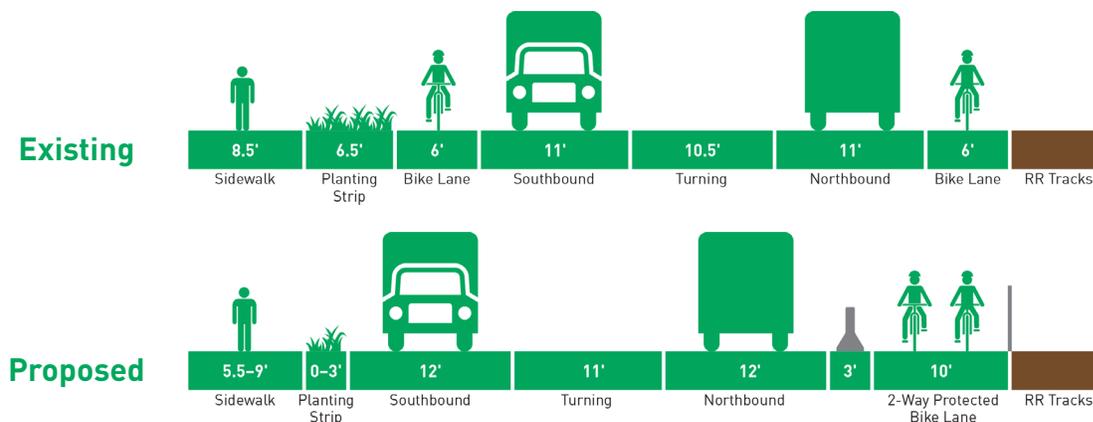


Figure 6: Typical Existing and Proposed Roadway Cross Sections

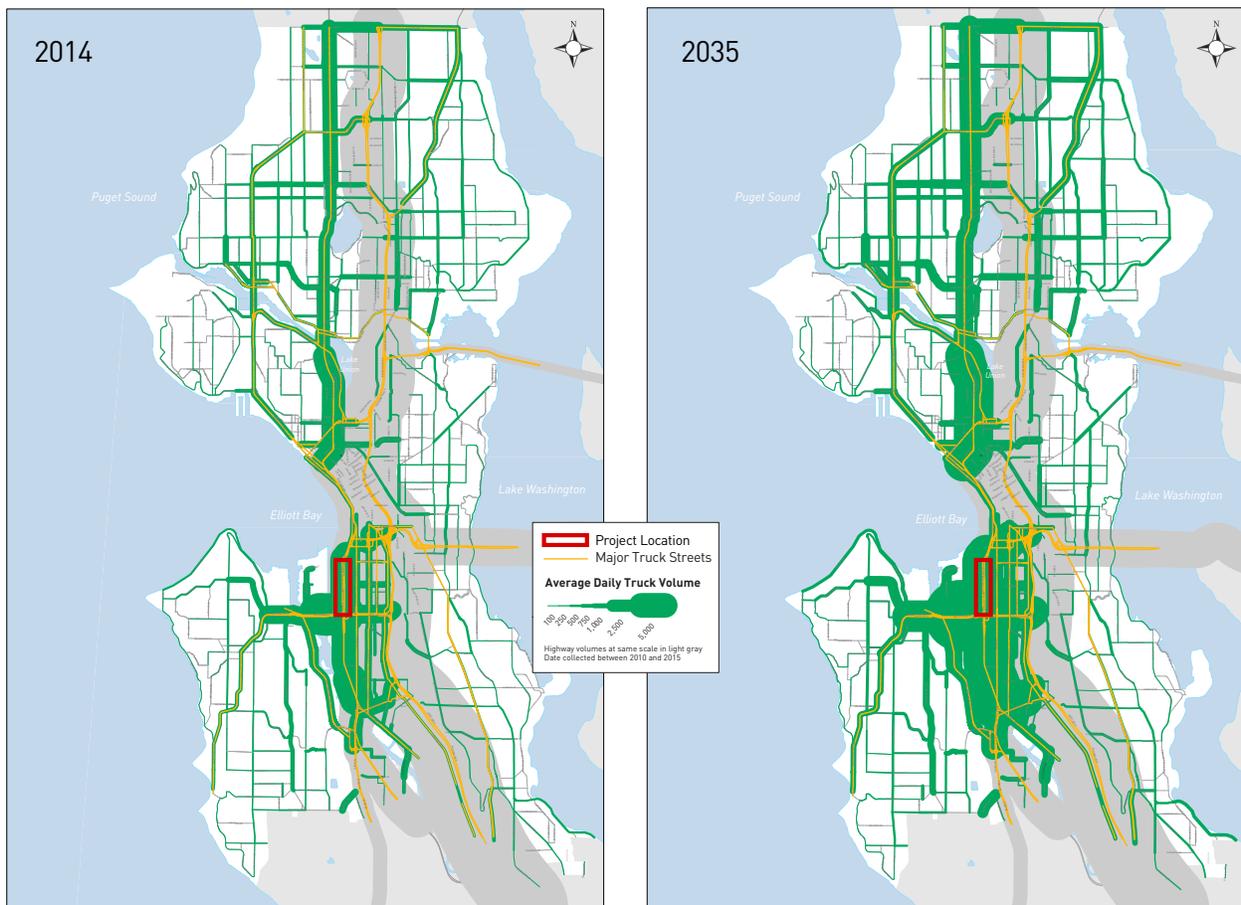
2. [Evaluation of the VDOT Adaptive Signal Control Technology Pilot Project](#). Virginia DOT. 2015.

of turning collisions. These improvements will also enhance the safety of pedestrians on the sidewalk by reducing the number of bicyclists on the sidewalk, improving crossing safety with upgraded signalized intersections, and adding a landscaped buffer in additional locations.

Separating bicyclists from the adjacent truck and car traffic with a protected bike lane will significantly increase visibility and predictability for all roadway users in the corridor, which lowers the risk of crashes and leads to smoother traffic flows and a more reliable system, a serious need in this area. The RAISE Project will also make all signalized movements along the bike lane protected to improve safety at intersections where the majority of crashes have occurred.³

Mobility and Increasing Demand

East Marginal Way S is a vital freight, commute, and bicycle corridor through the South Seattle maritime and manufacturing industrial center. In 2019, prior to COVID-19, the East Marginal Way Corridor between S Massachusetts St and S Spokane St carried 34,000 bicyclists each month and 9,650 motorized (freight and non-freight) vehicles in average weekday daily traffic with more than 3,700 trucks a day making up nearly 40% of all traffic. In fact, East Marginal Way S is among the top streets in Seattle carrying the highest volumes of trucks, and is anticipated to carry more traffic with worsening congestion in the future (Figure 7). Traffic back-ups occasionally occur during peak periods and events at the two major sports venues located



Source: *City of Seattle Freight Master Plan* [pp. 36 and 43]

Figure 7: 2035 Average Daily Truck Volumes

3. SDOT, Bicycle and Pedestrian Safety Analysis, 2016, p. 6.

at the northern end of the RAISE Project limits, such as concerts, major conference/corporate events, and professional sports events, primarily the Seattle Mariners, Seattle Seahawks, and Seattle Sounders.

Freight traffic will continue to utilize East Marginal Way S in these numbers due to the corridor's designation as part of Seattle's Heavy Haul Network, where overweight vehicles are permitted to operate. This network was developed in partnership with the Northwest Seaport Alliance (NWSA), a marine cargo operating partnership of the Ports of Tacoma and Seattle, to create a more competitive international gateway. The Heavy Haul Network is also intended to improve the livelihood of truck drivers by raising the truck weight limit and allowing heavier cargo containers to be transported between the Port of Seattle, industrial businesses, and rail yards.

The RAISE Project will address existing congested intersections within the project limits by:

- Constructing new adaptive signals to improve traffic flow and help drivers respond more quickly to traffic conditions
- Reconfiguring the traffic signal at S Hanford St to provide protected turning movements
- Relocating the existing railroad tracks at S Hanford St to continue the protected bike lane through the intersection and provide separation of users for improved safety and visibility
- Installing DMS to provide information to travelers using East Marginal Way S

Deterioration of Pavement

The RAISE Project will also dramatically rehabilitate the dire state of the roadway by upgrading the pavement to full-depth (15-inch) concrete constructed to Heavy Haul Network standards with a 50-year useful life.

Pavement degradation and outdated intersection designs, ruts, potholes, small curb radii, and outdated signals slow all travelers, but especially freight haulers. The pavement on East Marginal Way S has reached the point of failure (Figure 8). As it continues to degrade and impede freight flow, there will be an increasing need



Figure 8: Deteriorated Roadway Conditions on East Marginal Way S

for intermittent closures of this critical freight corridor. Especially now with the closure of the West Seattle Bridge, the East Marginal Way S corridor is too important for regional mobility and commerce to close in its entirety. Without the RAISE Project, we will have to continually implement costly short-term pavement fixes to maintain the roadway in an operable condition.

The RAISE Project will specifically avoid detours that cost trucking companies an estimated 160 to 210 hours per day (approximately 5,000 trips per day with an average detour time of 2 minutes per trip) from freight diversions onto side streets or other parts of the network. Keeping East Marginal Way S fully operational will mitigate the effects of freight activity on the surrounding communities by eliminating the need for diversions and cut-throughs, as truckers seek reliable access to seaport terminals, intermodal facilities, and other freight centers.

1.4 Project Background and Related Improvements

The need for improvements to the East Marginal Way S corridor has been documented in studies over several decades, including the following:

- The region’s 1988 [Freight Action Strategy for the Everett-Seattle-Tacoma Corridor \(FAST Corridor\) Plan](#), which identified major traffic and congestion chokepoints, including East Marginal Way S, that were impeding access to the region’s three major seaports
- SDOT and the Port of Seattle’s [Industrial Areas Freight Access Project](#) (2015) Recommended Priority Project List, which ranks East Marginal Way S as a high priority
- The City of Seattle’s [Move Seattle: 10-Year Strategic Vision for Transportation](#) (2015), which laid out how Seattle will work to create a safe, interconnected, vibrant, affordable, and innovative city and identified the RAISE Project as a citywide priority that needs to be implemented by 2024 because of its safety and multimodal access benefits and its critical role in improving the movement of goods and maintaining a critical corridor within the regional freight network
- The 2016 [City of Seattle Bicycle and Pedestrian Safety Analysis](#) report, which made safety recommendations that align with the RAISE Project
- The 2015 Seattle voter-approved [Levy to Move Seattle](#), which expires in 2024 and included a portion of funding for East Marginal Way S improvements

As a result of these studies and initiatives, the City of Seattle and the federal government have invested in and completed key projects, including grade separations and other improvements, that have supported freight mobility and access to industrial centers. For example, our \$100 million [Lander Street Bridge Project](#), which built a bridge over the railroad tracks on S Lander St between 1st Ave S and 4th Ave S to provide a roadway unimpeded by rail operations, improve safety, and relieve congestion in Seattle’s SODO neighborhood, was supported by a FY 2016 FASTLANE grant. While there are other freight corridors within this region, East Marginal Way S has been continually prioritized due to its position as a critical last-mile connector and vital route for oversized trucks or those carrying flammable cargo. The RAISE Project is among the last of

these priority projects left to complete with a need for federal investment.

1.5 Regional and National Significance

The East Marginal Way S corridor serves as the sole – or primary – surface connection to three major seaport terminals, two freight railyards (Union Pacific and BNSF), and the USCG Puget Sound Sector Base, which could triple in size based on proposed Coast Guard [expansion plans under review](#). As shown in Figure 9, the RAISE Project is significant because it is critical to regional, national, and global freight movement. Some of the RAISE Project’s benefits will accrue to Pacific Northwest farmers and manufacturers who are the biggest beneficiaries of port activity.

The corridor is a critical last-mile connector for both standard and oversized freight trucks carrying goods and flammable cargo in and out of the major seaport terminals and rail yards where freight flows through the national supply chain. It is also an important commuter route for residents in the surrounding neighborhoods, as well as neighboring cities to the south, to access downtown by car or bike.

East Marginal Way S lies just south of Downtown Seattle within the regionally-designated [Duwamish MIC](#), established in 2002 to ensure that adequate accessible industrial land is available to promote a diversified employment base and sustain Seattle’s contribution to regional high-wage job growth. The Duwamish MIC is one of the largest and most intensely developed manufacturing and industrial areas in the Pacific Northwest, receiving and distributing goods via roadway, water, rail, and air.

Additionally, East Marginal Way S is identified as a priority route by the U.S. Departments of Transportation and Defense, Washington State, the joint City of Seattle/Port of Seattle Heavy Haul Network, and for the City’s over-dimensional/overweight load routing.

Three Port of Seattle facilities have direct ingress/egress from the portion of the East Marginal Way S corridor that will be improved through the RAISE Project. As part of the NWSA, the Port of



Figure 9: Freight Context Map

Seattle supports regional and national growth and is a driving force in the local, regional, and national economy. The NWSA is the 4th-largest port in the country by export value and by 20-foot equivalent units (TEUs), and ranks among the top 50 busiest container ports in the world.⁴ It is also the 2nd largest port in the country as measured by agricultural trade tonnage, and the nation's leading export gateway for refrigerated agriculture products, representing nearly 20% of national volumes.⁵ Directly and indirectly, the Port of Seattle's marine cargo division supports a combined \$138.1 billion in economic activity, equivalent to one-third of Washington State's gross state product. The Port of Seattle also supports more than 48,000 jobs, including 18,900 direct jobs, and produces \$379 million in state and local taxes annually.

By providing safer, separated facilities directly to the Port of Seattle, the RAISE Project will support the Port's ability to move containers between sea and overland routes more quickly and safely and, thereby, help the local, regional, and national economies recover from the current

economic downturn. It will allow businesses and rural farmers in Washington and throughout the Northwest that rely on safe, predictable access to the Port of Seattle and BNSF facilities to effectively compete in regional and global markets.

The RAISE Project is also regionally and nationally significant because it will provide:

- Safer and more reliable access to potential development within a Qualified Opportunity Zone (QOZ), in the same way it supports a 3-story 590,000 square foot Amazon fulfillment center opened in 2018 on East Marginal Way S and planned redevelopment of the Port of Seattle's Terminal 106 located just south of the project limits
- A two-way protected bicycle lane, which will serve as a critical connection to other active transportation investments currently being developed as part of the City of Seattle Bicycle Master Plan, the Move Seattle vision, and the Levy to Move Seattle

2. PROJECT LOCATION

The RAISE Project is located within the Seattle, Washington Urbanized Area (UZA) in Congressional District WA-7. The Seattle UZA had a 2010 Decennial Census population of 3,059,393 and 1,010 UZA square miles. The City of Seattle itself had a population of 608,600 in 2010, which grew by 25%, to 761,100, in 2020.⁶

The RAISE Project is situated within the Duwamish MIC, the region's largest and densest MIC, and includes a QOZ (Census Tract: 53033009300), which increases the likelihood of

new development and industry. Figure 1 shows the Project Vicinity Map and how the RAISE Project is situated within the city and region, and Figure 10 illustrates the Project's location situated within the larger Seattle bike network.

Project Coordinates

Northern Boundaries:

Latitude 47°35'18.38"N | Longitude 122°20'18.58"W

Southern Boundaries:

Latitude 47°34'15.89"N | Longitude 122°20'21.97"W

4. [NWSA Economic Impact](#)

5. U.S. Senate Committee on Commerce, Science and Transportation Subcommittee on Transportation and Safety, "Building Infrastructure in America: Overview of the Build America Bureau and the U.S. Department of Transportation Rural Initiatives," [Testimony of The Honorable John McCarthy, Port of Tacoma Commission President and Co-Chair of The Northwest Seaport Alliance](#), January 28, 2020, p. 2.

6. Washington State Office of Financial Management, [April 1, 2020 Population of Cities, Towns and Counties](#).



Figure 10: Bike Network Map

3. GRANT FUNDS, SOURCES AND USES OF PROJECT FUNDS

SDOT requests \$20 million in FY 2021 RAISE grant funding, which will match \$18.1 million in state, local, and other federal funding to design and construct the RAISE Project. This section presents the sources and uses of funds planned for the RAISE Project.

3.1 Project Costs

The total estimated cost of the RAISE Project is \$43.83 million (Table 1). Through FY 2021,⁷ we will have expended \$4.48 million in local, state, and federal funds for planning, design, and other pre-construction activities for the RAISE Project as “previously-incurred expenses.” The remaining \$38.13 million represents future RAISE-eligible costs for construction of the RAISE Project.

3.2 Sources and Uses of Funds

As shown in Table 2, non-federal sources make up \$16.13 million, or 42%, of RAISE-eligible costs for the RAISE Project. Federal sources make up \$22.00 million, or 58%, of RAISE-eligible costs.



Puget Sound Regional Council

One other federal source of funds for the RAISE Project, aside from the requested FY 2021 RAISE grant funding, is federal highway aid administered by the [Puget Sound Regional Council \(PSRC\)](#). The PSRC is the Metropolitan Planning Organization for the four-county Seattle area and allocates, on a competitive basis,

Table 1: Project Costs by Project Milestone and Fiscal Year (\$ Millions)

	FY 2021 & Prior	FY 2022	FY 2023	FY 2024	FY 2025	Total
PE/NEPA, Design	\$4.48	\$1.12	-	-	-	\$5.60
ROW	-	-	-	-	-	-
Construction	-	\$0.10	\$10.44	\$20.85	\$6.84	\$38.23
Total	\$4.48	\$1.22	\$10.44	\$20.85	\$6.84	\$43.83
	Previously incurred (non-RAISE-eligible) expenses		RAISE-eligible expenses			\$38.13

Table 2: Project Budget Summary by Source and Use (\$ Millions)

	Funding Source	Total Funding Amount	Percent of Total
Federal Funds	RAISE Grant Funds	\$20.00	58%
	FHWA	\$2.00	
	Total Federal Funds	\$22.00	
Non-Federal Funds	City of Seattle	\$3.00	42%
	State Grants	\$7.63	
	Port of Seattle	\$5.50	
	Total Non-Federal Funds	\$16.13	
Total Project Funding (eligible RAISE costs only)		\$38.13	100%

7. Seattle’s Fiscal Year runs from January 1 to December 31.

Federal Highway Administration (FHWA) formula funds apportioned to the region. PSRC invests these funds in a variety of roadway, transit, and non-motorized needs through its annual [project selection process](#). We have won two awards for East Marginal Way S – a \$2 million construction grant dedicated to bicycle facilities and associated intersection improvements, and a \$4 million preliminary engineering grant dedicated to design work for the RAISE Project elements. We will apply \$2 million of these funds to the RAISE Project.

Non-federal sources for the RAISE Project include the following:



Levy to Move Seattle – A 9-year, \$930 million property tax measure to fund transportation infrastructure approved by Seattle voters in 2015, the [Levy to Move Seattle](#) provides 30% of the City of Seattle’s transportation budget and has dedicated \$3 million to the RAISE Project, which was one of two critical freight mobility projects (along with the Lander Street Bridge Project) that voters prioritized for local funding through the levy.



Urban Arterial Program – The Washington State Transportation Improvement Board (TIB) oversees grant programs, including the [Urban Arterial Program](#), which has dedicated \$3 million in funding to design and construct the RAISE Project’s bicycle facility and signal elements. TIB funds are generated from a set-aside of the State’s gas tax revenues and are distributed on a competitive basis, awarded to projects that demonstrate a commitment to safety, growth and development, mobility, and enhancing the physical condition of roadways.



The Washington State Freight Mobility Strategic Investment Board (FMSIB) was created by the State Legislature to facilitate the build out of the FAST Corridor projects cited above in Section 1.4 that facilitate freight movement between and among local, national, and international markets and enhance trade opportunities. The RAISE Project was selected as a [priority project of FMSIB](#) and will receive up to \$6.1 million in funding that we expect to apply as a local match to the RAISE Project.



Port of Seattle – The Port of Seattle, founded by King County voters in 1911 as a special-purpose government to promote economic development and trade in the region, has been a crucial partner of ours in designing a cost-effective RAISE Project that will support Port tenants and customers in the enhancement of safe and efficient freight movement. The Port has committed \$5.5 million in private funds to construct the RAISE Project.

3.3 Contingency

The RAISE Project includes a 15% construction contingency in addition to a 20% allowance at the current phase of the design process to ensure the project budget has reserve funds. If actual cost escalations exceed contingency funds, we are committed to covering these additional costs with other local reserve funds.

4. SELECTION CRITERIA

The RAISE Project will directly result in quantitative and qualitative benefits, as provided below.

4.1 Safety

Arterial streets like East Marginal Way S are Seattle's primary transportation corridors and where a majority of pedestrian and bicycle crashes occur. Even though arterials comprise a relatively small percentage of the total street network, 74.5% of bicycle crashes and nearly 80% of pedestrian crashes occur on the City's arterial streets.⁸ Thus, streets with higher traffic volumes, higher speeds, and higher likelihood of conflicts between bicyclists and motorists need special attention. These trends are only intensified on a street such as East Marginal Way S where people riding bikes have few alternatives but to mix with the 20+ ton cement mixers and container trucks that depend on the corridor.

As explained in Section 1.3, over the 10-year period between 2010 and 2019, a total of 105 crashes occurred on the RAISE Project corridor. Of these crashes, 38 (or 37%) involved fatalities or injuries. One fatal crash killed Lance David, a cyclist who, in 2013, collided with a freight truck at East Marginal Way S and S Hanford St. Of the 105 crashes on East Marginal Way S, 18 (or 17%) involved bicyclists or pedestrians (Table 3). The percentage of crashes involving bikes and pedestrians on East Marginal Way S is far higher than the 6.3% share of all crashes citywide from 2007 to 2014.⁹ This may be due to the high truck volumes on the RAISE Project corridor, which have been found to lead to greater risk for serious crashes that can cause fatalities and injuries as well as significant losses in productivity, property, and personal injury.¹⁰

Underlying the safety data is the perception that East Marginal Way S is perilous and intimidating, even for the most fearless bicyclists who contend

with fast-moving cars, railroad tracks, heavy freight trucks, and poor pavement conditions (Figure 11). In [recent public outreach efforts](#) for the RAISE Project, 59% of survey respondents cited a lack of bicycle facilities as a current barrier they face when biking in the project area, and another 21% mentioned the lack of quality street infrastructure, such as poor roadway conditions and a lack of truck separation, as current barriers. During the [2020 East Marginal Way Freight Survey](#), 67% of participating truck drivers agreed that the proposed RAISE project will enhance their interactions with people on bikes.

Table 3: East Marginal Way S Crash Data (2010-2019)

Type of Crash	Total Crashes	% of Total
Property Damage Only and Unknown	67	64%
Possible Injury	29	27%
Suspected Serious Injury	6	6%
Fatality	3	3%
Total	105	100%
Bike	15	14%
Pedestrian	3	3%
Other	87	83%
Total	105	100%

Source: SDOT, 2020



Figure 11: Cyclists and Trucks Sharing the Project Corridor

8. SDOT. [Bicycle and Pedestrian Safety Analysis](#). 2016, p. 7.

9. *Ibid.*, p. 2.

10. ScienceDaily, "[Trucks a significant cause of severe accidents, study finds](#)," Taylor & Francis, December 5, 2013.

The RAISE Project will address these deficiencies by physically separating bicyclists and auto traffic with a protected 2-way bike lane, widening truck travel lanes from 11 to 12 feet, reconstructing sidewalks and motor vehicle traffic lanes, and installing enhanced lighting. These improvements will remove conflicts between more vulnerable users and heavy freight traffic, resulting in better safety outcomes, both real and perceived. The improvements in safety from the RAISE Project will help the City of Seattle meet its [Vision Zero program](#) goal, shared with advocacy groups such as West Seattle Bike Connections, of eliminating all traffic fatalities and serious injuries by 2030.

Studies have shown a 20% reduction in total injuries and a 74% decrease in the average risk of a serious injury following the installation of protected bicycle lanes.¹¹ Similar analysis on the safety impact of installing protected bicycle lanes in Seattle has shown that they reduce crashes overall by 20%.¹² Thus, it may be assumed that, with the RAISE Project improvements, crashes will decrease by up to 20%. The BCA for this grant application predicts that the RAISE Project will eliminate two fatal, 33 injury, and 47 property-damage-only collisions over the 24-year analysis period for a total benefit of \$14.8 million (at a 7% discounted rate). Notably, the RAISE Project will reduce the more catastrophic consequences of collisions involving cyclists. While an auto-to-auto accident is likely to result in a trip to the body shop, an auto-to-bicyclist or pedestrian collision often entails a trip to the emergency room.

“

Biking along trucks hauling freight is terrifying.

– 2020 Survey Respondent

“

I'd feel safe enough to bike more regularly to my job and downtown if this [RAISE] Project was in place, I've had so many close calls over the years.

– 2020 Survey Respondent

4.2 State of Good Repair

The RAISE Project will give new life to the deteriorating roadway by upgrading the pavement in the RAISE Project corridor. The RAISE Project will replace the existing asphalt with new materials that will provide a 50-year useful life constructed to Heavy Haul Network standards.

The RAISE Project is needed to remedy the poor and failing pavement throughout the corridor. The existing pavement section along the East Marginal Way S corridor varies along the alignment. Currently within the corridor, pavement sections have three different forms. Certain portions of the roadway contain asphalt over concrete and soil (Section B in Figure 12), while others have asphalt over concrete, soil, and another concrete sub-base (Section C in Figure 12), and another section has asphalt over concrete and brick (Section A in Figure 12). The roadway throughout consists of highly-distressed hot mix asphalt underlain by equally-distressed concrete. The thicknesses of the concrete vary widely, with sections as thick as 28 inches where railway tracks were previously located and as thin as 5 inches in other places. The concrete was also placed in one or two lifts.

The RAISE Project will bring the pavement to a state of good repair by removing the existing damaged and inconsistently placed asphalt, concrete, and brick and replacing them with new, full-depth (15 inches) concrete over 6 inches of mineral aggregate (Figure 12). The new concrete pavement will have a useful life of 50 years, which will essentially eliminate overall life-cycle costs for that duration. Shifting from asphalt to concrete will produce O&M and rehabilitation cost savings for us relative to the baseline alternative of continually maintaining the distressed asphalt roadway.

11. New York City Department of Transportation, [Protected Bicycle Lane Analysis](#), September 2014.

12. This finding was generated from an analysis of Seattle's Second Avenue protected bicycle lanes, which have also demonstrated significant increases in ridership. Installed in 2014, the Second Avenue bike lanes increased average daily bicycle trips from 188 to 744 in 2015 and attracted 4 times as many people to bicycle on Second Avenue. This growth continued when the Second Avenue protected bike lane was extended in 2017.

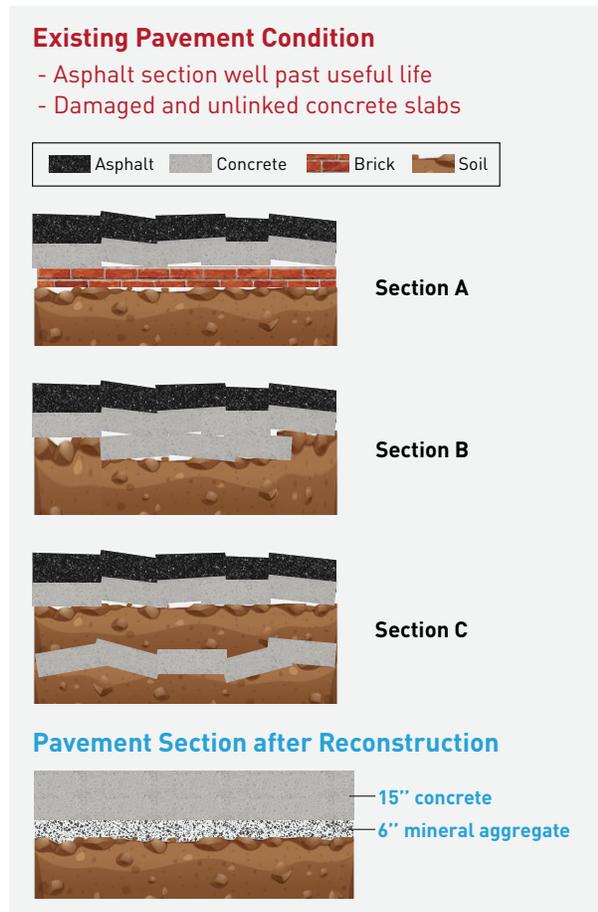


Figure 12: RAISE Project Pavement Condition and Materials

By using 15 inches of concrete over 6 inches of mineral aggregate, the RAISE Project will upgrade East Marginal Way S to Heavy Haul Network standards and restore the good condition of infrastructure that supports commerce and economic growth. In Washington State, the Heavy Haul Network standards were created to ensure that designated roadways capable of supporting gross vehicle weight in excess of the 80,000 pound standard, up to 105,000 pounds – typically to and from ports and intermodal freight terminals – are designed to withstand these additional stressors and safely accommodate oversized vehicles.

The Washington State Department of Transportation (WSDOT) has the statutory authority to designate Heavy Haul Industrial

Corridors “with port districts and adjacent jurisdictions or agencies of the districts, for the purpose of identifying, managing, and maintaining short heavy haul industrial corridors within port district property for the movement of overweight sealed containers used in international trade.”¹³ Under this authority, we have partnered with WSDOT to designate East Marginal Way S as a Heavy Haul Industrial Corridor. These standards ensure the roadway will be able to handle the excessive weights and still maintain a 50-year useful life, reducing O&M and rehabilitation costs to the roadway operator and freight shippers. The standards will minimize the recurrence of potholes that cause vehicles to reduce speeds and weave in and out of lanes to avoid rough conditions, improving safety and travel times.

The City of Seattle will manage ongoing O&M costs after initial construction. The City has a robust [asset management program](#) in place for maintenance and preservation activities, including long-term condition forecasting and optimization modeling to meet federal performance monitoring requirements and industry best practices. We maintain an interactive [Asset Web Map](#), which is updated weekly to reflect the existing conditions of the City’s assets and to aid in timely repairs and maintenance (Figure 13).

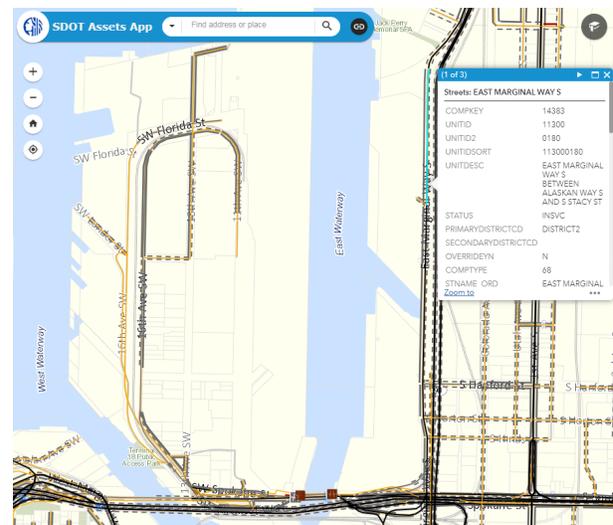


Figure 13: SDOT Asset Web Map

13. Washington State Legislature. [Revised Code of Washington § 46.44.0915](#). Heavy Haul Industrial Corridors.

For the RAISE Project, we used historical data to forecast future O&M costs of the roadway. The BCA performed for this grant application found that we would save \$113,900 (at a 7% discounted rate) in O&M costs over 30 years due to the RAISE Project. In addition, because the useful life of the RAISE Project exceeds the analysis period, the RAISE Project produces a “residual value,” representing its remaining value at the end of the analysis period. The total residual value of the capital investments is estimated at \$23.7 million (undiscounted) with 30 more years of anticipated asset life remaining at the end of the 24-year analysis period. The BCA also found that the state of good repair improvements from the RAISE Project will result in operations cost savings for drivers using the reconstructed roadway.

Finally, as part of the RAISE Project’s road reconstruction, Seattle Public Utilities (SPU) intends to replace both water and drainage facilities under the surface of East Marginal Way S. SPU will replace over 5,400 linear feet of water main and 2,000 linear feet of drainage main, as well as castings within the project area. SPU is partnering closely with us on the RAISE Project, which has incorporated these utility elements into project design. This work is not a part of the scope of this RAISE Project, but it is an example of a shared commitment to work closely in coordination with partners to upgrade transportation and utility infrastructure at the same time, be better stewards of public funds, and minimize impacts to the public for any infrastructure upgrades along the corridor.

4.3 Economic Competitiveness

International trade drives Washington’s economy and Seattle is at the center of the State’s economy. Washington State is a global hub, importing and exporting goods from all over the world and sending them to the rest of the country. In fact, the NWSA’s port facilities comprise the fourth-largest container gateway

in North America with 46 U.S. states using the ports to export their products to the world.¹⁴ To recover from the current economic downturn and become, once again, a thriving center of international commerce, the NWSA facilities will need roadway infrastructure that ensures quick and reliable transport of goods. The RAISE Project will be a key component of this recovery. By supporting the improved condition and functionality of East Marginal Way S, RAISE grant funds will secure jobs and livelihoods of commuters, farmers, and manufacturers across the region and nation.

Facilitating National and Global Trade

East Marginal Way S is identified as a priority route by the U.S. Departments of Transportation and Defense, Washington State, the joint City of Seattle/Port of Seattle Heavy Haul Network, and the City’s over-dimensional/overweight load routing. It provides direct access to two major railyards, a USCG facility, and Port of Seattle Terminals 25, 30, and 46, and also serves as the main connection from Terminals 5 and 18 to the BNSF railyard (Figure 1). Freight trucks are forced to use this corridor in its deteriorated condition because it is the only way in and out of these busy terminals and railyards. As a result, freight trucks are impacted by delays due to congestion and occasional closures for emergency repairs and collisions.

Upgraded roadway infrastructure on East Marginal Way S is needed to support the productivity and competitiveness of NWSA’s ports, which are among the closest U.S. ports to major trading partners in the Pacific Rim, with their largest trading partners including China/Hong Kong, Japan, and the Republic of Korea.¹⁵ In 2017, the NWSA handled more than 3.7 million TEUs while supporting 58,400 jobs, contributing nearly \$12.4 billion in business output, producing more than \$4 billion in labor income, and generating \$135.9 million in state taxes from container shipping, the largest driver of economic impact.¹⁶

14. Washington Council on International Trade, “[Policy Factsheet: Increase Competitiveness of Washington’s Ports and Strengthen Our Freight Mobility Infrastructure](#),” 2017, p. 1.

15. Bisnow, “[U.S. Seaports Driving Economic Growth and Industrial Demand](#),” 2017.

16. Port of Seattle, Port of Tacoma, and Northwest Seaport Alliance, [Economic Impact Analysis](#), 2019, pp. 6, 17, 19.

In 2018, annual container volumes at the Port of Seattle's Terminal 18 alone hit one million TEUs, a record-breaking figure for Washington State.¹⁷

The economic productivity of the NWSA ports is largely due to the fact that the majority of freight from the country's Northwest region, including rural agricultural production centers, is exported through the Ports of Seattle and Tacoma. Export trade is a key driver of job growth and economic prosperity across the region with 75% of all NWSA harbor exports originating in Washington, Oregon, and Idaho (Figure 14).¹⁸ This includes refrigerated exports – fruits, vegetables, and other perishable commodities – for which NWSA ports are America's leading gateway.¹⁹

In 2018, Washington-grown or processed food and agriculture exports totaled \$6.7 billion, consisting of products especially reliant on global trade, including wheat (up to 90% of the crop is exported each year), potatoes (up to 70% are exported in the form of French fries), and tree

fruit (approximately 33% of apples and 25% of cherries are exported each year).²⁰ As the state's 2nd-largest export category, agriculture and food processing provide over 164,000 jobs on Washington farms, of which 94% are small farms in rural areas dependent on the Port of Seattle to move these goods through the freight system.²¹ Washington State's agriculture industry is in many ways the backbone of the state's economy, moving goods from nearly 40,000 individual farms in the state that produce more than 300 commodities (not including products from farms in other nearby states). Sixty-five percent of the state's farmland is dedicated to small rural farms, a higher rate than the national average at 45%.²² The RAISE Project will safeguard their ability to reliably access trade routes and the expansive export network that funnels its goods through facilities centered on the corridor. The reconstruction of East Marginal Way S to meet Heavy Haul Network design standards will also allow efficient trade routes for overweight

Regional Influence

The Pacific Northwest is one of the most trade dependent regions of the United States. Export trade is a key driver of job growth and economic prosperity.



	WASHINGTON	OREGON	IDAHO	TOTAL PNW
Export Value	\$6.7 billion	\$1.5 billion	\$235 million	\$8.4 billion
% thru the NWSA	90%	68%	44%	83%
Jobs tied to trade	332,599	87,023	22,437	442,000+
Exporting Companies	12,211	5,953	1,432	19,596

Source: NWSAport Alliance

Figure 14: NWSA Ports Freight Flows through the Northwest

17. NWSA, "Terminal 18 Breaks Records with 2018 Volume," December 3, 2018.

18. NWSA. Delivering the goods for Pacific Northwest Exporters. 2017.

19. NWSA. Cold Storage Flyer. 2020.

20. Washington State Department of Agriculture. Export Statistics.

21. Washington State Farm Bureau. Agriculture's Contribution to Washington's Economy.

22. Ibid.

international freight. These added benefits will continue to support and fuel the Northwest economy and add even more value to these seaport terminals: the closest U.S. seaports to the nation's major Pacific Rim trade partners.

The East Marginal Way S corridor offers trucks a more direct route than I-5 for shipments traveling to key destinations along SR 99 to the north (such as the Ballard-Interbay MIC) or points along SR 509 to the south (such as Seattle-Tacoma International Airport, Boeing Field, and the Kent Valley, which provides warehousing for much of the greater Seattle region). This includes a 590,000-square-foot Amazon fulfillment center on East Marginal Way S that ProLogis opened in 2018; Terminal 30, which now only serves international freight to meet the high demand in the region; and Terminal 106, which is currently slated for redevelopment to expand the industrial market. The underutilized Terminal 46 is under review for potential redevelopment, either as a new cruise ship terminal, an expanded bulk cargo operations site, or an extension of the Coast Guard base. Regardless of the choice, traffic in and out of the Port is only expected to increase. Once the RAISE Project is completed, the route, which also provides system redundancy for shippers when congestion affects I-5, 4th Ave S, and other freight arterials, will provide a frictionless north-to-south route designed to withstand heavy haul freight trucks at high volumes.

The RAISE Project's support for regional and national economic competitiveness is evident

in the results from the BCA conducted for this grant application. By reducing freight and auto delays during peak periods, the RAISE Project will produce travel time savings for drivers that will benefit the entire Northwest economy. The Port of Seattle estimates that just one hour of truck delay costs the tax base \$114 per truck.²³ Based on the BCA, the RAISE Project will eliminate 368,838 person hours of travel delay for a total savings of \$1.9 million (at a 7% discounted rate) for drivers, passengers, and cargo over 24 years.

Leveraging Economic Development

The Puget Sound industrial market is one of the biggest beneficiaries of the Port's activities. Industrial vacancies hover around 3%, compared to 7% nationally in 2019.²⁴ This is significant because industrial real estate was in high demand with industrial/manufacturing businesses thriving before the COVID-19 crisis. This demand has a greater chance of continuing through and beyond the crisis due to the prevalence of QOZs around NWSA facilities. The RAISE Project corridor, in particular, lies within a QOZ (Census Tract: 53033009300) and is likely to benefit from economic development spurred by QOZ incentives. In 2019, private developers broke ground on the City's first project within a QOZ in Pioneer Square, just north of the project area. The City is committed to realizing the economic potential of QOZs and will promote new development and industry in the QOZ within the project area through delivering the improved access and mobility unlocked by the RAISE Project.

23. South Lander Street Grade Separation Project Social Effects and Environmental Justice Discipline Report, SDOT 2017.

24. Bisnow, "[U.S. Seaports Driving Economic Growth and Industrial Demand](#)," 2017.

Supporting Jobs

By supporting the regional freight economy, the RAISE Project supports more than 442,000 jobs that rely on export trade across the region through NWSA facilities and the 40% of all jobs in Washington that are tied to freight-related activity (Figure 14 and Figure 15).²⁵ During construction, the RAISE Project is estimated to support 533 in-state jobs, which will result in a substantial increase in heavy and civil construction employment in the area.



Source: City of Seattle Freight Master Plan, 2016

Figure 15: Puget Sound Freight-Related Jobs

4.4 Environmental Sustainability

The RAISE Project will demonstrate environmental sustainability benefits by:

- Diverting a portion of trips along the corridor to non-motorized modes (primarily people riding bikes) that produce less air pollution than motorized modes
- Reducing unnecessary idling and improving traffic flow with SCOOT technology, adaptive/integrated signals, and DMS
- Reducing diversions onto other routes
- Incorporating bioretention facilities as a stormwater mitigation measure

We used our local/regional GIS mapping tools, as well as the nationally recognized EJSCREEN tool, to ensure a full understanding of the affected communities and minimize adverse impacts to environmental justice communities. The Project’s Racial Equity Toolkit considered the impact on the diverse populations residing in the affected communities, as well as the truck drivers who rely on the route. The RAISE Project is also consistent with the City’s [Climate Action Plan](#) and [Equitable Development Framework](#).

Reduction in Air Emissions

According to the U.S. Environmental Protection Agency, the Seattle-Tacoma region is an area that is in non-attainment for National Ambient Air Quality Standards, including 1-hour ozone and carbon monoxide,²⁶ which are common vehicle pollutants. Roadway transportation makes up 40% of greenhouse gas emissions in Seattle.

By reducing vehicle miles traveled in vehicles burning fossil fuels, the RAISE Project will improve and protect Seattle’s natural environment. Expanding and enhancing active transportation opportunities along the East Marginal Way S corridor is a highly cost-effective approach for meeting the goals of Seattle’s [Climate Action Plan](#). In fact, the BCA performed for the RAISE application found that the RAISE Project will reduce tailpipe emissions from vehicles by 1,601 tons, a benefit valued at \$64,000 (at a 7% discounted rate) over the 24-year analysis period.

Stormwater Enhancements

Known for its wet weather, Seattle averages 37.49 inches of precipitation a year, with the vast majority falling as rain instead of snow.²⁷ The RAISE Project will add infiltrating bioretention areas and accompanying planting areas to provide a means of helping to manage stormwater that falls on the East Marginal Way S corridor’s impervious surfaces. These bioretention areas are designed to facilitate the percolation of stormwater into the ground and

25. City of Seattle. [Freight Master Plan](#), 2016.

26. EPA, [Washington Nonattainment/Maintenance Status for Each County by Year for all Criteria Pollutants](#), 2020.

27. Seattle Weather Blog, [Rain Stats](#).

lessen the impact to the existing piped storm drainage system. The bioretention areas are shallow earthen depressions with a designed soil mix and plants adapted to the local climate and soil moisture conditions. They are designed to more closely mimic natural conditions, where healthy soil structure and vegetation promote the infiltration, storage, and slow release of stormwater flows. Figure 16 shows an example of a similar stormwater treatment.



Figure 16: Stormwater Surface Treatment

4.5 Quality of Life

SDOT used the City’s Racial Equity Toolkit to deepen its racial equity analysis during each phase of planning. The Toolkit challenges a project sponsor to define racially equitable community outcomes related to the project. This includes a demographic analysis of affected areas using local and regional GIS tools such as the Race and Social Equity Index and Access to Opportunity Index, a review of contracting and workforce equity, and the development of meaningful public outreach plans. The Toolkit found the RAISE Project’s highest potential to increase racial equity was through its improvements to pedestrian and bicycle facilities

and reduced barriers to crossings for residents, who include a higher-than average-percentage of people who are Black, Indigenous, and People of Color (BIPOC).

Active Transportation

The creation of a protected two-way bicycle facility will provide a more inviting environment for biking that will result in additional people riding bikes for commuting and recreational purposes. This has already been demonstrated in the City of Seattle with a doubling of bicycle volumes on Westlake Ave as a result of investments in protected bicycle lanes, and the more than 300% increase in volumes on Second Avenue due to the installation of protected bicycle lanes.²⁸

Other U.S. cities have already demonstrated that installing new protected bike facilities, especially along roads that have lacked protected bike infrastructure such as East Marginal Way S, dramatically increases bike trips. Figure 17 shows that in Austin, Chicago, Portland, San Francisco, and the District of Columbia, a significant increase in bicycle volumes was observed after the installation of new buffered or grade-separated bike facilities such as the one proposed in the northbound direction along the entire project corridor. An analysis from the City of St. Paul, MN compared cyclist volumes in September 2015 and 2016 along five facilities and recorded an increase in bike traffic ranging from 62% to 160% after bike lanes were installed.²⁹

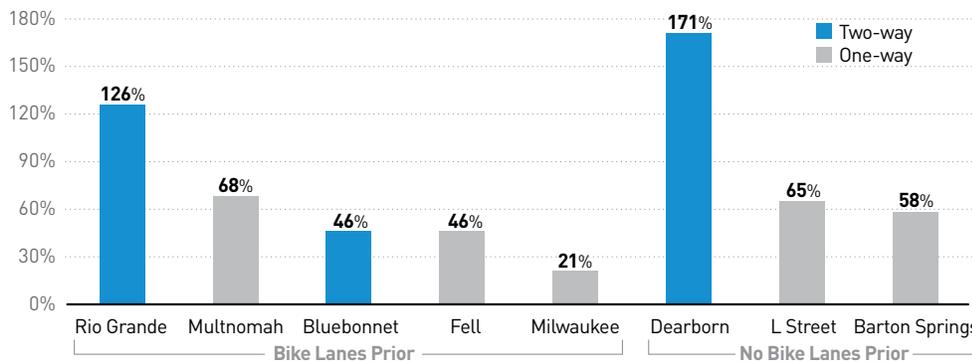


Figure 17: Increase in Bicycle Traffic After Protected Bike Lane Installations in Major U.S. Cities

Source: National Institute for Transportation and Communities. [NITC-RR-583: Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the U.S.](#)

28. SDOT, [2nd Ave Protected Bike Lane Before and After Study](#), 2016, p. 7.

29. City of St. Paul, MN. 2015-2016 [City of Saint Paul Bicycle and Pedestrian Count Report](#). 2017.

The BCA performed for this grant application found that the RAISE Project would generate an average of 5,601 new commuter cyclists per year, 237,800 hours of commuter bicycling per year, and 3,290 new recreational cyclists per year over the 24-year analysis period, for a combined \$31.5 million in benefits.

The RAISE Project's annual increase in cyclists will result in healthcare cost savings. This finding is in line with public health experts who assert that projects promoting safe and easily accessible walking and bicycling are an important tactic to combat the obesity epidemic.³⁰ One study found that the percentage of people living within 10 minutes of a safe place to walk were 16% more likely to meet activity levels recommended to maintain a healthy lifestyle.

A key reason for this growth in bicycle ridership through the RAISE Project is the fact that East Marginal Way S currently serves as a critical bicycle connection between significant regional destinations and fills a gap in the regional trail system, including the following:

- **Between Downtown Seattle and West Seattle** – East Marginal Way S carried just under 320,000 bicycle trips³¹ in 2019 connecting Downtown to West Seattle without protected bike facilities. The combined impact from COVID-19 and closure of the West Seattle Bridge is anticipated to increase baseline bike volumes by 29%, according to the BCA performed for this grant application.
- **Between bicycle trails and facilities in the region that are currently being developed as part of the City of Seattle Bicycle Master Plan and active transportation investments outlined in the Move Seattle Plan and the Levy to Move Seattle.** A major investment in Downtown Seattle will be the Portside Trail that will run along Alaskan Way as part of the City's redevelopment of the central waterfront following the tunnel replacement

of the SR 99 Viaduct. The East Marginal Way S protected bicycle lanes will largely serve as an extension of the facility from S Atlantic St to the West Seattle Bridge. The Portside Trail, anticipated to be completed in 2024, will produce a 10% increase in bicycle trips by improving connections to locations to the north of the project area. The completion of the East Marginal Way S protected bicycle lanes through the RAISE Project is anticipated to increase bicycle volumes by 58% in the near term.

- **Between the extensive Seattle and regional bike network** – At the northern limit of the RAISE Project corridor, the protected bike path will connect directly to the Portside Trail and to Downtown Seattle through the expanding Center City bike network. At the southern limit of the RAISE Project corridor, the protected bike facility will connect to a trail under the West Seattle Bridge and continue west to West Seattle and communities south of Seattle. Figure 10 shows how the RAISE Project unlocks connections to the regional bike network within a 5.6-mile³² and 10-mile diameter. In particular, the RAISE Project will create new access for communities in neighboring cities, such as Tukwila, Renton, SeaTac, Burien, and Normandy Park to the south, and Mercer Island and Bellevue across the regional trail along I-90 to the east.

With 16% of Seattle households currently not possessing a motor vehicle for their personal use, the RAISE Project will provide a safer and more attractive option for riding a bike to work along the East Marginal Way S corridor. In this way, it will provide a healthy and affordable economic lifeline to the City's car-free residents. Providing bicycle infrastructure to all ages and abilities in parts of the City with lower car ownership will provide better transportation choice for all residents.

30. National Complete Streets Coalition. "[Benefits of Complete Streets](#)"

31. [Westlake Protected Bicycle Lane Program](#), 2016.

32. The average bicycle commute trip length for people who bike from home to work in Downtown Seattle is 5.6 miles, as measured in the [2019 Seattle Center City Commute Mode Split Survey](#).

Equity and Inclusion

As emphasized throughout the application, the RAISE Project was developed with a focus on racial equity using our RET to consider both the diverse populations along the corridor, as well as the diverse group of truck drivers who rely on this route for their economic livelihood. The robust public engagement process discussed later in this application shows that these communities have had meaningful involvement in the planning of this Project. The Project will reduce physical barriers for low-income populations and increase transportation options. Furthermore, we have been a proactive national leader in the fields of equity and inclusion. Led by the Office of Civil Rights, the Finance and Administrative Services Department, and a citywide Race and Social Justice Initiative, we actively promote progress in uplifting our diverse BIPOC communities through programs like our Priority Hire Program, which increases hiring in economically distressed zip codes of women and people of color on construction projects over \$5 million. Since late 2013, workers in distressed areas have earned an additional \$20.1 million as a part of the Program. We are in the process of applying to FHWA to be part of the pilot project allowing local/geographic hiring preferences.

4.6 Innovation

Innovative Technology

This RAISE Project includes [adaptive signal control technologies](#) to adjust the timing of red, yellow, and green lights based on real-time traffic conditions in order to ease traffic congestion. FHWA promotes [Adaptive Signal Technologies](#) as an innovative tool in its Every Day Counts Initiative. By collecting and processing data in real-time from sensors at each intersection, adaptive signal technology can control and adjust the timing of traffic lights to both increase traffic flow and decrease crashes. FHWA notes that studies have shown [delays at intersections can decrease up to 15% through adaptive signal timing](#) based on reduced intersection congestion. Similar improvements, often up to a 20% improvement or greater, are seen for travel time and throughput on congested corridors.

The RAISE Project will implement [SCOOT](#) technology, an innovative, dynamic, online, real-time method of signal control that continuously measures traffic demand on all approaches to intersections in a network and optimizes the signal timings at each intersection to minimize delay and stops. Timing changes are small, to avoid major disruption to traffic flows, and frequent, to allow rapid response to changing traffic conditions. SCOOT has been used by SDOT to improve overall travel times and travel reliability in the City's busiest corridors. SCOOT determines traffic levels, predicts the flow of traffic, and adjusts the amount of time available to each movement through an intersection. Based on the successful deployment in June 2017, traffic signal performance measures have reduced travel times an average of 21% along the corridors where SCOOT was deployed during the busiest peak hours.

The RAISE Project will also take advantage of [Warm Mix Asphalt](#) on the protected bike lanes. [Warm Mix Asphalt](#) is an innovative technology used to reduce paving costs, extend the paving season (which can be important in Seattle's climate), improve asphalt compaction, allow the mix to be hauled longer distances, and improve working conditions for crews by reducing the risk of exposure to fuel emissions, fumes, and odors.

Finally, the RAISE Project will install a [Dynamic Message Sign](#) to inform motorists about traffic conditions and direct them to the RAISE Project corridor on East Marginal Way S. DMS provides real-time information to better manage traffic and minimize delays and incidents.

Innovation in Permitting, Contracting, and Project Delivery

SDOT is committed to using relevant proven technologies and innovations to shorten and enhance project delivery through FHWA's Every Day Counts Initiative. The RAISE Project has benefited from [Virtual Public Involvement](#), an innovative approach to public involvement. SDOT has utilized [Virtual Public Involvement](#) throughout the life of the RAISE Project by using three online surveys, one in 2017 and two in 2020, and project update e-mails. According to FHWA, these tools

are cost-effective options to accelerate project delivery by securing public buy-in and quickly alerting the public to progress and possible impacts. They also enhance communication and collaboration by offering a wider group of people the ability to submit feedback on a project's priorities and design. These techniques can reach stakeholders who may not be able to attend open houses and public meetings in-person, especially today in an era of social distancing.

Innovation in Financing

This RAISE Project will be funded through a mixture of federal, state, and local funding. This includes the use of dedicated transportation revenues from the City's [voter-approved \\$930 million Levy to Move Seattle, which is raised through a property tax that costs the median Seattle homeowner about \\$275 per year](#).

Additionally, the Port of Seattle has committed [\\$5.5 million](#) to the RAISE Project in recognition of the necessity and importance of its completion to support private tenants and customers.

4.7 Partnership

This RAISE Project exemplifies a coordinated effort by the [City of Seattle](#), [Port of Seattle](#), [State of Washington](#), and [public advocacy groups](#) to complete this priority project in the region and enhance the safety and efficiency of freight and commuter movement, as well as pedestrians and people on bikes.

Project Sponsor:

[Seattle Department of Transportation \(SDOT\)](#) will lead the RAISE Project. SDOT is responsible for the operation and maintenance of the City's transportation systems, including roads, bridges, and other roadway structures; signals; transit; traffic control; and right-of-way permitting. The agency is funded primarily by general taxes supplemented by fees, partnership funding, and the Levy to Move Seattle. SDOT's 2020 budget was \$739 million.

SDOT has a long history of delivering successful capital projects, including the [South Lander Street Grade Separation and Railroad Safety Project](#), which received federal FASTLANE

funding in 2016, and was the first FASTLANE-funded project in the nation to start construction. SDOT has continually proven to be a good steward of federal funding and is well-versed in the reporting requirements associated with federal grants.

SDOT is also responsible for Seattle's Vision Zero program, with a goal of zero traffic deaths and serious injuries by 2030. The RAISE Project is an important component of SDOT's multimodal improvements to eliminate fatalities through the Vision Zero initiative.

Project Partners:

[Port of Seattle](#): The Port of Seattle is a critical partner in delivering the RAISE Project, which will support its tenants and customers. The Port has committed \$5.5 million of its own funds to complete the RAISE Project.

[Washington State Department of Transportation \(WSDOT\)](#): WSDOT serves as the lead environmental review agency for the State and works closely with SDOT to complete all required environmental reviews and approvals. WSDOT will approve the Construction Permit that allows work to be done under the SR 99 south viaduct, which is owned and maintained by WSDOT.

[The Washington State Freight Mobility Strategic Investment Board \(FMSIB\)](#): FMSIB selected the RAISE Project as [a priority project](#), providing up to \$6.1 million in funding to be applied as a local match to the RAISE grant.

[The Washington State Transportation Improvement Board \(TIB\)](#): Created by the Washington Legislature, TIB fosters state investment in transportation through the distribution of grants to local applicants with revenues collected from a set-aside of the State's gas taxes. TIB selected the RAISE Project to receive \$3.0 million in TIB funds through its competitive [FY 2020 Urban Arterial Program](#).

[Puget Sound Regional Council \(PSRC\)](#): PSRC awarded \$6 million in FHWA formula funds through its annual [project selection process](#) to the RAISE Project. SDOT will apply \$2.4 million of these funds to the RAISE Project.

Railroads Partners: SDOT is working closely with BNSF and Union Pacific Railroads (UPRR) to coordinate any required permits needed to complete work close to their rights-of-way, particularly for relocation/removal of the joint use track at S Hanford St as part of the RAISE Project.

Key Stakeholders: Through its public outreach efforts, SDOT has worked closely with stakeholders who support the RAISE Project.

These include elected officials, public agencies (Seattle Bicycle Advisory Board, Seattle Pedestrian Advisory Board, and Seattle Freight Advisory Board), the Port of Seattle/NWSA, businesses along East Marginal Way S, and other interest groups (West Seattle Bike Connections, Cascade Bicycle Club, and SODO Business Improvement Association). Letters of support are included in Attachment C.

5. ENVIRONMENTAL RISK REVIEW

5.1 Project Schedule

SDOT understands the statutory deadlines for FY 2021 RAISE funds and is prepared to execute a grant agreement with USDOT to obligate a RAISE award by June 2022, well in advance of USDOT's statutory obligation deadline of September 2024. As shown in Table 4, the RAISE Project will be ready to begin construction shortly after obligation in June 2022. Final design completion is anticipated in April 2022.

Table 4: Proposed Project Schedule

Project Milestone	Completion Date
Design Contract Award	August 2019
NEPA Document Certification	May 2021
RAISE Grant Award (Estimate)	September 2021
Final Design Completion	April 2022
All Permits Received	May 2022
Obligation of RAISE Grant	June 2022
Construction Contract Award	September 2022
Start of Construction	January 2023
Substantial Completion	January 2025

5.2 Required Approvals

SDOT has an excellent history of risk management with decades of experience managing large, complicated, and innovative highway projects.

Environmental Permits and Reviews

The RAISE Project received a Documented Categorical Exclusion class of action in accordance with the National Environmental Policy Act of 1969 (NEPA) on May 28, 2021. The project expects to issue a State Environmental Policy Act (SEPA) Determination of Non-Significance in July 2021.

Fulfillment of Federal, State, and Local Planning Requirements

Inclusion in the TIP – This RAISE Project is included in the [Statewide Transportation Improvement Plan \(TIP\)](#) as Project SEA-225. On February 4, 2020, SDOT submitted a revision to the TIP to include the expanded Phase 1 Project area, presented as this RAISE Project, to include S Alaska St as the southern terminus. This now includes construction (CN Phase) funds for the bicycle/pedestrian components of this RAISE Project. The RAISE Project's construction phase will span beyond the 2019-2022 TIP and will continue to be updated.

Freight Planning Documents – The RAISE Project was selected as one of the top capital priorities of the [2015 Move Seattle Strategic Plan](#), a 10-year strategic vision that served as a basis for [Levy to Move Seattle](#) funding priorities. The RAISE Project was also included as a priority project in the 2016 [City of Seattle Freight Master Plan](#),

which calls on the City to “reconstruct a core freight route to heavy haul vehicle standards, add safety and advanced management systems and incorporate separate bicycle and pedestrian facilities while maintaining freight efficiency.”³³ The East Marginal Way S corridor is also designated as a priority T-1 State Route for freight in the [Washington State Freight and Goods Transportation System 2017 Update](#).

Right-of-Way – SDOT worked closely with the Port of Seattle to determine that no permanent right-of-way acquisition will be required for the RAISE Project. Temporary Construction Easements will be finalized by March 2022. SDOT will also secure a small amount of property from King County Wastewater, another local agency. This will be acquired by June 2022.

Additional Permits – Changes to existing railroad tracks will require a permit from BNSF and UPRR. Discussions are ongoing between the railroads and SDOT about securing this permit and approving the current design. SDOT also secured an exemption from the Shoreline Substantial Development Permit requirements and will submit a National Pollutant Discharge Elimination System stormwater construction permit later in 2021. Standard construction permits will be required from UPRR and BNSF because the RAISE Project is within 25 feet of railroad tracks. Finally, SDOT is already working with WSDOT to secure a necessary construction agreement for work under the SR 99 viaduct.

Public Engagement

SDOT completed an extensive public engagement process to design the RAISE Project with its [Public Involvement Plan](#), last officially updated in April 2020. Design workshops began in 2015 and continued through 2016. SDOT held an online open house and survey for public input in the spring and summer of 2017 to receive feedback on design priorities for the corridor. In July 2020, SDOT released a survey to the public regarding the current design at 90% completion, which included highlighted changes from those presented in the February 2020 60% survey. In

August 2020, SDOT released a Freight Survey to commercial truck drivers in 8 languages. The survey was targeted at truck drivers who rely on the East Marginal Way corridor and focused on the feasibility of Seattle’s proposed changes and plans for construction. The survey languages were chosen to align with the truck driver demographics uncovered in the Racial Equity Toolkit analysis. SDOT also meets regularly with key stakeholder groups such as the Seattle Freight Advisory Board and the Seattle Bicycle Advisory Board, and has coordinated with a homeless shelter located along the route to develop a connection to the new protected bicycle lanes (Figure 18).



Figure 18: SDOT public outreach along the corridor

5.3 Assessment of Project Risks and Mitigation Strategies

Certain risks may impact RAISE Project implementation and completion. Table 5 describes those risks, as well as the strategies and plans to mitigate them if they occur.

33. SDOT, [City of Seattle Freight Master Plan](#), p. 92.

Table 5: Potential Risks and Mitigation Strategies

Risk	Mitigation Strategy
Schedule: To construct the RAISE Project, SDOT will need to secure construction permits from both UPRR and BNSF to work within 25 feet of active rail and relocate a section of track from the intersection of East Marginal Way S and S Hanford St. This could pose a schedule risk.	SDOT's strategy has been to engage early with the railroads. SDOT has been in regular conversations with BNSF since 2017. SDOT also engaged formally and signed a preliminary engineering agreement with UPRR once its joint ownership of the railroad track to be relocated was established. During construction, SDOT will coordinate the use of UPRR and BNSF flaggers, scheduling well in advance to avoid delays.
Budget: While the budgetary impacts of COVID-19 and the West Seattle Bridge closure are not fully known at this time, there is a risk of funding shortfalls for the RAISE Project.	Most of the non-RAISE funding for the RAISE Project has already been secured and is not at risk of becoming unavailable due to budgetary issues presented by COVID-19 and the West Seattle Bridge closure. This includes funds from the Port of Seattle, PSRC/FHWA, TIB, and FMSIB. In addition, SDOT has strategies for mitigating capital funding shortfalls, including use of a 15% construction contingency and a 20% allowance during the design process to ensure the project budget has reserve funds.
Maintenance of traffic/construction detours: The RAISE Project corridor runs adjacent to Port of Seattle/NWSA facilities with access that must be maintained during construction. Similarly, access to the BNSF railyard just east of East Marginal Way S on S Hanford St is a busy freight intersection, and detours must be minimized.	SDOT included Maintenance of Traffic Plans in design documents and is committed to maintaining two lanes of traffic whenever possible. SDOT is working with the Port of Seattle/NWSA to make connections directly with seaport tenants so that their busiest times can be taken into account during construction sequencing. The RAISE Project's PSRC/FHWA funding requires that Traffic Control Plans be included with the bid documents. This ensures that the contractor will be provided a plan for construction. SDOT has worked with freight truck drivers through its 2020 freight survey to understand their preferences and needs during construction. If not awarded these FY 2021 RAISE Funds, SDOT will be forced to complete this project in two phases as funding allows, resulting in six additional months of major traffic impacts.
Poor soils/dewatering issues: Past construction experience in this area has shown how difficult the soils/water table along the East Marginal Way S corridor can be. Trench support and dewatering have proven extensive on past projects.	SDOT has obtained boring information for locations along the corridor in advance of the 90% design milestone to identify the extent of construction activities needed. This information will be used to prepare the contractor for expected conditions.

6. SUMMARY OF BENEFIT-COST ANALYSIS

The benefit categories associated with the RAISE Project, and analyzed for their inclusion in the BCA, are mapped into the merit criteria set forth by USDOT. Table 6 and Table 7 summarize the BCA findings. Annual costs and benefits are computed over the life-cycle of the project (20 years), and benefits accrue during the full operation of the Project.

Table 6: Benefit-Cost Analysis Results

	Base Case (7% Discount Rate)	Alternative (3% Discount Rate)
Net Present Value	\$19,279,243	\$56,908,700
Benefit/Cost Ratio	1.57	2.50

Source: WSP, 2021

With a 7% real discount rate, the \$33.7 million capital investment in discounted dollars would result in \$53 million in total benefits and a Benefit/Cost ratio of about 1.57.

In summary, benefits attributed to the RAISE Project, and monetized in the BCA, include the following:

- **Safety** benefits generated from reduced collisions resulting from the protected bike lanes and protected movements at intersections
- **State of Good Repair** benefits comprised of pavement maintenance cost savings from reconstruction using concrete and residual value of the new assets at the end of the analysis period

- **Economic Competitiveness** benefits through travel time savings
 - **Environmental Protection** benefits resulting from reduced emissions cost savings and bioretention facilities
 - **Quality of Life benefits** benefits from the increase in commuter and recreational bicyclists and lower healthcare costs for those bicyclists
- Please refer to the BCA Supplementary Documentation of this application for more detail.

Table 7: Project Impacts and Benefits Summary

Project Improvement	Population Affected by Impact	Economic (Dis)Benefit	Summary of Results	
			7% Discount Rate	3% Discount Rate
Current Status/Baseline & Problem to be Addressed: Deteriorating roadway, safety, and mobility				
Improved roadway and SCOOT enhancements	Auto and truck drivers with reduced wait time and faster speeds	Travel time savings	\$1.9 million in savings	\$2.2 million in savings
Addition of new signal	Cyclists have increased wait times with new signal	Travel time increases	\$0.4 million increase in costs	\$0.7 million increase in costs
Mode Shift	Vehicle use reductions as a result of mode shift to biking	Reduction in vehicle maintenance costs	\$0.2 million in savings	\$0.3 million in savings
Protected bicycle lane and intersection improvements	General population	Reduced tailpipe emissions from vehicles	\$64,000 in reductions	\$64,800 in reductions
	All existing and future users of the facility	Reduced crashes	\$14.8 million in savings	\$24.8 million in savings
	New bicyclists	Improved Health Leading to Lower healthcare costs	\$1.0 million in savings	\$1.8 million in savings
	New commuter bicyclists	Improved mobility	\$31.12 million in savings	\$54 million in savings
	New recreational bicyclists	Value of time benefit to access recreational activity	\$0.3 million in savings	\$0.5 million in savings
Improved roadway, protected bicycle lane and ITS/signal enhancements	SDOT, Maintenance Operations	Reduced operating and maintenance costs with the new roadway	\$113,900 in savings	\$188,000 in savings
	SDOT	Residual value of the new assets at the end of the thirty-year benefit analysis period	\$4.7 million in remaining value	\$11.7 million in remaining value

Source: WSP, 2021

Category	Unit	Quantity	Direction
Person-Hours Traveled	PHT	385,978	↓
Fatalities	#	2	↓
Injury Accidents	#	35	↓
Property Damage Only (PDO)	#	47	↓
Emissions	Tons	1,548	↓
Health Benefits	Cumulative incremental bicycle miles	14,332,243	↑
Commuter Mobility Benefits – Bicyclists	Hours	4,756,346	↑
Recreational Benefits – Bicyclists	New Cyclists	65,792	↑

Source: WSP, 2021



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