

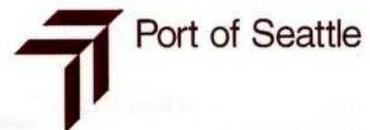
AccessDuwamish

A Freight Mobility and Economic Strategy for the Duwamish Area

JUNE 2000

Project Summary Report

The North Duwamish Intermodal Access Project was funded in significant part through a United States Department of Transportation grant.



Access Duwamish Project

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Introduction & Background

The North Duwamish, home to the Port of Seattle maritime facilities, is a vital industrial and economic center of the region and the state. At the time that the Access Duwamish project was initiated, area growth and increasing congestion threatened mobility, safety, and the economic health of the region, yet a comprehensive plan for accommodating area problems did not exist.

The manufacturing/industrial, maritime shipping/trade, and professional sports/entertainment uses in the study area represent the largest concentrations of such activities in the region. As such, they form the economic base for a much larger impact area and are influenced by regional, state, national, and international economic trends. These trends portend continued expansion of the maritime trade and shipping activities and major new additions to the professional sports and entertainment facilities in the project area. Maintaining efficient truck and freight access to the North Duwamish area and Port of Seattle facilities is vital for continued growth in Eastern and Western Washington exports.

Recognizing their common interest in preserving the economic health of the region, and reducing street and highway blockage, the City of Seattle and Port of Seattle commissioned a partnership project to address access and congestion problems in the North Duwamish area. The project's objective was to develop a package of multi-modal transportation improvements in sufficient detail and with significant community support for the City of Seattle and the Port of Seattle to pursue funding through the State Legislature and from federal funding sources.

This report summarizes the Access Duwamish project activities and the comprehensive and collaborative approach used to consider the mobility, access, and transportation problems, needs, and opportunities of all modes of travel through the area. Major products of the project included building a coalition of public support for a set of recommended solutions, creating an implementation plan for transportation improvements, preparing a Comprehensive Report on Truck Mobility, and conducting several site-specific detailed engineering analyses (including traffic analy-

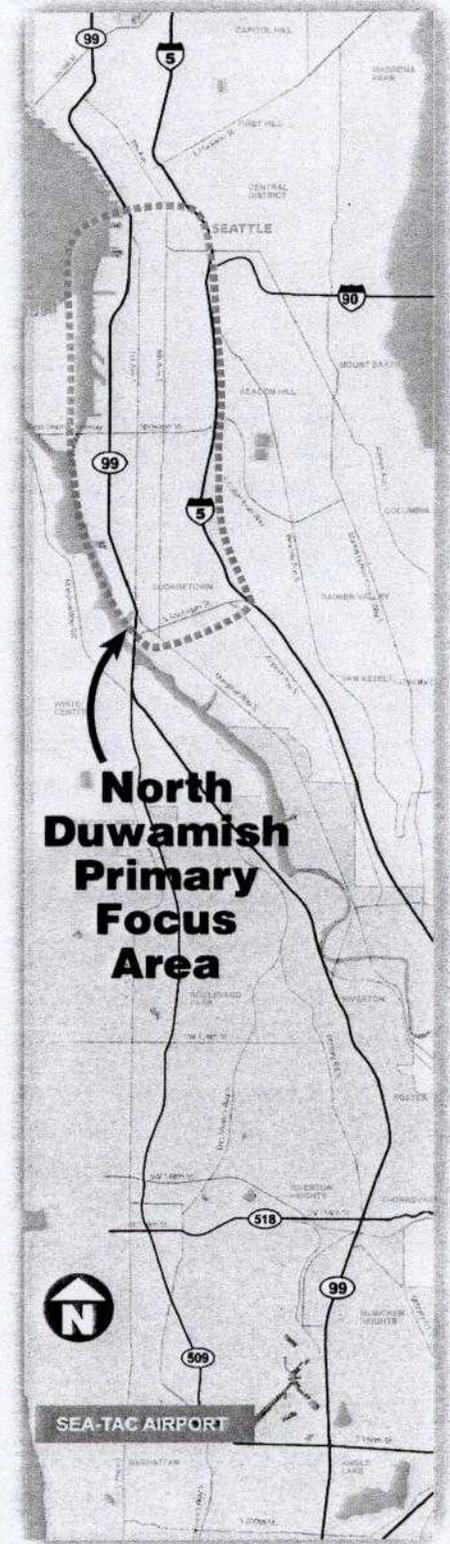


Figure 1. Project Area

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The Access Duwamish primary project area is generally bounded by the Duwamish waterway on the west, Interstate 5 on the east, and S. Michigan St. on the south, and the Central Business District on the North. The project area covers more than 11,000 acres and is home to almost 2,000 businesses and over 87,000 jobs, producing an annual payroll of \$2.5 billion. Over 80% of the industrially zoned land in Seattle lies within project area boundaries. The area also provides a major regional transportation hub for freight and goods movers, as well as providing a link to West Seattle and all points west through the Ferry System.

sis, physical constructability, and cost estimates). This project was coordinated with a number of planning initiatives for areas within, adjacent to and including the project area. The contribution of stakeholders from the area and around the region whose interests are inherently tied to developments in the project area were key to the Access Duwamish project.

The Access Duwamish initiative relied on substantial outreach and communication with the industries, users, modal representatives, and communities affected by access and mobility problems in the North Duwamish area. Over 70 meetings were held with these groups during the project. After assimilating this input, further evaluation and conceptual engineering work was conducted for a set of proposed projects that were considered viable. Project principles and public involvement were incorporated into the criteria used to evaluate the projects. The resulting priority list of recommended projects includes a phased implementation strategy to decrease modal conflicts and improve area safety and economic health of area industry and the state as a whole. The phasing of these projects is key for both funding strategies and to avoid further exacerbation of congestion and modal conflicts in the area.

Capital projects and operational programs that relieve existing congestion and reduce modal conflict, increase access to the area, or change structures that move freight and people through the area more efficiently are expensive.

Individual local jurisdictions face significant transportation revenue shortfalls and have major capital improvement backlogs. Increased competition for federal and state funds requires demonstration of partnerships and ability to leverage funds from various sources. Recent projects that were successful in securing a portion of limited funding are often packaged to maximize their regional benefit and ability to leverage funding. Financing strategies that promote partnerships and collaboration are required to secure adequate funding to approach the problems of the North Duwamish area.

The Access Duwamish project analyzed current and future needs given expectations of growth and other planning initiatives affecting the North Duwamish. Many of the issues and subject matter that this document conveys were explored in depth in technical memoranda through the course of the project. Where additional information may be of interest, these documents, which are published in two volumes of technical appendices that accompany this report, are referenced in the text.

Study Goals

This study identified and analyzed the access and mobility problems of these corridors and evaluated a wide range of specific solutions aimed at alleviating congestion, reducing modal conflicts and eliminating safety problems. Recognizing the scope of the problem in the North Duwamish Corridor and the diversity of interests, four goals were the focus of the study:

- ◆ Provide for the efficient movement of goods and people to ensure the economic vitality of the North Duwamish Industrial Area,
- ◆ Reduce modal conflicts and enhance connections,
- ◆ Contribute to regional air quality objectives by planning improvements that reduce congestion and transportation related pollution, and
- ◆ Reduce safety hazards and ensure a safe operating environment for all modes of transportation.

Problems & Needs

The North Duwamish industrial area is a vital employment center as well as a major transportation hub for marine, rail, and truck freight movements. The area is bordered by the Port of Seattle's marine intermodal container facilities and contains a number of major transportation facilities which serve both local and regional travel needs. In addition to the extensive roadway network, both the Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) railroads have major intermodal and main-

One in five jobs in Washington relates to international trade.

Over the last 20 years King County trucking and warehouse employment grew by 110%, wholesale-distribution jobs by 85%, and manufacturing employment grew by 42%.

line rail facilities in the area. The area also contains three major passenger rail and transit facilities and the most heavily trafficked terminal in the ferry system. Access to the North Duwamish area is limited and circulation for people and freight within the area is limited by mode conflicts and congestion. People move through the area in cars, buses, on bicycles, and on foot; they access passenger rail and ferry service; trucks move freight to access the area's Port and rail facilities; and trains move people and freight through the area. On average, more than 200,000 vehicles and 60 trains made their way through the project area each day in 1998. By 2010, the number of vehicles will approach 300,000 each day and more than 80 trains will pass through the Duwamish. The corridor will contain future commuter rail and light rail services being implemented by Sound Transit.

The Duwamish area experiences recurrent daily and peak congestion, as well as surge traffic or significant high-use periods associated with sports or entertainment events or the arrival of a container ship. These modes often come into conflict at grade crossings and on shared roadways, which can result in significant delay or accidents.

60 trains move through the area daily, creating long delays at mainline crossings. The number of trains could grow by more than 20 percent over the next 10 years.

Modal conflicts threaten the economic health of the North Duwamish and strain businesses operating in the area.

Significant job growth and increased use or expansion of rail and truck facilities is expected in the North Duwamish. Access to the area and circulation or mobility within the area both for people and freight are critical to the area's future health and economic expansion, as well as the region's "day ahead" competitive advantage over other U.S. West Coast ports in international trade.

The combination of so many trucks, trains, buses, automobiles, pedestrians, and cyclists delays traffic and threatens public safety as more users compete for limited physical and time capacity of existing roadways, bridges, and at-grade rail crossings. Congestion impedes mobility and traffic flow through the North Duwamish area, particularly for east/west circulating traffic and north/south through traffic. Traffic congestion costs people and freight interests time, money, and aggravation each day. The six at-grade rail crossings in the North Duwamish area are now blocked by trains a cumulative total of 40 hours per day. By 2010 this number will increase to nearly 60 hours of blockage per day.



Congestion also imposes costs of reduced sales for retail businesses throughout the region, increased delivery time and expenses for manufacturing facilities, and disruption of operations for the waterfront businesses, ferries, and freight movers. In order to enhance economic viability of the area's industrial and manufacturing firms and maintain or increase the region's competitive advantage, it is imperative that access to the area and circulation for people and freight moving through the area be improved.

The project focus area, in which problems of mobility and safety issues are the most severe and in need of most immediate attention, is the area between South King and South Spokane Streets. This area can be further isolated into critical access corridors around the stadium area, waterfront/port access, and Spokane Street Corridor areas. Secondary focus areas were the roadways south of S. Spokane Street and the Broad Street area connecting to the North Waterfront.

Based on the analysis of existing conditions and future expectation of growth in the Duwamish corridor, the project identified six major impediments to movement and access in the North Duwamish:

- ◆ **Accessibility to/from the North Duwamish area and the regional transportation system** - There are limited access points to the regional freeway system encircling the North Duwamish Area. This access is limited primarily to two points, the I-90 ramp touchdowns (full directional access to I-5 and I-90) at 4th Avenue South. Partial I-5 and West Seattle Freeway access along the Spokane Street Viaduct and at its interchanges with SR-99 and I-5 to/from 1st, 4th, and 6th Avenues South. Regional transportation access is limited by existing capacity of I-5 and Spokane Street Viaduct, and constraints on access to/from SR-99.
- ◆ **Difficult traffic circulation within the area** - The numerous rail lines (mainlines, yards, local service tracks) within the North Duwamish provide impediments to efficient traffic flows, particularly in the east-west direction. Special events at the new stadiums and exhibition hall will exacerbate these conflicts.
- ◆ **Major modes (auto, truck, rail, transit) have competing needs for available surface capacity within the area** - The confluence within the North Duwamish of various travel modes provides challenges for efficiently separating and/or managing the overall transportation system.
- ◆ **General rail capacity** - The existing rail system within the study area is insufficient to accommodate expected growth in freight and passenger travel.
- ◆ **Travel growth within the study area** - Growth is anticipated in major industrial uses and other land uses throughout North Duwamish. The area accommodates growing through-traffic, given its gateway role to downtown Seattle and West Seattle.
- ◆ **Coordination of transportation and development project construction** - Several major construction projects are programmed during the next five to ten years, requiring close attention to construction traffic management for all modes of travel.

Modes & Uses

In transportation, a mode refers to the method of travel from one point to another. For the purpose of understanding the needs and issues of all users in the North Duwamish, six different modes of access to the area were defined for the project. The movement of people through the area is associated with access of four major modes: automobiles for commuters and local users, transit, bicycle, and pedestrian. The movement of goods and freight can be grouped into three types of access: truck freight, marine vessels, and rail freight. Access issues associated with each mode are discussed further in Volume 2 of the Access Duwamish Technical Appendices "Baseline Conditions" (Item 27) and "Future Forecasts" (Item 32).

Trends will all result in an increase in demand for improved local and regional connections for all transportation modes.

Many of the modal issues are inter-related because users in the area impact the ability of other users and freight movements through the corridor and beyond. For example, increased frequency of passenger and freight train travel will increase hours of blockage at train tracks and adversely impact other modes of transportation. Sound Transit will be adding commuter rail service through the corridor in the year 2000, and light rail by the year 2006. Additional traffic associated with several new special event sports and exhibition venues in the North Duwamish area will put more pressure on the already stressed transportation system.

General/Commuter/Local Access

General traffic flow problems in the area are related primarily to local circulation, through traffic movements, and limitations on accessibility to the regional roadway network. The majority of these problems are caused by a lack of sufficient east/west routes throughout the project area, intermodal conflicts caused by the numerous at-grade rail crossing throughout the area, and limitations of existing ramps to/from the I-5, and I-90, SR-99, and the Spokane Street Viaduct/West Seattle Freeway. In addition to its role as a major Seattle industrial area, the North Duwamish/Spokane St. corridor is also the gateway into communities such as West Seattle and Vashon Island via the Fauntleroy Ferry Terminal.

Puget Sound traffic slowdowns are costing citizens an average of \$3.54 a day or \$920 annually in fuel and lost time. Average rush hour freeway speeds in the region have dropped to 40 miles per hour. Source: TTI, 1997

As a result of both project area development and increased activity throughout the region, overall traffic volumes through the project area are projected to increase significantly in the future. Additional traffic volume (projected to increase between 15-25 percent from 1990-2010 on major east-west arterials and 25-45 percent on north-south arterials) must be accommodated by the area's existing surface street network because of lack of excess capacity on regional facilities in the area (such as I-5 and the Spokane Street Viaduct).



Truck Freight Access

Truck access and circulation are limited by the substandard local street geometrics in the project area. Some street deficiencies limit truck movement. For example, many intersections in the project area do not provide adequate turning radii for trucks. Extensive information about future truck growth and truck volumes is presented in the "Truck Mobility Report" located in Appendices Volume 1 (Item 19). Truck access and mobility are essential to the health of businesses in the area and across the state. If trucks cannot access a business, port, or rail facility in the area or experience major delays en route, business owners may seek alternative sites without these hindrances.

More than 19,000 one-way truck trips are made into and out of the North Duwamish project area each day. This volume is expected to increase by 1 percent per year through the year 2010. Depending on the location, trucks represent 5 to 28 percent of the total daily traffic on a street. The Port of Seattle's container

Between 1994-1996, nearly 1,800 accidents were reported in the North Duwamish. At least one in five involved tractor trailer or other large trucks.

terminals serve truck traffic from all over the state. In 1998, 83 percent of the agricultural production and 89 percent of processed food from Eastern Washington was transported to Western Washington by truck. Of all regional truck trips to and from the Port of Seattle, 25 percent are from the Green River Valley, 25 percent are from locations between Auburn and Longview, 17 percent are from Eastern Washington, and 10 percent are from locations between the City of Shoreline and Canada. More than 50 percent of the truck trips generated by other businesses in the area, originate or are destined to areas outside the City of Seattle. These figures show that the truck mobility issues within the North Duwamish area are affecting the economies of the entire region and the state.

Port Access

Terminal operations are largely governed by the time a ship calls the terminal. The Port of Seattle invested \$230 million in Terminal 5 and will invest \$210 million in Terminal 18 to provide world-class container handling and on-dock rail service for its tenants. Both terminals are designed to handle arriving and departing intermodal trains up to 8,000 feet long directly to and from the mainline. The Port of Seattle forecasts that intermodal trains arriving and departing from the Port area will double over the next fifteen years. To accommodate expected growth, the Port has embarked on a plan to expand its facilities in the next ten years to improve its competitive edge. Expansion at Terminals 5, 18, 25/30, and 37/46 will increase the capacity of terminals; thus increasing container and truck traffic in the project area. These improvements will also add significantly to both switching and mainline rail activity. Configuration of rail access

Each year, over \$34 billion in the state's total cargo passes through the North Duwamish freight life line to be shipped out of the Port of Seattle by rail to inland destinations.

About 65% of import containers move through the Port of Seattle by rail to inland destinations.

A third of Washington's \$5.77 billion in agricultural production is exported.

to several terminals will impact the project area by adding crossing movements to the tracks immediately to the south of the project area. Access to the Port of Seattle marine terminals is of critical importance not only to the region and state, but to the entire nation. The time advantage that the Port of Seattle provides to shippers trading with Asia is constantly eroded by increasing congestion and conflict in the North Duwamish area.

Ferry System Access

The ferry system attracts trips from throughout the region to Downtown Seattle's Colman Ferry Dock. The designated ferry access route through the project area includes portions of South Royal Brougham Way (State Route 519) and Alaskan Way South. According to the Washington State Ferries System Plan, over 3,000 vehicles will seek access to Colman Dock for ferry boarding during the peak-hour by 2015. Another 5,000 passengers will access the ferries by walking, taking the bus, trolley, taxi or bicycle. Many ferry destined and originating trips pass through the Duwamish area. For those headed to the ferry, extreme delay on the way through the Duwamish area could mean the difference between making it onto a boat and missing one. The need to preserve access to the ferry system reinforces the importance of the Access Duwamish projects to the entire State. The waterfront area of downtown Seattle relies on access from its north and south ends. Access to and along the waterfront is important to the health of waterfront businesses and to industrial-related traffic traveling between the Duwamish area and industrial sites north of downtown.

Recent analysis has shown that separating the rail line from roadway at just one crossing would create time savings benefits to businesses and commuters averaging more than \$10 million per year.

Rail Freight Access

Rail crossings of the BNSF mainline tracks (such as those at Royal Brougham Way and Holgate) experienced more than five hours of cumulative vehicle delay per day in 1998. By 2005, these delays could exceed seven and a half hours on some days. Rail traffic in 1998 blocked East Marginal Way south of Spokane street, which leads to SR-99, up to two hours a day. The use of longer and more frequent container trains traveling in and out of newly expanded nearby terminals can potentially "close" East Marginal Way for up to 19 minutes at a time. Several other surface streets throughout the project area experience similar rail congestion for equal or shorter periods.

BNSF anticipates an increase of 17 percent in the total mainline rail movements through the project area over the next eight years. Blockage times were computed based on average speeds at each crossing per each type of train. The largest increase in mainline blockage would occur at Royal Brougham Way, where passenger train transfers between maintenance facilities and the King Street Station Platforms cause a significant increase in blockage frequency.

Transit and Passenger Rail Access

Currently transit operates through the Duwamish area with little or no congestion-related delay in the north/south direction. King County is seeking to expand the three major bus operations bases in the project area Atlantic, Ryerson, and Central. Expanded transit use in the area is expected with the development of the RTA's light rail transit service and commuter rail service. Commuter rail service will be provided during peak periods from Everett



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to Tacoma along the BNSF mainline. Expanded Amtrak service at King Street Station, through the Intercity High Speed Rail Program, will upgrade both speed and level of service between Eugene, Oregon, and Vancouver, British Columbia.

Bicycle & Pedestrian Access

Area roadways provide a primary link for bicycle commuters traveling across the West Seattle Bridge, along the Waterfront, and to ferry terminals. Bicyclists frequently travel on East Marginal Way, Spokane Street, and other often-crowded area arterials as part of their commute or for recreation. During events, the stadiums and exhibition halls generate high volumes of pedestrians. Deteriorated pavement, inadequate drainage, disorganized parking in public rights of way, inadequate street lighting-(primarily around South Spokane Street, East Marginal Way and Airport Way South) also impact these modes of travel through the North Duwamish area.

Special Event Venue Access

The North Duwamish area is the location of two large sports stadiums and an exhibition center. Safeco Field is the home of the Seattle Mariners Baseball Club and seats 45,000 fans. The Washington State Football/Soccer Stadium is currently under construction and will seat 72,000 fans for both Football and Soccer contests. An exhibition center has already been constructed adjacent to the Football/Soccer Stadium which hosts trade shows and other events.

The maintenance of reliable and good regional access is important to the special event venues and their patrons. The investment in these facilities totals over one billion dollars. Traffic generated by events at these facilities is characterized by surge patterns that overwhelm the transportation system. Special event traffic control and temporary street closures help minimize the impacts of these traffic surges as well as to maintain local access.

Other Planning Efforts

Many groups have interests in the North Duwamish area. When the Access Duwamish project began, no planning initiative had attempted to identify multi-modal system enhancements that would benefit all users. This project enlisted participation of stakeholders to arrive at a comprehensive view of needs throughout the project area and incorporated involvement of other planning initiatives. This effort attempts to bring all the interests of all the parties together to coordinate priorities, funding opportunities, and implementation of projects. Projects and initiatives underway at the time of the project were considered in this project's effort including the Sound Move Program, South Downtown Strategic Plan, Greater Duwamish Manufacturing and Industrial Center Plan, Freight Mobility Advisory Council, Public Facilities District – Baseball Park, Football Northwest - Football Stadium, and Exhibition Center and Puget Sound Freight Mobility Roundtable.

Other planning initiatives addressed intermodal transportation in the North Duwamish area but did not match the scope of the Access Duwamish effort. Planning efforts that address modal conflicts include:

Freight Action Strategy for Seattle-Tacoma (FAST) Corridor project is a joint planning activity of the Washington State Department of Transportation (WSDOT) and the Puget Sound Regional Council (PSRC). The project focuses on the corridor near the north-south rail lines connecting Everett to Tacoma and aims to update State and regional transportation plans to better meet the needs for freight and

goods movement. The geographic focus is broader and modal focus is more specific than Access Duwamish but it incorporates this project's project area and modal interests. Several of the FAST Corridor recommended projects are within the Access Duwamish area; SR-519 Intermodal Access Project Phase 1, Lander Street Overcrossing, Holgate Street Overcrossing, East Marginal Way overcrossing, and Broad Street grade separation.

Greater Duwamish Manufacturing and Industrial Center Plan is a product of the City of Seattle's neighborhood planning process by the Greater Duwamish Planning Committee. It focused on specific goals and policies to ensure the viability and expansion of manufacturing and industrial activity in the Duwamish Corridor. The effort's strategies seek to reduce incompatible or competing land uses, encourage job retention and growth in family wage jobs, improve access and transportation, and retain and expand industrial businesses, and encourage new development inside the corridor. Many of the transportation problems identified by this effort and the proposed strategies for solutions are similar in scope to those identified by the Access Duwamish project.

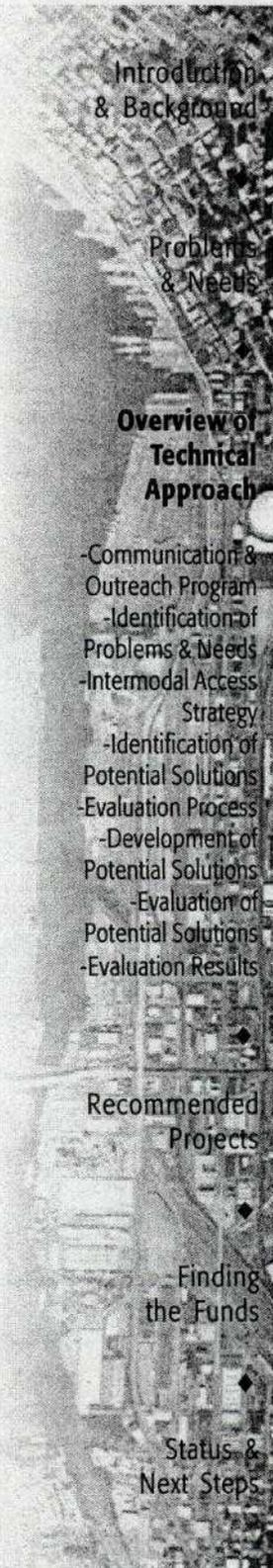
Overview of Technical Approach

The technical approach for the Access Duwamish project comprised eight major work elements and a program of continuous outreach and communication. These work elements included the following:

- ◆ Identification of project goals and purpose
- ◆ Endorsement of project goals and purpose by project stakeholders
- ◆ Data collection
- ◆ Identification of baseline conditions
- ◆ Identification of existing problems and future assumptions
- ◆ Development of formal identification of the problem
- ◆ Adoption of the problem statement
- ◆ Establishing a strategy for addressing North Duwamish problems based on the problem statement

Potential solutions were identified and tested both against the strategy and with the project stakeholders. If a project was rejected, the technical team would identify another potential solution to address the problem. Development and evaluation of the projects on the final list of potential solutions was used to narrow the list to the specific projects that could effectively address problems in the North Duwamish.

The evaluation process consisted of three steps. The process started with general screening. Projects that successfully passed the screening tests were considered candidate projects to be taken forward in the development and evaluation. The second step was the development of candidate projects. Development studies generated the data required for the third step, evaluation.



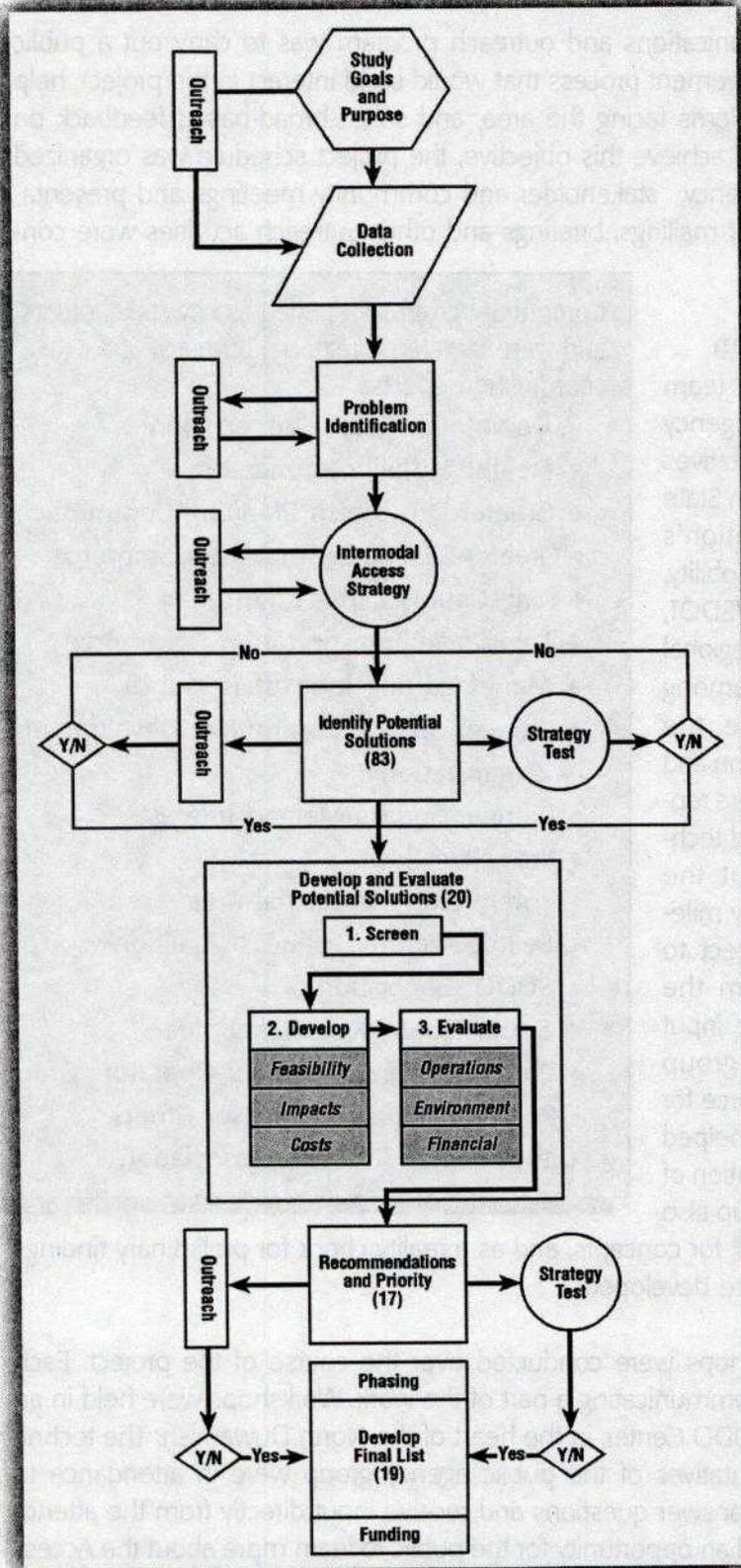
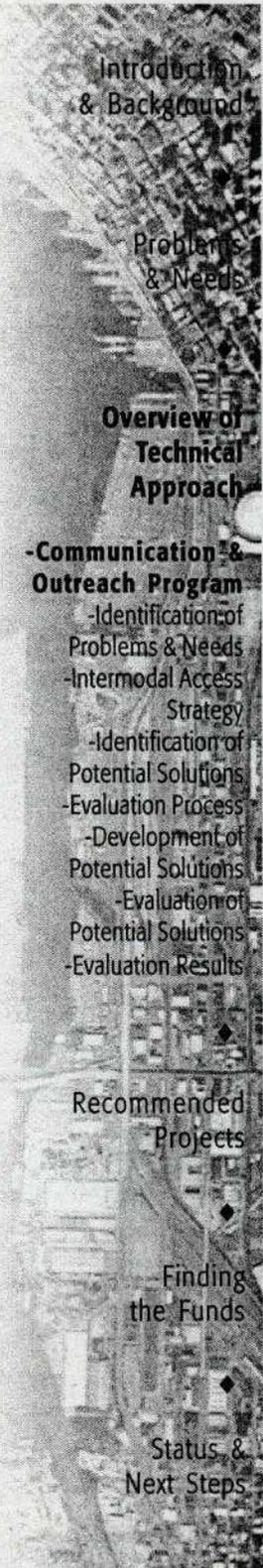


Figure 2. Project Process Diagram

In order to define solutions for priority locations, design work was performed for nine of the candidate projects. The level of development provided by the design work ranged from planning to conceptual design analyses. This work identified fatal flaws, engineering constraints, potential impacts, incompatibilities between projects and construction cost estimates. Some of this information was used to successfully acquire funding for continued project development as an outcome of the Access Duwamish Project. These include the East Marginal Way Ramps, currently in the design phase and partially funded for construction, the Lander Street Overcrossing, which has secured funding for conceptual design, and the North Waterfront Access Project which has secured funding for additional design engineering and environmental review that will define the preferred design alternative. The Access Duwamish Project design work also helped to get several projects included on the State Freight Mobility Strategic Investment Board's list of recommended projects. Inclusion on this list provides these projects an excellent position from which to obtain funds.

Projects passing the evaluation became part of the recommended list. Once again, the technical work was tested for consistency with the strategy and for support by agency and community stakeholders. If projects were accepted, they were added to the final list. The final list, once completed, was studied for phasing and promoted for funding.

The figure on the left represents the project process, the eight major work elements and the relationship to the outreach program.



Communication & Outreach

The objective of the communications and outreach program was to carry out a public agency and community involvement process that would build interest in the project, help identify key issues and problems facing the area, and solicit broad-based feedback on stakeholder perspectives. To achieve this objective, the project schedule was organized around a series of public agency, stakeholder and community meetings and presentations. In addition, a series of mailings, briefings and other outreach activities were conducted.

Public Agency Coordination

The Project's technical work team coordinated with a public agency group comprised of representatives from the City, Port, Washington State Department of Transportation's (WSDOT) Office of Urban Mobility, the Northwest Region of WSDOT, Sound Transit, Puget Sound Regional Council, and King County, among others. In addition to these, the Washington Trucking Association and the BNSF and UP Railroads were represented. This group provided technical oversight throughout the project. This group met at key milestones throughout the project to hear progress reports from the project team and to provide input on technical issues. The group served as an important resource for data collection efforts, and helped coordinate interagency resolution of issues as they arose. The group also served as a "sounding board" for concepts, and as a reality check for preliminary findings and conclusions, as they were developed.

Community groups identified as key stakeholders and were targeted for special outreach and coordination efforts:

- ◆ Downtown Seattle Association
- ◆ Freight Mobility Roundtable
- ◆ Greater Duwamish Planning Committee
- ◆ Greater Seattle Chamber of Commerce
- ◆ King County Labor Council
- ◆ Legislative Transportation Committee
- ◆ Manufacturing Industrial Council
- ◆ Pioneer Square Community Development Organization
- ◆ Pioneer Square Merged Interests
- ◆ Propeller Club
- ◆ Rotary Club - Industrial Area
- ◆ Seattle Marine Business Coalition
- ◆ SODO Association
- ◆ South Downtown Stakeholders
- ◆ Port of Seattle's Terminal Operators Group
- ◆ Port of Seattle's Truck User Group
- ◆ Washington Trucking Association

A total of four public workshops were conducted over the course of the project. Each workshop was focused on communicating a part of the work. Workshops were held in an open house format at the SODO Center, in the heart of the North Duwamish. The technical work team and representatives of the public agency group were in attendance to present project information, answer questions and receive input directly from the attendees. The workshops provided an opportunity for the public to learn more about the Access Duwamish project. Below is a list of the public workshops and the topic of each.

- ◆ Workshop 1–Topic: Problem Definition, Baseline Conditions, and Alternatives. October 22, 1997
- ◆ Workshop 2–Topic: Alternatives Descriptions and Evaluation, contents of Interim Action Plan. December 4, 1997
- ◆ Workshop 3–Topic: Identification of Truck Freight Mobility Needs. February 3, 1998
- ◆ Workshop 4–Topic: Results of Conceptual Engineering Design Tasks. March 5, 1998

The communications and outreach program included more than 70 meetings over the course of the Access Duwamish Project. That number includes meetings with the Greater Duwamish Planning Committee, meetings with the Duwamish Manufacturing-Industrial Council, meetings with the SODO Association and meetings with other community groups. More meetings were held with agency interests.

Materials and presentations for each of the meetings were tailored to the interests of the group. Economic impacts, economic development, operational considerations, funding needs and sources, traffic conflicts, construction impacts and other issues were identified and discussed. These sessions raised issues ranging from:

- ◆ Maintaining and developing family-wage jobs and worker safety in the area,
- ◆ Coordination with major construction projects in the area,
- ◆ Relieving mid-day blockage of port facilities and coordinating bridge openings,
- ◆ How Access Duwamish might benefit commerce,
- ◆ How the project and related changes to the area might impact downtown,
- ◆ Encouraging better utilization of area roadways,
- ◆ Reducing truck and bike conflicts on East Marginal Way and
- ◆ How the Broad Street Overcrossing could best access the North Waterfront.

Identification of Problem & Needs

A rigorous data collection and analysis effort was used to develop a detailed understanding of problems to be addressed. The data were used to establish existing or baseline transportation conditions in the North Duwamish. The first step in understanding the background conditions was a comprehensive assessment of traffic operations and system performance. Following the system performance evaluation, existing routes for six distinct access modes were identified: General Commuter/Local Access, Truck Freight and Goods Access, Port Access, Ferry System Access, Rail Freight Access, Transit Access, Bicycle/Pedestrian Access. To complete the picture, high accident locations were identified, as were points of entry into the North Duwamish. These are considered critical points requiring special attention during the selection of solutions. Land use was also evaluated in order to identify areas with critical access needs.

Data used to identify problems and needs in the area include:

Traffic Operations	Roadway Volume to Capacity Ratio Level of Service at Intersections	Travel Time Analysis
Route Use by Mode	Screenline Counts Vehicle Classification Counts	Sidewalk Inventory Bicycle Facility Inventory
Critical Points	Accident Locations System Connections	Land Use

Truck Freight Mobility Issues

In addition to the wide range of traffic and transportation data used to identify needs, the project specifically focused on truck freight mobility issues and solutions. The project included focus group outreach to the trucking industry and development of additional truck-specific data. Data included detail on truck trip characteristics in the North Duwamish and the significance of Duwamish freight truck traffic to the region and the State. An inventory of policies and regulations affecting trucks was assembled and reviewed as well. The truck mobility evaluation was documented in a Truck Mobility Report and was used throughout the project and extensively in the development of recommendations.

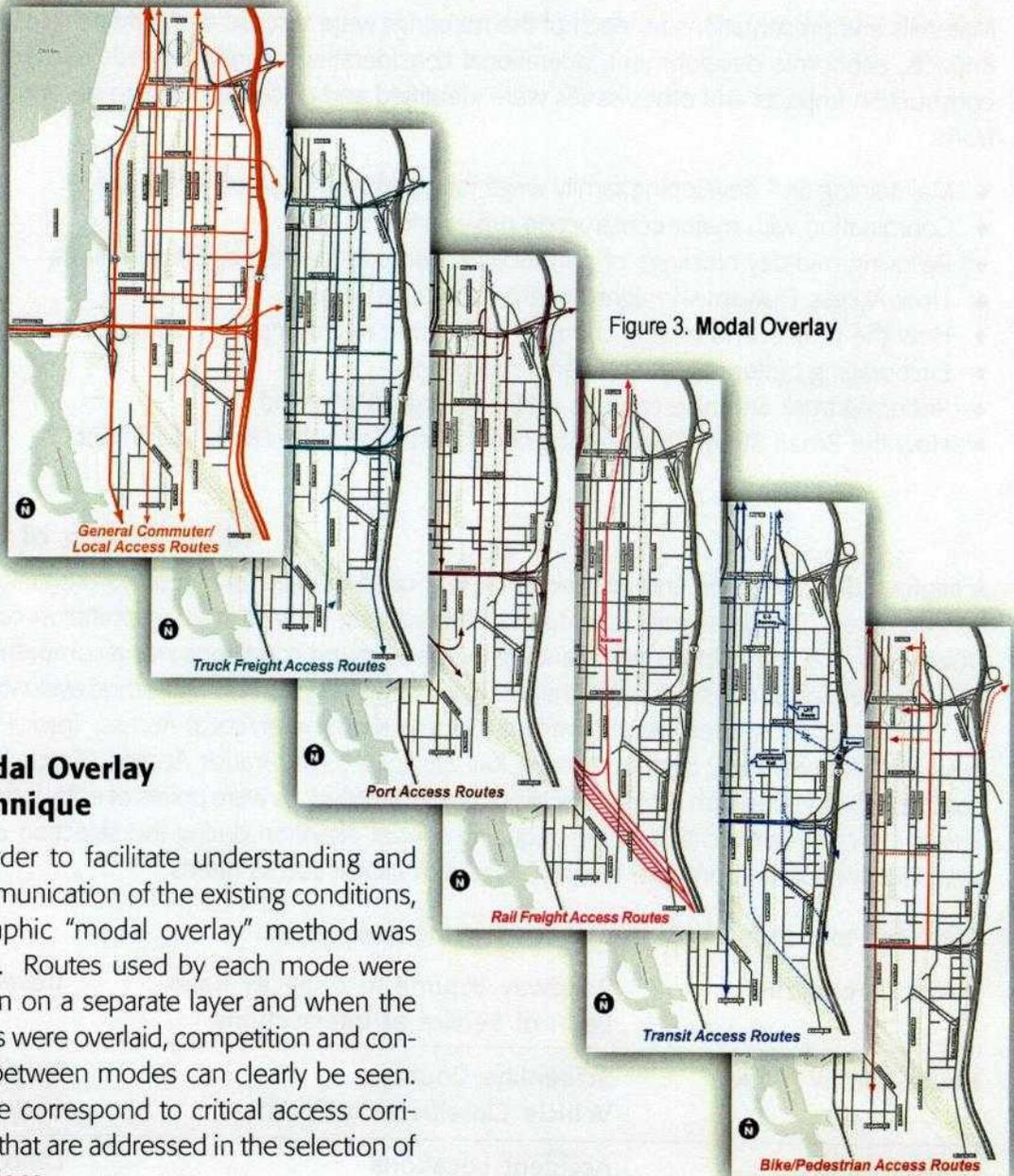


Figure 3. Modal Overlay

Modal Overlay Technique

In order to facilitate understanding and communication of the existing conditions, a graphic "modal overlay" method was used. Routes used by each mode were drawn on a separate layer and when the layers were overlaid, competition and conflict between modes can clearly be seen. These correspond to critical access corridors that are addressed in the selection of solutions.

Introduction & Background

Problems & Needs

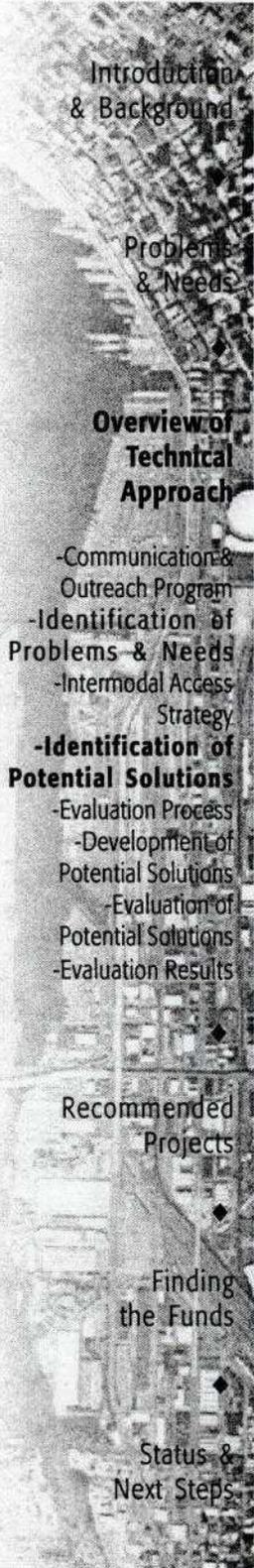
Overview of Technical Approach

- Communication & Outreach Program
- Identification of Problems & Needs
- Intermodal Access Strategy
- Identification of Potential Solutions
- Evaluation Process
- Development of Potential Solutions
- Evaluation of Potential Solutions
- Evaluation Results

Recommended Projects

Finding the Funds

Status & Next Steps



The Intermodal Access Strategy

Development of the solution strategy preceded identification of potential solutions. The strategy guided the selection of solutions for development and evaluation and served as a test in developing recommendations and setting priority in subsequent work elements. The strategy was designed to promote intermodal access as it focused on considering the needs of all modes and the interactions between modes.

Identification and evaluation of solutions followed a thorough assessment of existing conditions and involved extensive public and agency involvement. Problems identified are attributed to four main categories: conflict between modes (e.g., trucks and trains), missing links in the system that makes it difficult to travel to and through the North Duwamish, traffic congestion caused by an inefficient and insufficient traffic control system, and deteriorating and substandard roads and structures.

The following four strategies were adopted to ensure that improvements effectively serve the many modes that converge in the North Duwamish. Projects were identified, reviewed and selected for evaluation based on their ability to support one or more of these strategies.

- ◆ **Separate modes to reduce conflicts.** Projects should consider all opportunities to separate competing modes and their potential benefit. Separating modes provides opportunities to greatly improve safety and address critical points of conflict such as at-grade railroad crossings. This includes several grade separations simultaneously identified by the FAST corridor program, which are a critical priority for the North Duwamish corridor.
- ◆ **Improve circulation to relieve congestion.** Projects should be selected in the context of improving connections to the regional system and completing 'missing links'. Opportunities to better utilize north/south capacity and improve east/west movement are important to identify.
- ◆ **Enhance operations to keep things moving.** Projects should allow more efficient use of existing infrastructure. This includes operational system enhancements and improved information for users. Technology upgrades should be considered.
- ◆ **Restore infrastructure to protect investments.** Existing infrastructure should be maintained and improved to restore its operating condition. This will reduce vehicle operating costs while improving safety and providing some protection against seismic dangers. Existing facilities that do not meet current design standards are a priority.

Identification of Potential Solutions

The process of identifying potential solutions was designed to meet the needs identified in the problem statement and to support the modal access strategy. The first action in the process was compiling a comprehensive list of potential projects. The list was developed by researching all prior studies in the area; through input from stakeholder outreach; and from ideas generated through brainstorming sessions with staff on the project team.

The potential project list was developed using the following:

- SEATRAN - Port of Seattle, Workshop, January 1997 ('The List')
- North Duwamish Intermodal Access Project Team Kick-off Meeting, September 1997
- Duwamish Coalition, Infrastructure Assessment of the Duwamish Corridor, January 1996
- Duwamish Coalition, Freight Mobility Report, January 1996
- David Evans & Associates, South Downtown Transportation Study, August 1994
- FMAC, Issue Paper Number 3, January 1997
- Intermodal Access Study NEPA Environmental Assessment, January 1997
- North Duwamish Intermodal Access Team, Solutions Workshop, October 1997
- Transpo Group, Port of Seattle Container Terminal Access Study, April 1993
- ICF Kaiser, North Duwamish Access Workshop, August 5, 1996
- Lund Consulting, Inc., Critical Linkages, January 3, 1997

Table 1. Initial List of Potential Solutions

Number	Potential Solution	Number	Potential Solution
1.	Galer Street Railroad Overcrossing	43.	BNSF Railroad Trestle
2.	First Avenue Signals	44.	SR99 and Seattle International Gateway Railyard Realignment
3.	S. Spokane Street Seismic	45.	New Railroad Bridge Over the Duwamish River
4.	Extend Terminal Gate Hours at Port of Seattle	46.	BNSF King Street to North Seattle International Gateway Railyard Railroad Connection
5.	Spokane Street Viaduct Widening	47.	Joint Railyard Operations Between UP and BNSF at the UP Argo Railyard
6.	Ramps between E Marginal Way and SR 99	48.	Improve Signal Coordination, add Left and U-turns on Lower Spokane Street
7.	SR 519 Intermodal Access Project Phase 1	49.	Automated Traveler Information Signs on I-5 for Spokane Street Conditions
8.	Alaskan Way Surface Improvements	50.	Automated Traveler Information Systems on I-90/I-5 Interchange
9.	King Street and Stadium Pedestrian Bridges and Extension of Trolley Bus Wires	51.	Incident Management on S Spokane Street Viaduct
10.	Coordinated Signals at Railroad Crossings	52.	Washington State Department of Transportation Signal Control
11.	Lander Street Overcrossing	53.	City of Seattle SEATLAN Signal Control
12.	SR519 Phase 2	54.	Railroad / Street Crossing Signal Coordination
13.	Hanford "T" Ramps to SR99	55.	North-south Arterial Signal Timing Improvements on E. Marginal, 4th, 6th and Airport Way
14.	Broad Street Overcrossing	56.	North Truck Gate to Seattle International Gateway Railyard
15.	Ramps From SR99 to Royal Brougham Way	57.	Washington State Ferries Remote Lot
16.	Holgate Street Overcrossing	58.	Ferry Queuing Route Under Alaskan Way
17.	Intersection Turning Radius Improvements	59.	On-street Parking Restrictions
18.	Improve Vertical Clearance for Truck Traffic	60.	Drainage and Sewer Facility Relocation
19.	Increased Utilization of Airport Way	61.	Implement Environmental Hazard System on I-90 Tunnel
20.	Lower Spokane Street Undercrossing	62.	Bus Tunnel Hours of Service Extension
21.	Directional Signs to Port Terminals	63.	S. Massachusetts Street Extension
22.	Holgate Truck Route	64.	E-3 Busway Extension to Highway 99
23.	Restrict S. Spokane Street Swing Bridge Openings During Peak Periods	65.	E-3 Busway Extension to Industrial Way
24.	Exclusive Freight Lanes	66.	South Downtown Seattle Transportation Management Association
25.	Freight Priority Lanes on Selected Arterials	67.	Stadium Transportation Demand Management
26.	Bike System Improvements for E-3 Busway	68.	Stadium Parking Pre-pay
27.	Pavement Rehabilitation Throughout North Duwamish	69.	Stadium Event Carpool Parking
28.	Dust Control Street Paving	70.	Stadium Event Parking Shuttle
29.	E. Marginal Way Closure to General Purpose Traffic, Conversion to a Freight Frontage Road	71.	Stadium and Port Traffic Event Conflict Management
30.	Spokane Street Surface Closure	72.	South Downtown Seattle Parking Management Organization
31.	E. Marginal/SR99 Bikeway	73.	Bathrooms at Port Truck Gates
32.	HOV/Truck Ramp to I-5 at Industrial Way	74.	Airport Way Widening
33.	Widen Lanes on First Avenue S	75.	I-5 Capacity Improvements
34.	Bikeway/Walkway to I-90 Rainier Lid	76.	East Marginal Way Realignment
35.	Truck-only Crossing of E. Marginal/SR99 to Seattle International Gateway Railyard	77.	Construction Notification System
36.	Horton Street Corridor Improvements	78.	E. Marginal Way Overweight Vehicle Corridor
37.	Marginal Way Frontage Road South of S Spokane Street	79.	Revise Hazardous Cargo Permit Process
38.	FAST Corridor Initiative to Improve Rail Mobility in Western Washington	80.	Off-peak Construction
39.	Union Pacific Argo Railyard Access Improvements	81.	Safe Container Act
40.	Tacoma - Seattle Freight Corridor Expansion	82.	Enforce Loading Zones
41.	Maintain Oversize (Over-dimensional) Routes Through North Duwamish	83.	Hanford Street Overcrossing
42.	North Argo Track/Coach Wye Reconfiguration		

Evaluation Process

The evaluation process was designed to ensure that recommended projects would directly address problems identified in the Access Duwamish Problem Statement, and directly fulfill the project goals. The process followed three steps. The first step was to screen a long list of 83 potential concepts down to a smaller list of 20 for detailed evaluation. Concepts passing the screen were developed to varying degrees as candidate solutions for the recommended project list. Conceptual engineering studies were performed on six potential solutions and preliminary design engineering was performed on three projects. Candidate solutions were critically evaluated using fourteen evaluation criteria.

Screening of Potential Solutions

Screening criteria were designed to provide simple tests to the viability of potential projects in gaining support, acceptance, funding, implementation, and meeting project goals. The screening criteria below were used to separate 20 candidate projects from the long list of 83 potential projects identified in the North Duwamish area. Potential projects that did not pass the screening tests listed below were not evaluated further.

- ◆ **Sponsorship** - Candidate projects must have potential to obtain sponsorship from public agencies and public funding entities.
- ◆ **Relative Effectiveness** - Candidate projects must be the best solution available to solve the particular problem.
- ◆ **Public Acceptance** - Candidate projects must be acceptable to the public.
- ◆ **Goal Achievement** - Candidate projects must address or fulfill the goals of the Access Duwamish Project.
- ◆ **Feasibility** - Candidate projects must not be too costly, too difficult to build, or create unacceptable impacts.
- ◆ **Program Scope** - The project should be within the scope of the Access Duwamish Freight Mobility program.

Candidate projects that most favorably met the screening criteria were identified for a higher level of development.



Development of Potential Solutions

Six projects from the list of 20 candidate projects were selected for preliminary conceptual engineering feasibility analyses. Each of these analyses included a written description of the project addressing design alternatives, technical issues, right-of-way needs, physical impacts, and a discussion of benefits. Included are preliminary 'order of magnitude' feasibility-level cost estimates, conceptual layouts, profile checks, and cross sections. The full description and results of the preliminary conceptual engineering feasibility analyses are located in Volume 1 of the *Access Duwamish Technical Appendices* (Item 10). The six engineering feasibility studies conducted in support of project evaluation were:

- ◆ SR-99 Half Interchange from South Royal Brougham Way / to South Atlantic Street
- ◆ South Spokane Street Surface Closure
- ◆ East Marginal Way Exclusive Truck Route / Separated Bikeway
- ◆ South Hanford Street "T" Ramp to SR-99
- ◆ Lander Street Overcrossing of BNSF Mainline
- ◆ North Argo Track / Coach Wye Improvements

Conceptual design engineering reports were prepared for three projects. Each of these designs contained a detailed description of the project scope, multi-modal impact analyses, preliminary environmental impacts assessment, alternatives analysis, geometric design criteria, design deviations and more detailed cost estimates. Full reports for each of the design studies are contained in Volume 2 of the *Access Duwamish Technical Appendices* (Items 16, 29, 37).

- ◆ East Marginal Way Grade Separation
- ◆ Broad Street Overcrossing (North Waterfront Access Project)
- ◆ SR-99 Half Interchange

Several other special studies were performed in order to develop candidate projects for evaluation and assess potential benefits and impacts. These studies were focused either on a specific geographical subarea of the North Duwamish or on specific modes. These include the following:

- ◆ West Seattle Transit Access Evaluation of Concepts
- ◆ Spokane Street Corridor Analysis
- ◆ Port/Rail Improvements
- ◆ Freight Access Improvements for South of Dawson Street

Development of candidate projects provided the data necessary to evaluate each against a set of fourteen discrete criteria. Information produced during this process resulted in several projects being dropped from consideration.



Analysis of each candidate project was performed for 14 criteria (see inset at right). Quantitative criteria such as capital cost and traffic network Implications are measured in units specific to the type of analysis such as dollars or vehicle hours of delay. Qualitative criteria were evaluated based on a relative range of measurement such as low, moderate and high. The difference in measurement units used in the analysis required that evaluation results be normalized to a common scale for comparison and presentation.

Each of the 20 candidate projects were evaluated against the criteria listed. A value of relative effectiveness (on a scale of 1 to 5) in meeting the criterion was assigned to each. The overall ratings for each project shown in the evaluation matrix represent the Access Duwamish Technical Work Team's assessment of the relative effectiveness of the projects and their relative value to the North Duwamish.

- Fourteen criteria were used to evaluate candidate projects. The focus in this evaluation was to establish enough detail to enable an unbiased comparison between projects and alternatives rather than to identify the absolute benefits and impacts. For this reason several of the criteria are qualitatively defined.
- ◆ Capital Cost
 - ◆ Operations and Maintenance Cost
 - ◆ Traffic Network Implications
 - ◆ Rail Network Implications
 - ◆ Safety Implications
 - ◆ Effect on Emergency Vehicle Access
 - ◆ Port Terminal Access Implications
 - ◆ Institutional and Legislative Impact
 - ◆ Right-of-Way Impacts
 - ◆ Parking Implications
 - ◆ Air Quality and Energy Implications
 - ◆ Cost Effectiveness
 - ◆ Ability to Fund
 - ◆ Implementation Timeframe

Below is an example of how this analysis was achieved. A complete description of each criterion and how the scale was developed can be found in Volume 2 of the Access Duwamish Technical Appendices (Item 32).

Right-of-Way Impacts

- Less than 5,000 SF right-of-way required (best)
- ◐ 5,000 to 10,000 SF right-of-way required
- ◑ 10,000 to 50,000 SF right-of-way required
- ◒ 50,000 to 100,000 SF right-of-way required
- Over 100,000 SF right-of-way required

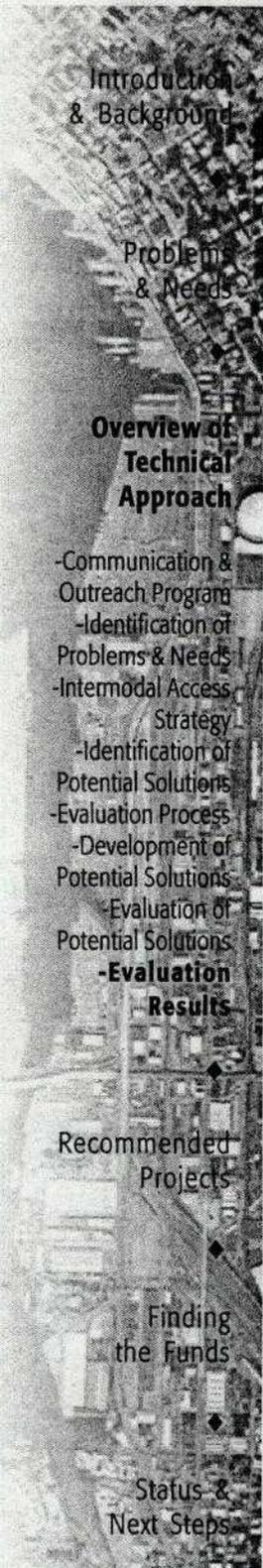
Evaluation Results

The Technical Work Team reached these findings through rigorous technical analyses that included traffic operations analysis, capital and operations cost estimation, air quality analysis, right of way needs, policy analysis and benefit-cost calculation. An additional dimension was added to the evaluation by assigning different weights for the various evaluation criteria.

Criteria weighting was developed based on funding criteria, public and agency input, and an understanding of the relative severity and immediacy of the problems in the North Duwamish. Criteria that were weighted to reflect significant importance include Port Terminal Access, Safety, Traffic Implications, Ability to Fund and Implementation Time.

	Capital Cost	Operations and Maintenance Cost	Traffic Network Implications	Rail Network Implications	Safety Implications	Affect on Emergency Vehicle Access	Port Terminal Access Implications	Institutional and Legislative Implications	Right-of-Way Impacts	Parking Implications	Air Quality and Energy Implications	Cost Effectiveness	Ability to Fund	Implementation Time	OVERALL
RECOMMENDED PROJECTS															
FAST Corridor Phases 1 and 2															
SR-519 Intermodal Access Project [Phase 1]	○	○	●	○	●	●	●	○	○	○	○	○	○	○	○
Spokane Street Viaduct Widening	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ramps between East Marginal Way and SR-99	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SR-519 [Phase 2]	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Lander Street Overcrossing	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Other Railroad Grade Separations															
Hanford Street On-Ramp to SR-99	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N Waterfront Access (Broad Street)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Highway Access Improvements															
SR-99 Half Interchange	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Directional Signs to Port Terminals	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Arterial Improvements															
Intersection Improvements	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Pavement Rehabilitation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Construction Notification System	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Advanced Technology for Traffic Management	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
East Marginal Way Truck Emphasis Route/ Separated Bikeway	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Railroad Operations Improvements															
Off-Mainline Rail Improvements	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Train Crossing/Signal Coordination	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
PROJECTS NOT RECOMMENDED															
Holgate Street Overcrossing	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Hanford Street Off-Ramp from SR-99	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
West Seattle Transit Access to the E-3 Busway	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Airport Way Upgrades/Enhancements	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Hanford Street Overcrossing and Extension	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Table 2. Evaluation Matrix



In addition to evaluation criteria, each project was tested for consistency with the overall Access Duwamish Strategy. The matrix below indicates how each candidate project supports the strategy. Testing each project against the strategy allowed for stakeholder agencies and community groups to understand how each project served their unique needs and interests.

Table 3. Strategy Matrix

	Mainline Railroad / Road	Port Railroad Access / Road	Intermodal Railyard / Road	Truck / Auto	Truck / Non-Motorized	Rail / Non-Motorized	Transit / Traffic	Relieve Congestion	Parallel Routes	Internal Circulation	Regional Access	Traffic Operations	Traveler Information	Railroad Operation	Emergency Vehicle Operations	Seismic Upgrades	Roadways
RECOMMENDED PROJECTS																	
FAST Corridor Phases 1 and 2																	
SR-519 Intermodal Access Project [Phase 1]	✓			✓	✓	✓		✓			✓	✓		✓	✓		
Spokane Street Viaduct Widening	✓	✓	✓		✓			✓		✓		✓		✓	✓	✓	✓
Ramps between East Marginal Way and SR-99		✓	✓					✓		✓	✓						
SR-519 [Phase 2]	✓							✓	✓	✓							
Lander Street Overcrossing	✓					✓		✓	✓	✓					✓		
Other Railroad Grade Separations																	
N Waterfront Access (Broad Street)	✓					✓		✓		✓		✓		✓			✓
Highway Access Improvements																	
SR-99 Half Interchange On-Ramp		✓						✓		✓	✓	✓			✓		
Directional Signs to Port Terminals										✓	✓	✓					
Arterial Improvements																	
Intersection Improvements								✓	✓		✓				✓		
Pavement Rehabilitation																	✓
Construction Notification System								✓			✓	✓					
Advanced Technology for Traffic Management								✓		✓	✓	✓					
East Marginal Way Truck Emphasis Route/ Separated Bikeway				✓	✓				✓			✓					✓
Railroad Operations Improvements																	
Off-Mainline Rail Improvements														✓			
Train Crossing/Signal Coordination	✓							✓				✓		✓			
PROJECTS NOT RECOMMENDED																	
Holgate Street Overcrossing	✓					✓									✓		
Hanford Street Off-Ramp from SR-99		✓								✓				✓			
West Seattle Transit Access to the E-3 Busway							✓										
Airport Way Upgrades/Enhancements								✓	✓	✓		✓					✓
Hanford Street Overcrossing and Extension	✓							✓	✓	✓				✓			

Recommended Projects

Based on the evaluation, the projects listed on the following page have been found to effectively provide benefits in the areas of traffic network operations, rail operations, safety and port terminal access among others. In addition, these projects were evaluated favorably for criteria such as cost, physical impacts, environmental implications, air quality, cost effectiveness, ability to fund and implementation timing. As the result of the evaluation, these projects were recommended for highest priority consideration.

The table indicates the anticipated implementation timeframe when each project may be constructed as well as the existing or anticipated partnerships to support project implementation. The significance of these partnerships as they relate to funding are described in the next section of this document. The projects are organized into several subgroups. These include the FAST Corridor projects, which provide grade separations between mainline railroad tracks and roadway facilities; other grade separation projects that are not included on the FAST Corridor list of projects; highway access improvements; arterial improvements; and railroad operations improvements. All costs presented are expressed in 1999 \$ Millions.

The recommended projects are illustrated on Figure 6. These address the corridors of critical need that were identified during problem identification. The package of recommended projects includes critical grade separations that are consistent with the FAST Corridor Phase 2 project priorities, enhancements to the major entry/connection points to the North Duwamish (North Waterfront Access, SR-519, SR-99 Ramps, South Spokane Street Viaduct improvements, improvements to the 14th/16th Street Bridge), significant improvements to east/west access to address critical circulation needs with the North Duwamish, and major investments in preservation projects to protect and extend the service life of existing facilities.

Access Duwamish projects were identified to serve long-term, future needs as well as to provide near term solutions. These include lower cost projects that are also important, particularly for local industries and businesses housed in the Duwamish Area. These include changes to City streets, the traffic control system, truck routes, and at-grade rail crossings. To reduce rail/traffic conflicts for example, besides grade separations, lower-cost measures could be used. These include improved crossing technology, signal/gate improvements to reduce blockage time, and ongoing coordination between the freight railroad operators. These lower cost solutions may not be the ultimate solution for problems in the Duwamish area, but can go far in improving the existing mobility problems in the area. They can be implemented in a short time frame and can be funded more readily using the limited available funds.

If constructed, the Access Duwamish Projects could provide savings of over 100,000 truck hours of travel annually by 2010. This equates to a \$50,000,000 savings in 1999 dollars over what it will cost in 2010 if nothing is done. In addition, nearly 900,000 hours of non-truck vehicle travel time could be saved if the Projects are implemented. With Access Duwamish safety improvements in place, accidents could be reduced over existing levels in 2010 even though traffic volumes will increase substantially. The SR-519 Phase 1 project and the Lander Street overcrossing could each save more than 100,000 vehicle hours of travel annually when implemented. In the near term, the low cost, advanced technology for traffic management, if deployed, could save more than 200,000 vehicle hours of travel annually by 2010. The actual benefits provided by the Access Duwamish improvements could be much higher if current rates of growth are maintained. Conversely, congestion and delay could be much worse than expected if nothing is done.

Introduction & Background

Problems & Needs

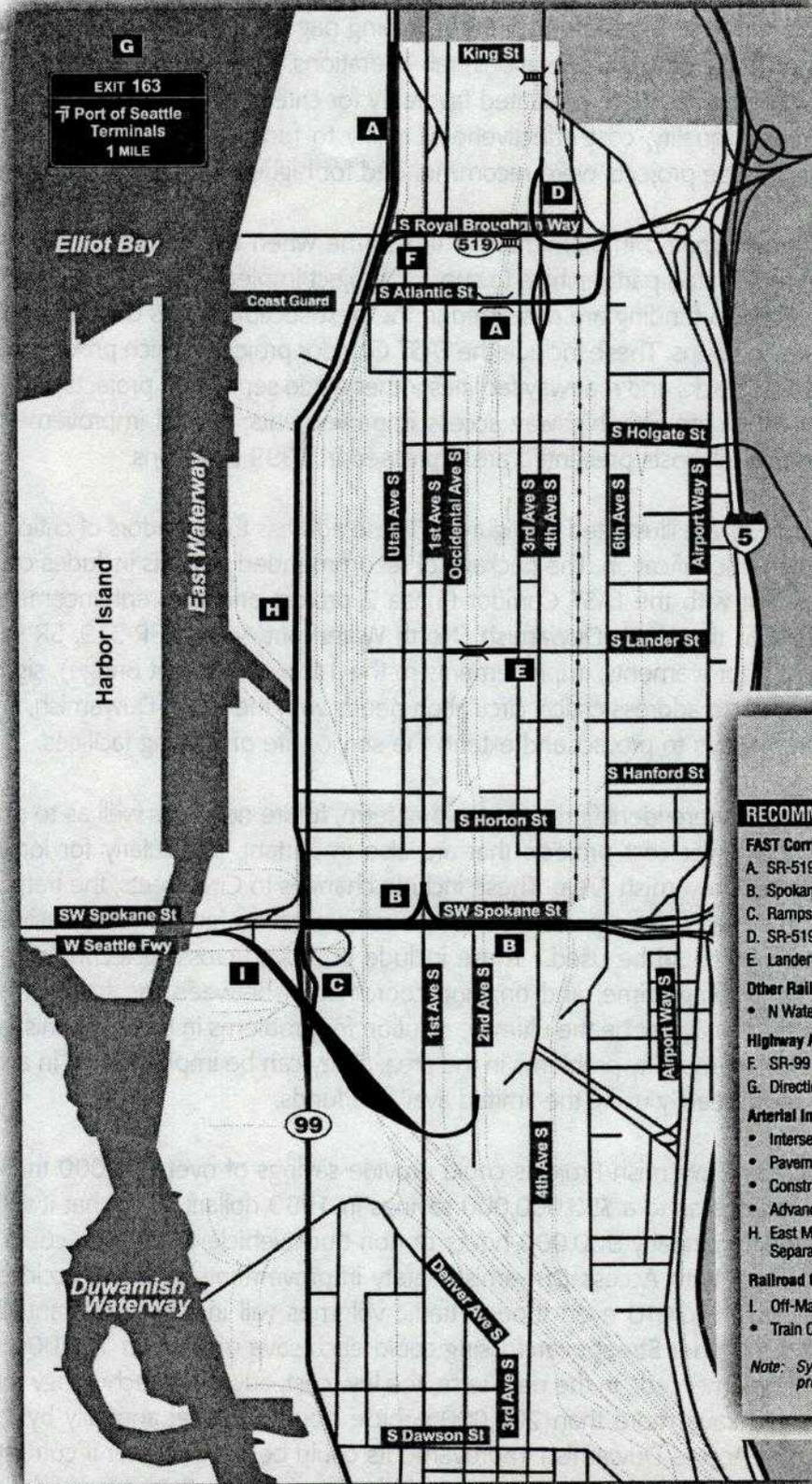
Overview of Technical Approach

Recommended Projects

- FAST Corridor Phases 1 & 2
- Other Railroad Grade Separation Projects
- Highway Access Improvements
- Arterial Improvements
- Railroad Operations Improvements

Finding the Funds

Status & Next Steps



Recommended projects depicted on the map (Figure 6) are described in the following pages. Included in this description are preliminary concept-level cost estimates and a summary of benefits and impacts associated with each project.

RECOMMENDED PROJECTS

FAST Corridor Phases 1 and 2

- A. SR-519 Intermodal Access Project [Phase 1]
- B. Spokane Street Viaduct Widening
- C. Ramps between East Marginal Way and SR-99
- D. SR-519 [Phase 2]
- E. Lander Street Overcrossing

Other Railroad Grade Separations

- N Waterfront Access (Broad Street)

Highway Access Improvements

- F. SR-99 Half Interchange On-Ramp
- G. Directional Signs to Port Terminals

Arterial Improvements

- Intersection Improvements
- Pavement Rehabilitation
- Construction Notification System
- Advanced Technology for Traffic Management

H. East Marginal Way Truck Emphasis Route/ Separated Bikeway

Railroad Operations Improvements

- I. Off-Mainline Rail Improvements
- Train Crossing/Signal Coordination

Note: System-wide projects and projects out of map area are bulleted.

Figure 6. Access Duwamish Recommended Projects

Table 4. Project Implementation and Potential Partners

	Implementation Timeframe		Potential Partner Agencies						
	Short-term (1 to 6 years)	Mid-term (6 to 10 years)	Long-term (10+ years)	City of Seattle	Port of Seattle	King County	State of Washington	BNSF	Sound Transit
RECOMMENDED PROJECTS									
FAST Corridor Phases 1 and 2									
SR-519 Intermodal Access Project [Phase 1]	✓			✓	✓	✓	✓	✓	
Spokane Street Viaduct Widening	✓			✓					✓
Ramps between East Marginal Way and SR-99	✓			✓	✓		✓	✓	
SR-519 [Phase 2]		✓		✓			✓	✓	
Lander Street Overcrossing		✓		✓	✓	✓		✓	✓
Other Railroad Grade Separations									
N Waterfront Access (Broad Street)		✓		✓	✓			✓	✓
Highway Access Improvements									
SR-99 Half Interchange On-Ramp		✓		✓		✓	✓		
Directional Signs to Port Terminals	✓				✓		✓		
Arterial Improvements									
Intersection Improvements	✓			✓					
Pavement Rehabilitation	✓			✓					
Construction Notification System	✓			✓					
Advanced Technology for Traffic Management	✓			✓		✓	✓	✓	
East Marginal Way Truck Emphasis Route/ Separated Bikeway	✓			✓	✓				
Railroad Operations Improvements									
Off-Mainline Rail Improvements	✓				✓			✓	
Train Crossing/Signal Coordination	✓			✓				✓	✓
OTHER PROJECTS TO BE CONSIDERED									
Hanford Street On-Ramp to SR-99			✓	✓	✓		✓		
E. Marginal S., Michigan to County Line	✓		✓	✓		✓			
Duwamish 14th/16th Bridge			✓			✓			
SR-99 Half Interchange Off-Ramp			✓	✓		✓	✓		

Note: This table replaces and updates the project list presented in the Access Duwamish Brochure published in December 1997.

FAST Corridor Phases 1 & 2

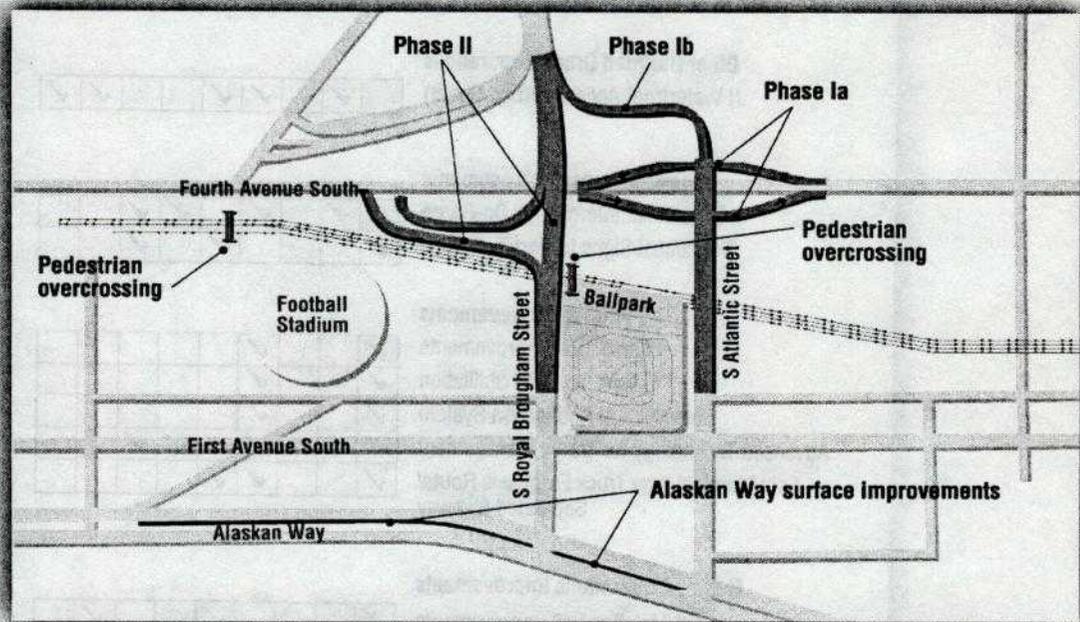
SR-519 Phase 1

Cost: \$110 Million

This project includes the construction of an elevated roadway structure along the Atlantic Street alignment between Occidental Avenue and a realigned I-90 ramp, an interchange between the elevated roadway and 4th Avenue South, and extensive surface realignments and traffic improvements for Alaskan Way South.

The SR519 project, in addition to the on-ramp to southbound SR99 would greatly reduce event-related traffic delay and the impacts to freight access this delay creates.

- + Significant auto traffic delay savings
- + Significant truck traffic delay savings
- + Port terminal access improvements
- + Improved railyard operations
- + Improved circulation during stadium events
- + Improves access to regional system
- Requires significant right-of-way
- Impacts access to adjacent properties
- Visual impacts
- Displaces existing businesses



Spokane Viaduct Widening/Improvements

Cost: \$81.8 Million

This project includes seismic strengthening and retrofit to the existing structure. Widening will add a new parallel structure to tie into existing structure. This project will widen lanes to 12', add an auxiliary lane in the westbound direction, provide for 6-foot shoulders on either side, and add a 32" barrier down the center of the structure. On and off ramps currently at 4th Avenue South will be relocated to 1st Avenue south to reduce weaving conflicts.

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- FAST Corridor Phases 1 & 2
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- Highway Access Improvements
- Arterial Improvements
- Railroad Operations Improvements

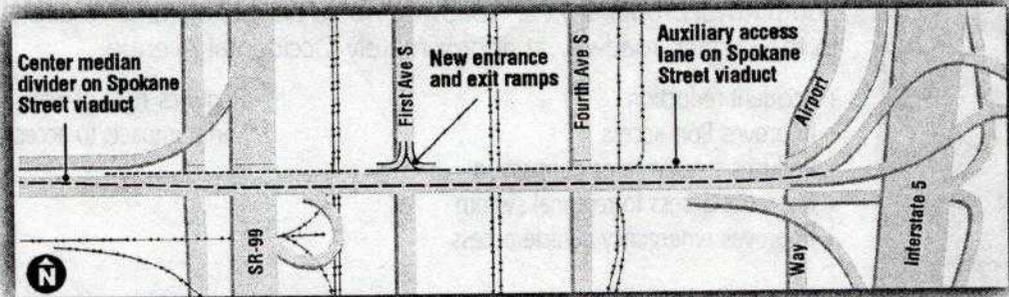
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- + Significant auto traffic delay savings
- + Significant truck traffic delay savings
- + Port terminal access improvements
- + Accident reduction
- + Improved air quality
- + Improved access to regional system/ West Seattle
- + Improves safety in time of seismic event

- Requires minor amounts of right-of-way
- Minor impacts to access of existing uses



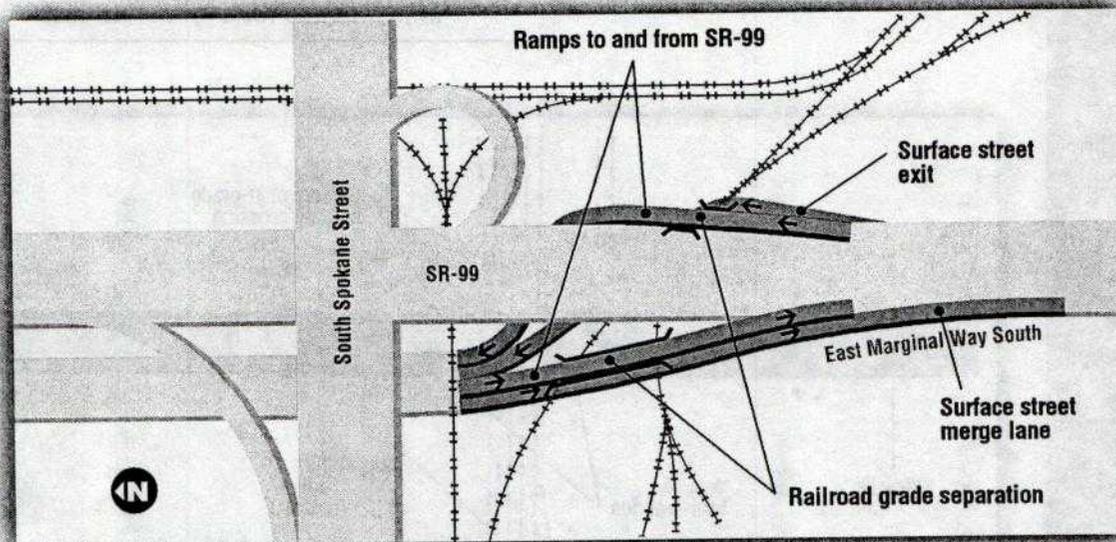
SR-99/East Marginal Way Ramps

Cost: \$33 Million

This roadway grade separation of the Harbor Island lead rail track on East Marginal Way will provide ramps both to and from SR-99 for truck freight and general traffic access. Further detailed information can be found in Volume 2 of the AccessDuwamish Technical Appendices (Item 37) "East Marginal Way Grade Separation Design."

- + Significant auto traffic delay savings
- + Significant truck traffic delay savings
- + Accident reduction
- + Significantly improved Port access
- + Eliminates delay at Harbor Island Lead tracks
- + Improves access to regional system/West Seattle

- Requires additional right-of-way
- Impacts to adjacent properties



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-Other Railroad Grade Separation Projects

-Highway Access Improvements

-Arterial Improvements

-Railroad Operations Improvements

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SR-519 Phase 2

Cost: \$55 Million

Phase 2 of the SR-519 Intermodal Access Project would construct an elevated roadway structure on South Royal Brougham Way to complete a couplet with Atlantic Street. The South Royal Brougham Way roadway would be reconfigured to directly connect I-90 down to the surface roadway at approximately Occidental Avenue.

- + Accident reduction
- + Improves Port access
- + Reduces stadium area congestion
- + Improves access to regional system
- + Improves emergency vehicle access
- Requires right-of-way
- Minor impacts to access to existing uses

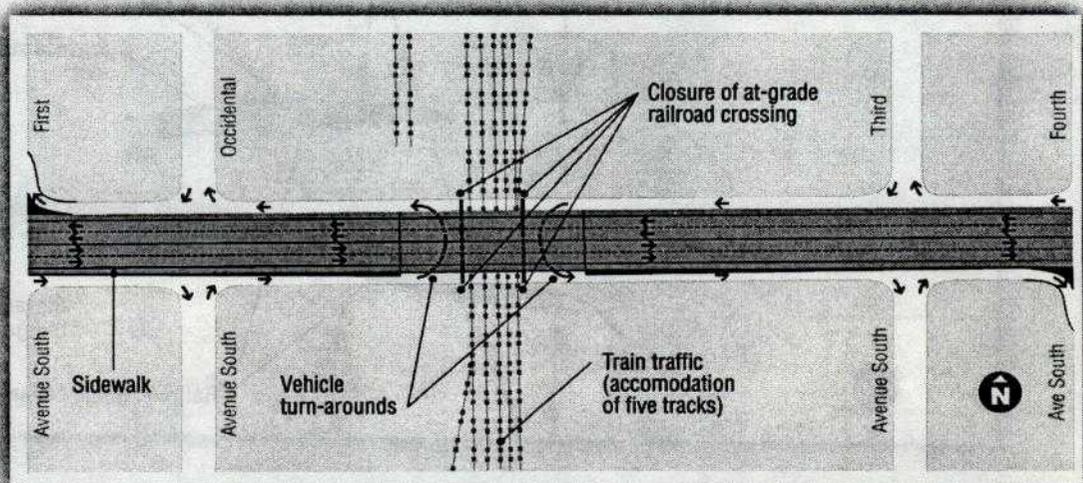
Lander Street Railroad Overcrossing

Cost: \$14.3 Million

This project would develop a grade separation of the South Lander Street Roadway over and the BNSF mainline tracks between 1st Avenue South and 4th Avenue South. The overcrossing would be two lanes wide each way with six-foot shoulders and a five-foot sidewalk on one side. Surface movement would be modified into one-way circulation routes and the surface crossing would be closed. The overpass would be constructed of retained fill approaches with a concrete girder bridge structure. A preliminary conceptual engineering feasibility project on this project is located in Volume 1 of the AccessDuwamish Technical Appendices (Item 10) "Identification of Alternatives."

- + Significant auto traffic delay savings
- + Significant truck traffic delay savings
- + Improves rail access and operations
- + Improves emergency vehicle access
- + Improves east/west circulation
- Impacts access to adjacent properties

The Lander Street Overpass would provide major vehicle delay savings, improvements to rail operations, and improved port and emergency vehicle access. This project, while providing great operational benefits will not impose significant parking or right-of-way impacts and can be implemented for a moderate cost.



Other Railroad Grade Separation Projects

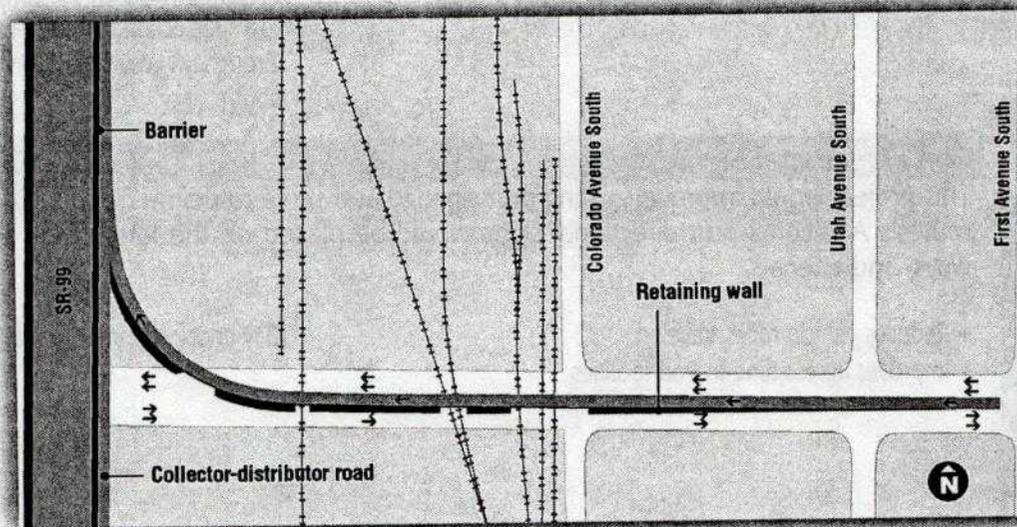
Hanford On-Ramp to SR-99 Northbound

Cost: \$37.6 Million

The Hanford Street On-Ramp would provide access from Hanford Street to northbound SR-99. The ramp would be accessed from the intersection of South Hanford Street and 1st Avenue South. The ramp would be grade-separated from the BNSF's SIG and yard lead tracks. A preliminary conceptual engineering design and feasibility project on this project is located in Volume 1 of the AccessDuwamish Technical Appendices (Item 10) "Identification of Alternatives."

- + Auto traffic delay savings
- + Truck traffic delay savings
- + Improves access to regional system
- + Improves emergency vehicle access

- May impact traffic operations on First Avenue South
- Impacts access to adjacent properties
- Impacts truck access to BNSF Sig yard



North Waterfront Access Project

Cost: \$25.5 Million

Broad Street provides the major east/west connection between Seattle's north waterfront and I-5. Today, access to and from the north waterfront is constrained by frequent train crossings on the BNSF Mainline tracks at the intersection of Broad Street and Alaskan Way. In addition, the waterfront streetcar trolley track crosses at the same location requiring frequent closures to street traffic during operating hours. The North Waterfront Access Project provides a Broad Street overcrossing of the BNSF mainline and waterfront streetcar tracks. The overcrossing leaves the existing Broad Street grade near Alaskan Way and touches down on Elliott Avenue.

- + Auto traffic delay savings
- + Truck traffic delay savings
- + Improves Central Waterfront Access
- + Improves Port rail access
- + Improves emergency vehicle access
- + Improves east/west circulation

- Impacts to access of existing uses
- Potential aesthetic impacts
- Impacts pedestrian and bicycle access to Myrtle Edwards Park



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-Other Railroad Grade Separation Projects

-Highway Access Improvements

-Arterial Improvements

-Railroad Operations Improvements

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Highway Access Improvements

SR-99 Half Interchange **Cost: On-Ramp \$6.6 Million
Off-Ramp \$20.8 Million**

A potential SR-99 Half-Interchange would be constructed between the Alaskan Way Viaduct and South Royal Brougham Way. The on ramp portion would take off from the inside (south) lane of South Royal Brougham Way westbound just west of 1st Avenue South. The off-ramp portion would touch down on the inside lane of eastbound South Royal Brougham Way just west of 1st Avenue South. Both ramps would tie into the viaduct structure somewhere south of the Atlantic Street alignment.

- + Significant improvement for post-event traffic
- + Improves access to regional system
- + Improves emergency vehicle access
- Right-of-way required
- Impacts access to adjacent properties
- Off-ramp may increase congestion at the intersection of South Royal Brougham Way and 1st Avenue South

Port Directional Signs **Cost: \$0.3 Million**

This project would improve existing port signage and serve to define desirable port access routes. Additional port directional signs would be placed on the Interstates, State Highways, and arterials.

- + Reduces vehicle miles traveled
- + Improves access time to Port facilities
- May encounter institutional barriers

Arterial Improvements

Intersection Improvements **Cost: \$0.8 Million**

There are several intersections in the North Duwamish where intersection improvements would enhance traffic safety, traffic operations, and truck movements. Improvements could include: upgrading or installing traffic signals, increasing the turning radii to accommodate large trucks, and restricting parking to improve sightlines and turning radii. Intersection improvements at critical locations would cost-effectively provide traffic benefits without impacting parking or adjacent properties.

- + Reduces accidents
- + Reduces automobile and truck delay
- May impact sidewalks
- May require limited right-of-way

Pavement Rehabilitation

Cost: \$11.3 Million

This project would provide pavement improvements for roadways throughout the North Duwamish Area focusing on non-arterial roads not currently on the City's pavement maintenance program schedule. Rehabilitation could consist of asphalt overlay, asphalt removal and replacement, or asphalt removal and replacement with Portland Cement Concrete.

- + Reduces wear and tear on vehicles
- + Improves drainage

Construction Notification System

Cost: \$0.5 Million

A construction notification system would consist of communication of current construction information by radio, fax and internet. The broadcast radio portion would provide up to the minute construction information to travelers in the area much like the existing Highway Advisory Radio (HAR) broadcast by WSDOT. A fax on demand and automated information retrieval system would allow more detailed information to be accessed using a touch tone phone. A construction notification internet site would provide an information clearinghouse for all construction-related data. A detailed description of the Construction Notification System can be found in Volume 1 of the AccessDuwamish Technical Appendices (Item 22) "Construction Staging and Construction Period Traffic Management Plan."

- + Minimize traffic and truck delay during construction
- + No environmental impacts

Advanced Technology for Traffic Management

Cost: \$5.3 Million

Advanced technology applications which should be deployed in the North Duwamish include signal interconnection, variable messaging, connections to regional traffic management systems and other emerging technologies that improve traffic safety and operations. This program is called the Duwamish Intelligent Transportation Systems Program.

- + Reduced traffic and truck delay
- + Generally lower capital costs
- + No environmental impacts

East Marginal Way Truck Route

Cost: \$1.2 Million

This roadway improvement project will improve East Marginal Way South for heavy trucks, bicycles and pedestrians between Atlantic Street and Duwamish Avenue. Pavement on East Marginal would be strengthened to allow heavy and overweight trucks to access intermodal facilities east of SR-99 without being restricted by roadway bearing capacity. This project could be combined with a special permit system for overweight dray trucks. The project includes a realignment of the existing roadway to the west approximately 6 feet, with the existing bicycle lanes being combined into a single two-way bicycle facility to be located on the east side of the roadway and buffer separated from traffic. A preliminary conceptual engineering feasibility design is located in Volume 1 of the AccessDuwamish Technical Appendices (Item 10) "Identification of Alternatives."

- + Improves safety
- + Increases separation of modes (bicycle/truck)
- + Reduces truck delay
- + Improves Port access
- + Improves emergency vehicles access
- Institutional barriers may exist
- May reduce train storage capacity
- May require added right-of-way

Railroad Operations Improvements

Off-Mainline Rail Improvements

Cost: \$15.3 Million

Rail improvements would include the addition and realignment of trackage between Harbor Island Port Terminals and the UP Argo Intermodal yard. New tracks would be added near South Spokane Street/East Marginal Way parallel to the existing Harbor Island Lead. Also, the radius of the Whatcom Yard Wye track would be lengthened to improve rail operations.

- + Improves rail operations
- + Railroad travel time savings

Train Crossing/Signal Coordination

Cost: \$2.8 Million

This project consists of upgrading the railroad crossing signal technology in the corridor to eliminate unnecessary gate closures and make crossing operations more directly responsive to trains.

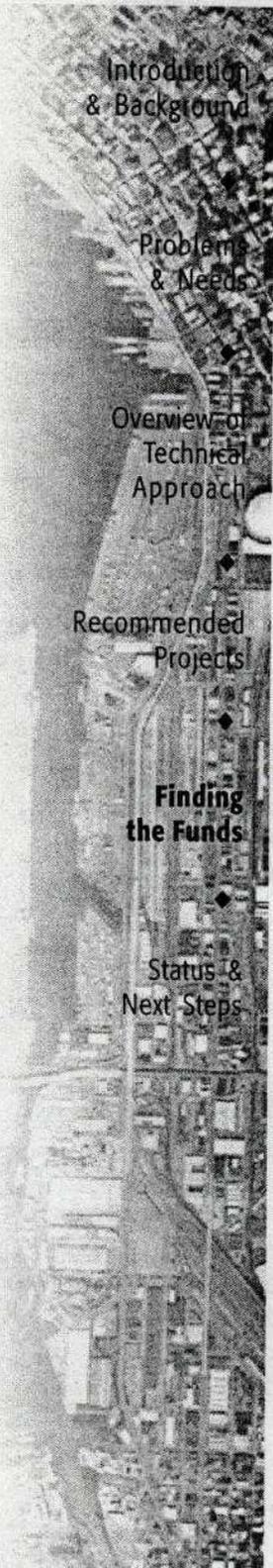
- + Reduces vehicle delay
- + Improves safety

Finding the Funds

Implementation of identified projects will require significant resources. Federal funding is both uncertain and limited, and both the state and the City face significant transportation revenue shortfalls and have major capital improvement backlogs. The following section outlines funding opportunities by source. A complete analysis of federal, state and local funding sources and their requirements is located in Volume 2 of the Access Duwamish Technical Appendices (Item 28) "Funding Options and Financing Strategies."

The project's technical analysis and financial analysis was completed prior to the passage of Initiative 695. The ability of State and local governments to fund transportation projects will change as a result of this Initiative. While the specific impact of the I-695 is unknown at this time, it has resulted in the loss of the Motor Vehicle Excise Tax funding and many state transportation projects have been put on hold, including many of the FAST Corridor projects. In addition, potential funding for future FAST Corridor projects (i.e. Phase II) is not likely at the current time.

The available range of financing strategies varies by the owner and parties who are interested in the specific project. Primary funding for projects is expected to be pursued by the party of primary interest. Projects on the recommended list are anticipated to be led by WSDOT, the City of Seattle through Seattle Transportation (SEATRAN), the Port of Seattle, the BNSF Railroad, Sound Transit, and potentially King County. All of these agencies are expected to partner on projects that fall under their area of interest and responsibility. WSDOT will lead projects relating to the state highway system including SR-99, SR-519, and I-5.



The City is expected to lead projects that relate to the local circulation system including roadway, intersection, pavement and signalization improvements to the area. The City is also leading the South Spokane Street Viaduct Project. Port-led projects include improvements designed largely to improve Port Access and may be roadway, grade separation or signage related. Railroad-led projects will be focused towards rail and rail/roadway interface projects. The following is a summary of the funding sources currently available and issues related to procuring these funds for the Access Duwamish improvements.

Federal Funds

Sources of federal funds for transportation include apportionment, grant and demonstration funding, and credit projects. A large portion of federal surface transportation funding is allocated to states and cities based on congressionally-established apportionment formulas. Another portion of federal assistance comes in the form of transit grants that are either earmarked by Congress or allocated based on formulas. These funds are generally committed to specific projects at least three years in advance based on anticipated levels of future federal funding. Redistribution of programmed funds would require WSDOT and the Puget Sound Regional Council (PSRC) to change their funding priorities.

Demonstration funding generally refers to funds that are earmarked by Congress for specific, high-profile transportation projects. The ability of an entity to secure demonstration funding is primarily tied to the strength and subject focus of its State's congressional delegation. There is considerable competition for demonstration funds. Federal credit programs provide a greater federal role in credit assistance and encourage increased transportation investment by the private sector. In order to use federal credit sources to pursue bonding as a means of financing the recommended program of improvements, project sponsors would need to identify and secure a revenue or designated tax source to repay project loans. The tax-exempt limitations of non-government construction bonds presents a barrier to greater private sector investment. State infrastructure banks also require project sponsors to identify a revenue stream or designated tax source to repay project loans.

TEA-21 funding, authorized in 1997, provides funding through an array of different programs. A significant portion of these TEA-21 funds are directed to WSDOT for state highway projects. However, local governments will compete for funds in the Surface Transportation (STP) Program, Bridge Replacement Program, and Congestion Mitigation and Air Quality Program. Several recommended projects may be acceptable candidates for these grant programs. The criteria used to award funding under these programs vary significantly, however, all require some type of local match. Typically, federal funding is used to leverage additional support from a variety of state and federal sources.

State Funds

Obtaining state transportation funding for large-scale improvement projects has been challenging in recent years, as inflation has eroded the effects of the 1990 fuel tax increase and hundreds of mobility projects statewide compete for the limited available funding. Historically, the state Transportation Commission has prioritized maintenance, operations, preservation, and safety projects as the highest priority. Mobility projects are the lowest priority; just over 20% of these projects will be funded if revenues continue to grow at their historic rate. Legislation passed in 1998 specifically provides for freight mobility funding opportunities. Further, the passage of Initiative 695 has affected the funding expectations. This was a major topic in the year

2000 Legislative Session. Sources of state funding include two sources of the Transportation Improvement Board: the Urban Arterial Trust Account and Transportation Improvement Account. These funds are distributed annually on a competitive basis, by ranking project applications against established criteria.

Local Funding

As with state transportation funding, the City of Seattle is facing a transportation funding crunch. Local matching funds are needed to leverage support from both the state and federal governments for large-scale, multi-jurisdictional projects such as those recommended by the Access Duwamish partners. To address the City's transportation funding shortfall, the City produced a Transportation Strategic Plan that recommended eight strategies. All of the City's long-term funding strategies involve approval by either the Legislature, the City Council, the King County Council, or the City's voters or a combination of approvals from these sources.

King County has traditionally reserved its transportation budget for maintaining and upgrading County roads and arterials. County policy is to spend these monies outside the incorporated areas to reinforce the goals of the Comprehensive Plan, and to support growth management and economic development. King County is a key partner in the FAST Corridor program and is participating in funding these projects.

Status & Next Steps

The Access Duwamish program has been successful in promoting several of the recommended projects into excellent position to receive funding. Access Duwamish recommended projects have captured over \$166 million in a variety of Federal, State and Local funds and are well positioned for the \$197.7 million plus still required. Table 5 lists the funding status for each of the Access Duwamish recommended projects as of October 1999.

Though a few Access Duwamish projects have done well in receiving funding; significant needs, limited funding and competition from other projects maintain the challenge in obtaining funding. Access Duwamish partners need to continue to work a strategic approach to financing and implementation of the recommended projects on an aggressive, yet realistic schedule. These key strategic issues must be considered:

The first-priority need is to obtain full federal, state and local funding for the FAST corridor projects. Three of Access Duwamish's recommended projects – SR-519 Phase 1, the East Marginal Way Grade Separations and the Spokane Street Viaduct Improvements – are included within the regional FAST Corridor program. These projects have a combined total cost of \$224.8 million, or 62% of the total cost of the recommended

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Access Duwamish program. The total FAST Corridor program has an estimated total cost of \$356 million, with a funding plan that calls for 50% of costs to be borne by the state, 25% by the federal government, and 25% by local, regional and private sector entities. This plan, which is the result of considerable effort and enjoys strong multi-jurisdictional support, is the first funding priority for the partnering agencies. Currently, the program is not fully funded, and the partners have indicated that new funding requests to the state and federal governments must await completion of FAST Corridor funding.

Explore “project packaging”, where possible, to improve competitive positioning for funds. One of the strategies successfully employed by the FAST Corridor partners has been grouping the various projects into a comprehensive, recommended freight mobility program for the Puget Sound. This approach has provided a number of benefits, including better communicating the program’s key objectives and messages, allowing the projects to score higher on the state’s priority ranking system, reducing the likelihood of projects competing against one another, and concomitantly, fostering partnerships among potential funding agencies. The Access Duwamish partners can emulate the effectiveness of this FAST Corridor program strategy by incorporating appropriate projects into other established projects or programs, such as SR-519 Phase 2 or FAST Phase 2, and by grouping individual projects into more system-oriented programs. An example of such a grouping is the Advanced Technology for Traffic Management program, which encompasses a variety of intelligent transportation system improvements.

Maintain focus on developing funding partnerships, and on leveraging funding from various sources. With limited funding opportunities, the ability to leverage funding sources becomes especially important, and interconnected. The likelihood of state funding via WSDOT’s priority array and legislative approval process is enhanced by local, regional and private sector funding components; projects can gain additional points on the priority array ranking system – effectively “buying their way up” the priority project ranking. The ability to attain state Transportation Improvement Board (TIB) funding for projects is likewise enhanced by the presence of multijurisdictional and private sector funding commitments. Conversely, TIB funding can be used as part of the local match for attaining state and federal funds.

Make a relentless effort to position and promote projects – to “be ready” – for additional federal, state and local funding as it becomes available. Some of the recommended Access Duwamish projects have been under consideration for several years and are already listed on the City’s Capital Improvement Plan (CIP) as well as various state lists including the 20-year Highway Plan and Freight Mobility Strategic Investment Board’s list of recommended projects. Others, however, are relatively new concepts and have yet to be added to the appropriate local, regional and state project lists. In order to be considered for funding requests, all projects need to be submitted for inclusion on the appropriate capital improvement plan lists.

The table on the following page lists the funding status of Access Duwamish recommended projects as of the publication of this report.

Table 5. Project Funding Status

PROJECT FUNDING STATUS TO DATE

Costs are expressed in \$1999 Millions.
Based on information available as of October 1999.

FAST Corridor Phases 1 and 2

	Project Cost	Funded to Date	Amount Unfunded
SR-519 Intermodal Access Project [Phase 1]	\$ 110.00	\$ 106.00	\$ 4.00
Spokane Street Viaduct Widening	\$ 81.8	\$ 52.8	\$ 29.0
Ramps between East Marginal Way and SR-99	\$ 33.0	\$ 2.5	\$ 30.5
SR-519 [Phase 2]	\$ 55.0	\$ -	\$ 55.0
Lander Street Overcrossing	\$ 14.3	\$ 0.15	\$ 14.1
Sub total	\$ 294.1	\$ 161.5	\$ 132.6

Other Railroad Grade Separations

N Waterfront Access (Broad Street)	\$ 25.5	\$ 1.0	\$ 24.5
Sub total	\$ 25.5	\$ 1.0	\$ 24.5

Highway Access Improvements

SR-99 Half Interchange On-Ramp	\$ 6.6	\$ -	\$ 6.6
Directional Signs to Port Terminals	\$ 0.3	\$ -	\$ 0.3
Sub total	\$ 6.9	\$ -	\$ 6.9

Arterial Improvements

Intersection Improvements	\$ 0.8	\$ -	\$ 0.8
Pavement Rehabilitation	\$ 11.3	\$ 0.9	\$ 10.4
Construction Notification System	\$ 0.5	\$ -	\$ 0.5
Advanced Technology for Traffic Management	\$ 5.3	\$ 2.3	\$ 3.0
East Marginal Way Truck Emphasis Route/ Separated Bikeway	\$ 1.2	\$ 0.3	\$ 0.9
Sub total	\$ 19.1	\$ 3.5	\$ 15.6

Railroad Operations Improvements

Off-Mainline Rail Improvements	\$ 15.3	\$ -	\$ 15.3
Train Crossing/Signal Coordination	\$ 2.8	\$ -	\$ 2.8
Sub total	\$ 18.1	\$ -	\$ 18.1

Total for All Recommended Projects **\$ 363.7** **\$ 166.0** **\$ 197.7**

OTHER PROJECTS TO BE CONSIDERED

Hanford Street On-Ramp to SR-99	\$ 37.6	\$ -	\$ 37.6
E. Marginal S., Michigan to County Line	\$ 0.9	\$ -	\$ 0.9
Duwamish 14th/16th Bridge	\$ 30.0	\$ 12.0	\$ 18.0
SR-99 Half Interchange Off-Ramp	\$ 20.8	\$ -	\$ 20.8
Sub total	\$ 89.3	\$ 12.0	\$ 77.3

