Chapter 1 – Purpose and Need

1.1 PURPOSE OF THE PROJECT

The purpose of the proposed action is to improve regional mobility by providing reliable and safe two-way transit and high-occupancy vehicle (HOV) operations on Interstate 90 (I-90) between Bellevue and Seattle, while minimizing impacts to the environment and to other users and transportation modes.

1.1.1 Study Area

The study area extends from 4th Avenue S in Seattle to the Interstate 405 (I-405) interchange in Bellevue along the I-90 corridor, a distance of approximately 8 miles. The section of I-90 between Interstate 5 in Seattle and the Bellevue Way SE Interchange in Bellevue is the roadway proposed to be modified. The existing I-90 roadway comprises three independent freeway alignments: two three-lane (eastbound and westbound) outer roadways and a two-lane, barrier-separated center roadway. The center roadway is commonly referred to as the I-90 express lanes and forms a portion of the region's HOV system. Figure 1-1 shows the existing I-90 roadway between Seattle and Bellevue in the context of the surrounding area.

1.2 NEED FOR THE PROJECT

Several conditions have changed over the past decade that have resulted in a growing interest in transportation improvements in the I-90 corridor. These conditions, noted below, are expected to continue in the future unless changes are made to improve bus and HOV travel times on I-90.

1.2.1 Changed Conditions

Changes in Travel Patterns

Since the completed I-90 reopened to traffic in 1993, the Puget Sound region has experienced significant growth, both in population and employment on the east side of Lake Washington and in employment and retail expansion in downtown Seattle. The result has been a gradual shift in travel patterns, from inbound to downtown Seattle in the morning and outbound from Seattle in the evening to a more dispersed travel pattern that is moving towards nearly equal volumes of traffic across Lake Washington in each direction during peak periods (55 percent peak direction, 45 percent reverse-peak direction). With existing and projected traffic volumes, the outer roadways on I-90 operate at capacity in both directions.

Reduction in Transit Reliability

The increase in reverse-peak direction travel has resulted in a degradation of the reliability of transit service across the lake. Buses are delayed as they operate in mixed traffic in the "reverse-peak" direction. For example, buses frequently fail to operate on schedule in both directions along I-90, primarily in the reverse-peak direction, with 60 to 65 percent of the westbound PM peak period buses running between 2 to 14 minutes late between Bellevue and Seattle. Some buses may arrive early, while some run even later depending on traffic conditions. This reduces the confidence of bus riders in the reliability of transit service, reduces riders' abilities to make transfer connections, makes it difficult for riders to reach their destinations when expected, and reduces the attractiveness of transit service in the I-90 corridor.

Impact to Users of the I-90 Corridor

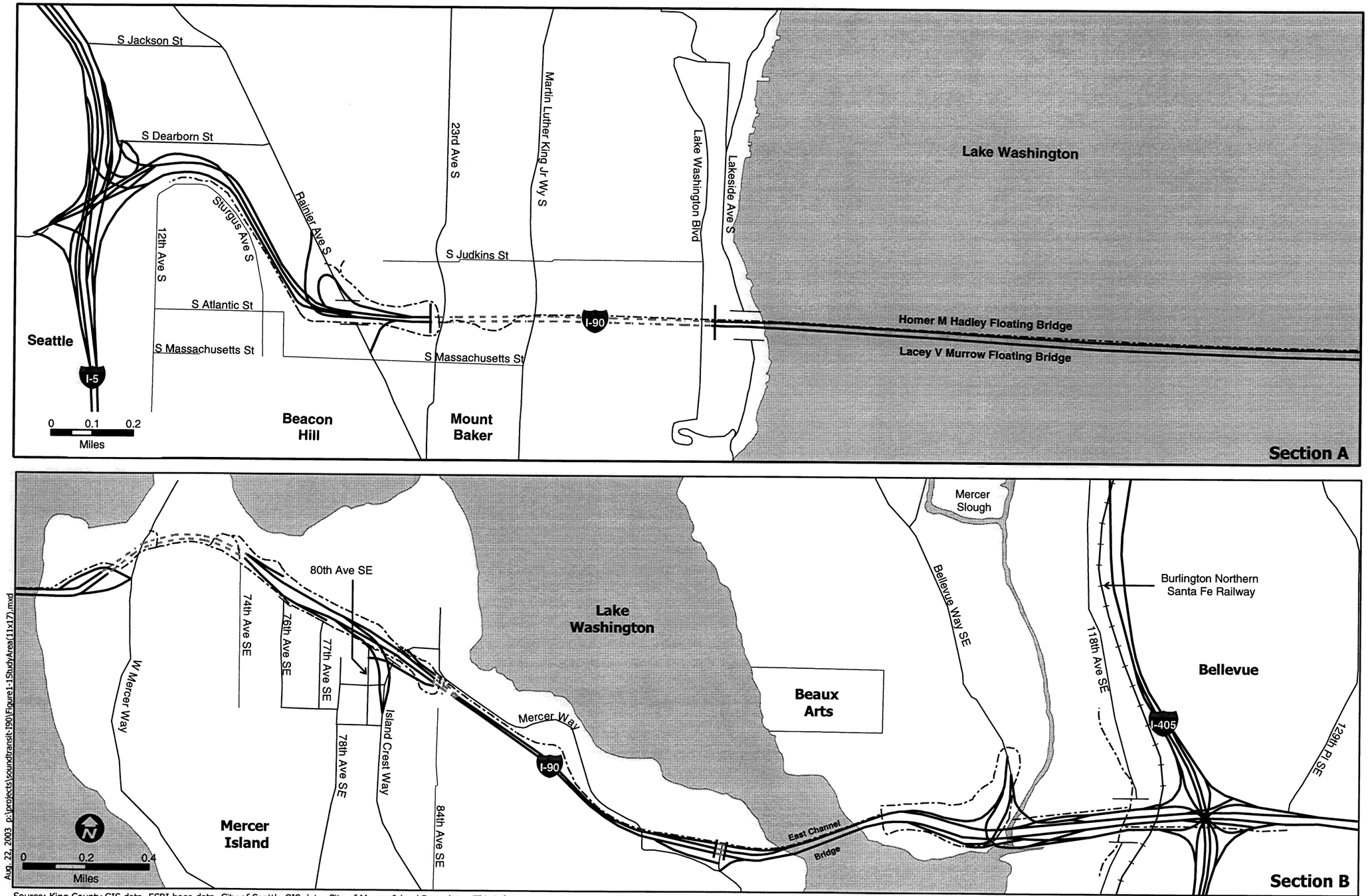
As congestion on I-90 worsens, all travel on the Lake Washington crossing will become increasingly slow and less reliable. This is a special concern for regional express and local transit buses, as well as carpools/vanpools operating in the reverse-peak direction. Solutions in the I-90 corridor are targeted to improve the reliability and travel time of these users without penalizing the travel needs of other users in the corridor.

1.2.2 System Linkage and Modal Interrelationships

- As one of only two routes across Lake Washington between the city of Seattle and the cities in eastern King County, I-90 is an important link in the regional transit system and vital to the success of the regional transportation system. Buses on I-90 connect on the west to I-5 and downtown Seattle and on the east to I-405 and routes in Bellevue and Issaquah.

- As the directional split on I-90 has become more balanced during peak hours, the reliability and effectiveness of the transit system has been diminished by congestion in the traditional reverse-peak direction that creates delays causing riders to miss connecting buses.

- The portion of I-90 from Seattle to Issaquah is part of the region's HOV Core Lanes, the basic system of HOV lanes identified by the Washington State Department of Transportation (WSDOT) and by the Puget Sound Regional Council (PSRC) as part of the *Destination 2030 Metropolitan Transportation Plan.* The WSDOT HOV Core Lane system includes the reversible center roadway on I-90 from Rainier Avenue S to Bellevue Way SE, and the I-90 outer roadway HOV lanes from Bellevue Way SE to State Route (SR) 900 in Issaquah. WSDOT's Freeway HOV System Policy includes provisions for consideration of two-directional separated HOV roadways "when directional splits are relatively even for the number of lanes present, there is a demand for ridesharing in both directions during peak hours, or there is a large volume of buses adversely affected by congestion in the off-peak hours or reverse-peak direction." Sound Transit's *Sound Move* program identifies a need for improvements to I-90 between I-5 and I-405 to facilitate two-way transit and HOV operations as a part of the regional "HOV Expressway" system.



Source: King County GIS data, ESRI base data, City of Seattle GIS data, City of Mercer Island Base data. This information may not meet National Map Accuracy Standards.

U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

SoundTransit

Washington State Department of Transportation

Legend

Roadway Tunnel

Shared-use Pathway

Figure 1-1
Study Area

1.2.3 Current Use and Operations of I-90

Current roadway operations of 1-90 are described in Chapter 3 – Transportation.

- During the AM peak hour, there are currently 34 westbound and 9 eastbound buses crossing Mercer Island on I-90. During the PM peak hour, there are 9 westbound and 34 eastbound buses.

- Transit and other HOV traffic traveling westbound in the morning and eastbound in the evening usually move freely on the express lanes, the dedicated reversible lanes in the center roadway. Bus transit and other HOV traffic traveling in the peak direction on I-90 currently are separated from general-purpose freeway traffic in the outer roadways through provision of dedicated reversible HOV lanes in the center roadway. No separation is provided for transit and HOV traffic traveling in the reverse-peak direction (eastbound in the morning and westbound in the evening). These vehicles must use the same lanes as general-purpose traffic and are subject to the same traffic conflicts, congestion, and delays. This situation results in ongoing delays to buses and other HOV traffic traveling in the reverse-peak direction along I-90.

- Peak hour transit represents less than 1 percent of the vehicular traffic in the corridor, but carries up to 15 percent of commuters with Seattle destinations, and about 6 percent of commuters with Eastside destinations.

- Carpools comprise 15 to 22 percent of the total peak hour traffic in the peak direction and 24 to 34 percent of the peak direction person trips. In the reverse-peak direction, carpools represent 9 to 17 percent of the vehicular traffic, and 17 to 29 percent of the person trips.

- Traffic volumes exceed 90 percent of capacity in the general-purpose lanes during both peak periods and in both directions. With the outer roadways on I-90 operating at capacity, increases in peak period person-carrying capacity in both directions on I-90 will need to be accommodated by transit and other high-occupancy modes of travel.

- Congestion levels on I-90 in the westbound, or reverse-peak, direction during the PM peak period are more severe than on eastbound lanes, with over 2 hours of very congested, unstable flow on a typical weekday. Delays to transit are not predictable day-to-day, reducing the reliability of transit. Simply adjusting schedules for longer travel times would not provide for increased reliability, as travel times would still vary widely from day to day.

- Sound Transit Route 550 was selected to illustrate the transit reliability issues within the I-90 corridor. In the AM peak hours in the eastbound direction, buses on this route typically start on time at the International District Station (91 percent leave on time). However, as the buses progress further along the route, they fall increasingly behind schedule. By the time the buses reach the South Bellevue Park-and-Ride, only about 60 percent of the buses are on time, whereas the rest are typically 2 to 6

minutes late. The worst condition occurs between 8 and 9 AM when the buses are usually 4 minutes late at the South Bellevue Park-and-Ride. Most of this delay is related to traffic conditions on I-90.

- Buses that stop on Mercer Island experience limited delay throughout the day. Bus loading and unloading at the I-90 and Mercer Island transit stations are also consistent throughout the peak period. In the westbound direction during the PM peak period, buses usually start trips around 1 minute late at the Bellevue Transit Center. The buses then fall progressively farther behind schedule as the trips continue west. Once the buses reach the in-line station on I-90 at Rainier Avenue S, only 35 to 40 percent of the trips are on time; the rest are between 2 to 14 minutes late, with some as much as 20 minutes late. On average, the buses are 4 to 5 minutes late at this stop during the PM peak period. As in the AM peak period, most of this delay is related directly to I-90 traffic conditions. The arrival times of the buses at the I-90 station vary greatly, resulting in unreliable service. The worst conditions occur between 5 and 6 PM when the buses are around 6½ minutes late (twice as much behind schedule as the system average).

- I-90 provides the only vehicular access route to Mercer Island. Traffic to and from Mercer Island represents approximately 18 percent of the total weekday traffic on the floating bridges between Seattle and Mercer Island and about 23 percent of the total weekday traffic on the East Channel Bridge between Mercer Island and Bellevue. Over 65,000 vehicle trips per day have origins or destinations on Mercer Island. Of these trips, about 43 percent are oriented to Seattle and 57 percent to the Eastside. Mercer Island traffic, at approximately 850 to 900 vehicles per hour, makes up 45 to 50 percent of the total center roadway traffic on the floating bridge during the AM and PM peak periods.

- Trucks are estimated to comprise 3 to 4 percent of the daily traffic volume between I-5 and I-405 in the I-90 corridor, or about 4,500 to 5,000 trucks per day. Trucks heading for important destinations such as the Port of Seattle container terminal facilities and the industrial areas located south of downtown Seattle use this portion of I-90.

- As the only bicycle-pedestrian path across Lake Washington, I-90 is also an important link in the regional non-motorized transportation system. Spring, summer and fall volumes are estimated at 100 to 200 cyclists per hour at times, with daily volumes at 300 to 500 users on weekdays and upwards of 1,000 to 1,200 users per day on weekends. Weekday peak bicycle traffic occurs during the same hours as peak motor traffic.

1.2.4 Future Transportation Demand and Operation

- As congestion on I-90 worsens, all motor vehicle transportation on the Lake Washington crossing will become increasingly slow and less reliable. Regional express vehicles, local bus transit, and carpools/vanpools operating in the reverse-peak direction will be greatly affected by the lack of HOV express lanes.

- Additional transit capacity is needed on this portion of the I-90 corridor to meet the projected transit demand. By the year 2025, the transit bus use of I-90 is expected to increase during the AM peak hour to 47 westbound buses (an increase of approximately 38 percent) and 14 eastbound buses (an increase of approximately 56 percent). During the PM peak hour, the numbers projected are a mirror image, with 14 westbound and 47 eastbound buses. Overall HOV use is expected to increase similarly, with volumes dependent on the configuration of I-90 and the mode of operation of the center roadway.

- Increases in peak direction traffic in the center roadway and resulting congestion and decreased reliability for transit will likely require an operational change on the center roadway by the year 2010. This change could consist of restricting the center roadway to HOV only, which would allow an HOV 2+ (2 or more occupants per vehicle) eligibility requirement to remain in place and move Mercer Island single-occupant vehicle (SOV) traffic to the outer roadways, or by changing the HOV eligibility requirement to 3+ (3 or more occupants per vehicle), that would allow Mercer Island SOVs to retain use of the center roadway between Island Crest Way and Rainier Avenue S. In either case, peak-direction congestion levels on the I-90 outer roadways would increase.

- Volumes in the general-purpose lanes are expected to exceed 100 percent of available capacity during both peak periods and in both directions of travel. Traffic estimates anticipate over 9 hours of daily congestion on the corridor by the year 2025.

- Although there are no available estimates for future bicycle use on the shared-use pathway, demand is anticipated to grow as population grows in King County.

1.2.5 Social Demands or Economic Development

- Travel in transit and other higher occupancy modes must be made more attractive than driving alone to meet and support the objectives of the Metropolitan Transportation Plan, Sound Move, The Commute Trip Reduction Act, Washington State Growth Management Act, and other transportation and growth management policies of local and regional jurisdictions. Reduced use of single-occupant vehicles will also lead to lower regional contributions to traffic noise, air emissions, and energy consumption.

- HOV lanes encourage the use of transit and other higher occupancy modes by providing travel-time savings and increased reliability compared to travel in the general-purpose lanes.

- The lack of HOV lanes eastbound in the morning and westbound in the evening on I-90 is a barrier to providing safe and reliable east-west transit connections and improving transit ridership. If transit riders cannot depend on buses to arrive at their desired location on schedule, they will resort to using SOVs.

- Safe and reliable two-way transit and HOV lanes on I-90 are critical to the success of encouraging people to use transit or HOVs instead of their SOVs, thus improving mobility in the corridor and supporting economic development and the movement of freight.

1.3 PLANNING CONTEXT

Refer to Section 1.2.1 for further planning context on HOV and transit improvements, Chapter 2 on the development of alternatives, and Section 4.1 Land Use of this DEIS for further planning context details on the state, regional, and local levels.

1.3.1 Federal Legislation and Regulations

1.3.1.1 The National Environmental Policy Act of 1969 and its Regulations

The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4332(2)(c) and 49 U.S.C. 303) is the national charter for the protection of the environment. It establishes policy, sets goals and provides means for carrying out the policy. NEPA contains action-forcing provisions to ensure that federal agencies act according to the letter and spirit of the Act. The Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 CFR Parts 1500 to 1508) were developed as a guide to assist federal agencies in complying with the procedures and achieving the goals of the Act. FHWA/FTA NEPA and Section 4(f) regulations are found at 23 CFR Part 771.

1.3.1.2 Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966

Section 4(f) refers to the original section within the U.S. DOT Act of 1966 that set out the requirement for consideration of significant publicly-owned park and recreational lands, wildlife and waterfowl refuges, and historic sites during the development of federally financed transportation projects. The law, now codified in two places (49 USC 303 and 23 USC 138), is implemented by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) through regulations found at 23 CFR 771.135.

1.3.1.3 Clean Air Act of 1970 and Amendments

Regional transportation plans (and individual projects within those plans) must demonstrate conformity with the State Implementation Plan and Clean Air Act of 1970 for air quality. The criteria for conformity specify that a transportation activity cannot: 1) cause or contribute to any violation of the federal air quality standards; 2) increase the frequency or severity of any existing violation of the standards; or 3) delay timely attainment of the standards. The region's *Metropolitan Transportation Plan* (MTP) has been found to meet the conformity tests as identified by the federal and state conformity air quality regulations.

1.3.2 State Legislation and Regulations

1.3.2.1 State Environmental Policy Act

The State Environmental Policy Act (SEPA) was enacted in 1971 as chapter 43.21C RCW in order to ensure that environmental values are considered during decisionmaking by state and local agencies. The Revised Code of Washington (RCW) 43.21C.030(2)(c) provides that all branches of the state government, including state agencies, municipal and public corporations and counties, shall:

> *Include in every recommendation or report on proposals for legislation and other major actions significantly affecting the quality of the environment, a detailed statement by the responsible official on:*
>
> *(A) the environmental impact of the proposed action;*
>
> *(B) any adverse environmental effects which cannot be avoided should the proposal be implemented;*
>
> *(C) alternatives to the proposed action;*
>
> *(D) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and*
>
> *(E) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.*

RCW 43.21C.150 states that:

> *The requirements of RCW 43.21C.030(2)(c) pertaining to the preparation of a detailed statement by branches of government shall not apply when an adequate detailed statement has been previously prepared pursuant to the national environmental policy act of 1969, in which event said prepared statement may be utilized in lieu of a separately prepared statement under RCW 43.21C.030(2)(c).*

This combined NEPA/SEPA Final Environmental Impact Statement (FEIS) meets the requirements of RCW 43.21C and the SEPA rules set out in Chapter 197-11 WAC.

1.3.3 Local Regulations

1.3.3.1 Memorandum Agreement

The Memorandum Agreement was signed in December 1976 by the Cities of Seattle, Mercer Island, and Bellevue, King County, Metro, and the Washington State Highway Commission documenting the resolution of disputes which had surrounded the plans to construct an improved I-90 facility between I-405 and I-5. The Agreement documents the support of the signatories to the Agreement for the construction of a facility which will accommodate no more than eight motor vehicle lanes arranged with three general-purpose lanes in each direction between the

South Bellevue Interchange and I-5, and two lanes designed for and permanently committed to transit use. The design was to accommodate the operation of two transit lanes in either a reversible or in a two-way directional mode. The parties further agreed that the transit lanes shall operate initially in a two-way directional mode, at no less than 45 mph average speed, with the first priority to transit, the second to carpools, and the third to Mercer Island traffic, with the transit lane restricted to buses in the direction of minor flow.

Chapter 2 Alternatives Considered

Chapter 2 – Alternatives Considered

2.1 INTRODUCTION

The regional transit initiative approved by voters in the Puget Sound Region in 1996, now known as *Sound Move*, includes a high-occupancy vehicle (HOV) expressway and bus components that will substantially improve transit service and facilities in the region. This Sound Transit Regional Express I-90 project would make transit improvements on the I-90 corridor between Bellevue and Seattle crossing Lake Washington via Mercer Island.

The purpose of this Project is to improve regional mobility by providing reliable and safe two-way transit and HOV operations on I-90 between Bellevue and Seattle, while minimizing impacts to the environment and to other users and transportation modes. The primary goal of the Project is to improve speed, reliability and access for regional transit. The Project purpose was expanded by the Project partners to include improvements to travel by high-occupancy vehicles (e.g., carpools and vanpools) in the corridor.

The Project is guided by the I-90 Steering Committee made up of Sound Transit and representatives of the signatories of the 1976 Memorandum Agreement (MA) for I-90, WSDOT, King County/Metro Transit, Seattle, Bellevue and Mercer Island. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) representatives are also participants.

The study corridor encompasses the I-90 freeway between 4th Avenue S in Seattle and I-405 in Bellevue, a distance of approximately 8 miles. The termini for the Project are the western terminus of I-90 beginning at 4th Avenue S and the I-90 interchange with I-405. The present-day facility is comprised of three independent freeway alignments: three-lane eastbound and westbound outer roadways, and a two-lane, barrier-separated center roadway. The center roadway is commonly referred to as the I-90 express lanes and forms a portion of the region's HOV system. The eastern terminus for the center lane portion of the Project is at the connections to Bellevue Way SE and I-405 via HOV-only ramps.

The process of selecting and evaluating Project alternatives began in 1998 and has involved extensive analysis, refinement, and screening of potential alternatives. The primary means of selecting and evaluating the alternatives was through two screening processes and by the scoping process. These are described in detail below.

On July 15, 2003, the Steering Committee identified an alternative that would add HOV lanes on I-90 on the outer roadways as their Preferred Alternative. The Preferred Alternative, R-8A, is described in detail later in this chapter in Section 2.2.5. This alternative, R-8A, was identified by the Sound Transit Board as its Preferred Alternative on November 13, 2003.

Following completion of the FEIS, a decision on the project proposed to be implemented will be made by both the Sound Transit Board and the Washington State Transportation Commission. As the lead federal agency, FHWA will make a final decision as a part of the NEPA process to be included in its Record of Decision (ROD).

Key changes to this chapter of the EIS between the DEIS and this FEIS include: adding information on the identification of Alternative R-8A as the Preferred Alternative; the removal of widening of the Homer M Hadley (HMH) floating bridge from the descriptions of Alternatives R-5 Modified and R-8A; removing operational options for time-of-day operation of the outer roadway HOV lanes and managed lane operations of the center roadway for Alternative R-8A; and updated estimated construction costs for all alternatives based on a WSDOT value engineering study and cost estimating validation process completed in July 2003.

2.1.2 Early Identification of Alternatives

The early identification of alternatives was conducted in 1998. The initial list of alternatives considered are briefly summarized in Table 2-1 and described below the table:

Table 2-1
Summary of Initial List of Alternatives

Roadway Alternative	Outer Roadway (number of lanes)			Center Roadway (number of lanes)		
	General Purpose	HOV/ Transit	Transit Only	HOV/Transit MI SOV	HOV/ Transit	Transit Only
R-1 (existing)	3 WB 3EB	0	0	2 Reversible	0	0
R-2A	3 WB 3 EB	0	0	0	0	1 WB 1 EB
R-2B	3 WB 3 EB	0	0	0	1 WB 1 EB	0
R-2C	3 WB 3 EB	0	0	1 WB 1 EB		
R-3	2 WB 2 EB	1 WB 1 EB	0	0	0	1 WB 1 EB
R-4	3 WB 3 EB	1 WB 1 EB	0	0	0	1 WB 1 EB
R-5A	3 WB 3 EB	0	Reverse-peak Outer Shoulder Use	2 Reversible	0	0
R-5B	3 WB 3 EB	0	Reverse-peak Inner Shoulder Use	2 Reversible	0	0
R-6	3 WB 3 EB	0	0	1 WB 1 EB	0	1 Reversible
R-7A	3 WB 3 EB	1 WB 1 EB Open in reverse-peak direction during peak hours only	0	1 WB 1 EB	0	1 Reversible
R-7B	3 WB 3 EB	1 WB 1 EB Full-time	0	1 WB 1 EB	0	1 Reversible

Notes:
WB = westbound
EB = eastbound

Alternative R-1: Existing and No Build (3-2R-3): The two existing lanes on the center roadway would remain reversible, operating one-way westbound during the AM peak period and one-way eastbound at all other times. The three existing general-purpose lanes in each direction on the outer roadways would remain in operation. Subject to the terms of the MA, general-purpose traffic with origins or destinations on Mercer Island would continue to have access to the center roadway between the Island Crest Way interchange on Mercer Island and the Rainier Avenue S interchange in Seattle.

Alternative R-2: Two-way Center Roadway (3-2-3): The center roadway would be converted to two-way operation. Depending on traffic volumes and carpool definition, the center roadway could be operated as transit only (option R-2A), transit plus HOV (option R-2B), or open to transit, HOV and Mercer Island general purpose traffic (option R-2C). The outer roadways would remain in the existing physical and operational configuration.

Alternative R-3: Two-Way Center Roadway with Outer HOV Lane Conversion (3-2T-3): The center roadway would be converted to two-way, transit-only operation. Non-transit HOV traffic displaced from the center roadway would be provided with HOV lanes on the outer roadways, created by conversion of one existing general-purpose lane in each direction to an HOV lane. Two general purpose lanes would remain in operation in each direction on the outer roadways between the East Channel bridge and the Rainier Avenue S interchange. Mercer Island Traffic would be restricted to the two remaining general-purpose lanes between Island Crest Way and Rainier Avenue S.

Alternative R-4: Two-Way Center Roadway, Add Outer HOV Lanes (4-2T-4). The center roadway would be converted to two-way, transit-only operation. HOV traffic displaced from the center roadway would be provided with HOV lanes on the outer roadways, created by restriping the outer roadways to reduce shoulder, and possibly lane widths, to create a fourth, HOV-only lane in each direction between the East Channel bridge and the Rainier Avenue S interchange. Mercer Island traffic would be required to use the three general-purpose lanes in each direction between the Island Crest Way and Rainier Avenue S interchanges.

Alternative R-5A: Reversible Center Roadway, Reverse-Peak Direction Transit-Only Shoulder Lane – Outside Shoulder (4-2R-3): The center roadway would remain a reversible, two-lane, one-way roadway. Reverse-peak direction transit buses would be allowed to use the outside (right) shoulder on the outer roadways—eastbound during the AM peak period and westbound during the PM peak period. This may require provisions to increase the width of the outer shoulders, such as restriping the outer roadways to reduce lane and/or inside shoulder widths. No change would occur to existing use of the center roadway by carpool and/or Mercer Island general-purpose traffic.

Alternative R-5B: Reversible Center Roadway, Reverse-Peak Direction Transit-Only Shoulder Lane – Inside Shoulder (4-2R-3): The center roadway would remain a reversible, two-lane, one-way roadway. Reverse-peak direction transit buses would be allowed to use the inside (left) shoulder on the outer roadways, eastbound during the AM peak period and westbound during the PM peak period. This would require restriping the lanes on the outer roadways to increase the width of the inside shoulders, or provisions for lane-control signals to allow use of the outside shoulder by general-purpose traffic during peak periods. No change

would occur to use of the center roadway by carpool and/or Mercer Island general-purpose traffic.

Alternative R-6: Three Lane Center Roadway (3-3-3): The center roadway would be converted to two-way operation, with a third reversible lane created within the existing center roadway envelope by reducing shoulder and possibly lane widths. Opposing traffic would be separated by a moveable barrier, creating two westbound lanes during the AM peak period and two eastbound lanes during the PM peak period. Depending on traffic volumes and the carpool definition, the two peak-direction lanes on the center roadway could be operated as transit-only, transit plus carpools/vanpools, or open to Mercer Island general purpose traffic between Island Crest Way on Mercer Island and Rainier Avenue S in Seattle. The single reverse-peak direction lane in the center roadway would most likely be transit-only. No changes would occur to the outer roadway.

Alternative R-7A: Three-Lane Center Roadway with Peak Period Four-Lane Outer Roadway (4-3-4): The center roadway would be converted to two-way operation, with a third reversible lane created within the existing center roadway envelope by reducing shoulder and possibly lane widths. Opposing traffic would be separated by a moveable barrier, creating two westbound lanes during the AM peak period and two eastbound lanes during the PM peak period. Depending on traffic volumes and the carpool definition, the two peak-direction lanes on the center roadway could be operated as transit-only, transit plus carpools/vanpools, or open to Mercer Island traffic between Island Crest Way and Rainier Avenue S. The single reverse-peak direction lane in the center roadway would most likely be transit-only. The outer roadways would be restriped, reducing shoulder and possibly lane widths, to create a fourth lane in each direction. This fourth lane would only be open during peak periods, in the reverse-peak direction, to HOV traffic. Lane control signals would be used to control use of the lanes in the outer roadways-outside of the peak periods, the fourth lane in each direction would be available for use as a "breakdown" shoulder.

Alternative R-7B: Three-Lane Center Roadway with Full-Time Four-Lane Outer Roadway (4-3-4): The center roadway would be converted to two-way operation, with a third reversible lane created within the existing center roadway envelope. Opposing traffic would be separated by a moveable barrier, creating two westbound lanes during the AM peak period and two eastbound lanes during the PM peak period. Depending on traffic volumes and the carpool definition, the two peak-direction lanes on the center roadway could be operated as transit-only, or with transit plus carpools/vanpools. The most likely operation of the single reverse-peak direction lane in the center roadway would be transit-only. The outer roadway would be restriped, reducing shoulder and possibly lane widths, to create a fourth lane in each direction. The fourth lane would be open to general-purpose traffic in the peak direction, providing capacity for Mercer Island traffic, and would be restricted to HOV traffic in the reverse-peak direction.

2.1.3 Initial Public Review of Alternatives

Two public open houses were held in the fall of 1998, on October 8 and October 29, to gather public comment on the initial list of alternatives. More than 210 members of the community as well as representatives from Sound Transit, the City of Mercer Island, Washington State

Department of Transportation, King County/Metro Transit, and the consulting team attended the open houses. The majority of open house attendees were residents of Mercer Island. Of the 210 community members, 57 completed questionnaires, and many registered their comments on paper flip charts next to all displays. The single most important issue to Open House attendees (on nearly every written comment) was maintaining Mercer Island single-occupancy vehicle (SOV) access to the center lanes. Illegal use of the SOV access by non-Mercer Islanders also drew many complaints (6). The attendees expressed a general dislike of "transit-only" lanes in the center roadway, and nine people specifically opposed any alternative that did not include Mercer Island SOV access to the center lanes.

2.1.4 The First Screening

The purpose of the screening exercise in the fall of 1998 was to prepare a list of reasonable alternatives that would be able to meet the Project's purpose and need (refer to Chapter 1 of this FEIS). The alternatives listed above were screened against the following criteria:

Consistency with Plans and Policies

- Identified purpose and need for the Project
- Provisions of the I-90 Memorandum Agreement
- City of Mercer Island Comprehensive Plan and related documents
- Metropolitan Transportation Plan
- Countywide Comprehensive Plan

Geometric Feasibility

- Satisfy Local, State, and/or Federal requirements

Environmental Compatibility

- Meet physical and natural environmental requirements without the need for substantial mitigation

Social/Economic/Land Use

- Business impacts
- Neighborhood/resident impacts
- Local mobility-circulation

Transportation

- Local mobility – freeway access
- Regional mobility
- Safety
- Freeway operations
- Transit operations
- Capacity to meet demand
- Maintenance requirements

Public Opinion

- Local support on Mercer Island
- Regional/State support

Financial Viability

- Whether or not the alternative's cost is likely to be viable within the budget available from Sound Transit and participating agencies.

Compatibility with Other Components

- The alternative matches well with other components of the future I-90 corridor.

2.1.4.1 Results of the First Screening

The alternatives were then rated on a qualitative three-point scale against each of the criteria and sub-criteria described above. The results of the initial screening for consistency with local plans, environmental compatibility and potential impacts on social, economic or land use are shown in Table 2-2. Public opinion ratings are based on the comments gathered at the October 1998 Open House. As described above, the single most important issue to attendees was maintaining Mercer Island SOV access to the center lanes, along with a general dislike of "transit-only" lanes in the center roadway.

Table 2-2
Screening Results for Plan Consistency, Environmental Compatibility and Social/Economic/Land Use and Public Opinion

Roadway Alternative	Consistency with Plans (of 15 pts)	Environmental Compatibility (of 3 pts)	Social/ Economic/ Land Use (of 9 pts)	Public Opinion (based on October 1998 Open House)
R-1	9	3	9	Satisfactory
R-2	13.5	3	9	R-2A and R-2B considered unsatisfactory
R-3	12	3	9	Unsatisfactory
R-4	15	3	9	Unsatisfactory
R-5A	15	3	9	Satisfactory
R-5B	15	3	9	Satisfactory
R-6	15	3	9	Unsatisfactory if no Mercer Island SOV
R-7A	15	3	9	Unsatisfactory if no Mercer Island SOV
R-7B	13.5	3	9	Unsatisfactory if no Mercer Island SOV

Based on the preliminary information used for screening, none of the alternatives were found to be environmentally incompatible, nor would any cause social, economic or land use impacts. Public opinion, based on the attendees at the October 1998 Open House, was weighted against any alternative that did not maintain Mercer Island SOV access to the center roadway.

The screening results for geometric feasibility, transportation, financial viability, and compatibility with other future components such as transit station and park-and-ride

improvements are shown on Table 2-3. Based on these screening results, recommendations were made as to which alternatives should be carried forward for additional study.

Table 2-3
Screening Results for Geometric Feasibility, Transportation, Financial Viability, and Compatibility with Other Components

Roadway Alternative	Geometric Feasibility (of 3 pts)	Transportation (of 21 pts)	Financial Viability (0f 3 pts)	Compatibility with Other Components (of 3 pts)	Recommended to be Carried Forward?
R-1	3	16.5	3	1.5	Yes
R-2	1.5	12	3	3	Yes
R-3	3	6	3	3	No
R-4	0	9	3	3	No
R-5A	1.5	13.5	3	3	Yes
R-5B	1.5	13.5	3	3	Yes, westbound
R-6	0	10.5	1.5	1.5	No
R-7A	0	9	1.5	1.5	No
R-7B	0	7.5	1.5	1.5	No

Alternative R-3 was eliminated given that it would have severe operational problems on the outer roadways. Alternative R-4 was eliminated because it would have narrow shoulder widths and reduced stopping sight distances that would create safety concerns. Alternative R-6 was eliminated because it compromised the design standards required for a three-lane center roadway. Alternatives R-7A and R-7B were eliminated because of concerns relating to road geometry, safety, and operation.

2.1.4.2 Alternatives Remaining after the First Screening

Alternatives R-1, R-2 (options R-2A, R-2B, and R-2C), and R-5 were selected for further evaluation. For Alternative R-5, options A (outside transit shoulders) and B (inside transit shoulders) were combined into a single alternative before being evaluated again.

Table 2-4
Alternatives Remaining After First Screening to Go Forward

Roadway Alternative	Recommended to be Carried Forward?
R-1 (existing)	Yes
R-2A (2-way center transit only)	Yes
R-2B (2-way center HOV and transit)	Yes
R-2C (2-way center HOV, transit and MI SOV)	Yes
R-5 (use of shoulder in outer roadway for transit)	Yes

2.1.5 The Second Screening

A second level of screening that included development of conceptual roadway design plans, traffic operations analyses, and environmental analyses for Alternatives R-1, R-2, and R-5 was undertaken throughout 1999 and 2000.

2.1.5.1 Public Scoping for Environmental Assessment

In February 1999, the Steering Committee made a recommendation to FHWA and FTA that they proceed with the preparation of a NEPA Environmental Assessment for the roadway and transit station improvements. Scoping notices were published by FHWA and FTA and an agency scoping meeting was held on March 11, and public meetings were held in March 1999 in Mercer Island and Bellevue, and April 1999 in the Mount Baker neighborhood of Seattle. At the Mercer Island meeting, attendees expressed general favor for Alternative R-5 and had some concerns about Alternative R-2 if Mercer Island SOV would not have access to the center roadway. The turnout was low at both the Bellevue and Mount Baker meetings and most people came to the meeting to review the information on alternatives or to ask for clarification on how the various alternatives would operate. At Mount Baker, concern was expressed that the Rainier Avenue S ramp remain as it currently exists.

On October 26, 1999 an Open House was held on Mercer Island to provide the public with updated information on the roadway alternatives. Fifty-five people attended and 17 filled out comment forms. Of the people who wrote comments, 5 "strongly preferred" Alternative R-5, and 3 "strongly preferred" R-1 (existing conditions) or R-2B (transit and HOV in center roadway). When asked whether any alternatives were "completely unsatisfactory", 5 people responded R-2A (transit only) and 4 responded R-1 (existing).

2.1.5.2 Continued Screening by Consultant Team and WSDOT Staff

Results of the traffic operations analyses indicated that operational options R-2A (transit only) and R-2C (existing restrictions) could be eliminated from further consideration due to severe congestion in the outer roadways with R-2A, and congestion problems in the center roadway with R-2C.

WSDOT convened an internal focus team to investigate widening options and other enhancements for Alternatives R-2B and R-5, and to identify any other alternatives that might be considered if previously-assumed construction budget and other constraints were relaxed. WSDOT reported its findings to the Steering Committee in August and September 2000 and recommended a third alternative be added that would add a fourth lane to each of the outer roadways for transit and HOV use. This alternative was named Alternative R-8.

Three build alternatives emerged out of this process, as described below.

Alternative R-2B Modified – This alternative was proposed to address operational concerns in the center roadway, related to a proposed roadway envelope of 19 feet in each direction, that would restrict the ability to pass disabled vehicles in the center roadway and affect reliability of the center roadway. The focus team suggested additional widening across Mercer Island with modifications to the westbound/center floating bridge.

Alternative R-5 Modified – Enhancements to the westbound transit shoulder operation, including ramp modifications at Bellevue Way SE and 80th Avenue SE, were added to this alternative to improve its performance for transit operations. Additional widening was also proposed in both of the outer roadways to mitigate the effects of lane and shoulder width reductions that would accompany Alternative R-5.

Alternative R-8A – The focus team developed a third build alternative. This alternative would add a fourth lane in the outer roadways, as existed westbound during an interim I-90 operation circa 1989-1993, to better balance existing and anticipated traffic demands. In response to evaluations of this alternative that occurred during the first half of 2000, the alternative was further modified (R-8A) to provide a wider westbound inside shoulder across the floating bridge to address concerns related to the ability to respond to incidents on the outer roadways. The fourth lane on the outer roadways would be for HOV use.

2.1.5.3 Public Review of Alternative R-8A

On October 17, 2000, an open house was held on Mercer Island, the central location of the project, to gather public comments on the new alternative. The open house featured graphic displays of the four remaining alternatives (R-1, R-2B Modified, R-5 Modified and R-8A), with staff from Sound Transit, WSDOT, the City of Mercer Island and the consultant team present to discuss the benefits and effects of the alternatives. Over 100 people attended, and 66 people filled out comments forms that night, and another 40 were mailed into to Sound Transit after the open house. The majority showed a preference for Alternative R-8A, which adds an additional HOV lane in each of the outside lanes. Those not in favor of this alternative voiced a concern that Alternative R-8A could have an impact on the existing shared-use pathway on the north side of the floating bridge. The other major concern was heard from Mercer Island residents who opposed Alternative R-2B Modified because it would eliminate Mercer Island SOV access to the center roadway.

2.1.5.4 Further Revisions to Alternative R-8A

Incremental widening was proposed to mitigate the effects of reduced lane and shoulder widths that would be required with this alternative. This included a proposal to widen the north floating bridge by 2 feet in order to maintain the existing 10 foot width of the shared-use pathway in response to comments from pathway users.

Additional analyses of operational and safety issues throughout the year 2001 resulted in the incorporation of crash reduction measures into all of the Build Alternatives.

2.1.5.5 Steering Committee Recommendation to Proceed with Environmental Impact Statement

In July 2001, the Steering Committee recommended proceeding with the preparation of NEPA/SEPA Environmental Impact Statement (EIS). A decision was made by the lead agencies (Sound Transit and WSDOT for SEPA, and FHWA and FTA for NEPA) to proceed with an EIS for the roadway alternatives only. The preliminarily recommended transit station location was its existing location, and would not be affected by any of the proposed roadway alternatives. The review of transit station alternatives was deferred until a decision had been made on the location of park-and-ride improvements.

2.1.6 EIS Scoping

The public scoping process was initiated in the fall of 2001 to inform the public, interest groups, affected tribes and government agencies about the EIS, and presents the proposed actions, alternatives and environmental impacts for review and comment. The alternatives that remain and that were brought to the scoping process are:

- **R-1:** Existing/No Build.
- **R-2B Modified:** Two-way center roadway with incremental roadway widening.
- **R-5 Restripe:** Transit-only use of outer shoulders on outer roadway, eastbound in the morning peak period, westbound in the evening peak period. The reversible center roadway operation would be maintained.
- **R-5 Modified:** Transit-only use of shoulders on outer roadway as above, outside shoulder eastbound, inside shoulder westbound, with incremental roadway widening in both directions. The reversible center roadway operation would be maintained.
- **R-8A:** Add HOV lanes on outer roadway, with restriping and incremental roadway widening, maintain reversible center roadway.

Approximately 400 comment letters were received during the scoping process (up until January 23, 2002). Public agencies, several organizations and members of the public commented on the scope of the EIS, offering suggested changes to alternatives and proposing issues to be analyzed in the EIS. Of the letters received, 87 percent included comments about the shared-use pathway on I-90. The letters expressed concerns about potential impacts to the path, noted the importance of the path for bicyclists and pedestrians, supported retaining the current width or provided other comments supporting retention of the path and bicycling as a transportation alternative. A few letter writers noted the path was not a priority to them or that the path could be made narrower to allow for additional roadway. Other issues cited in comment letters included impacts related to roadway alternatives, safety impacts due to narrowing the width of the travel lanes and shoulders, impacts of the Project on other freeways and streets, affects on bus travel times and general traffic congestion, and other environmental impacts.

The comments were divided by subject: roadway alternatives, the shared-use pathway, and the environmental and social criteria to be used in the EIS. Comments on Alternative R-2B Modified were generally favorable, and this alternative was seen as the least expensive and quickest alternative to implement. It was also seen as preserving the existing shared-use pathway and making greater use of transit lanes. Some saw Alternative R-5 Restripe as the best alternative as they believed it would solve the transit problem, would not add general purpose traffic lanes, and would have a reasonable cost. Others believed that Alternative R-5 Modified would move transit faster.

Alternative R-8A drew almost an equal number of comments in favor and opposed. Those in favor expressed a belief that now is the time to get the most capacity out of the roadway, that R-8A would provide more access for Mercer Island residents, and would add HOV capacity.

Those opposed saw adding more lanes as adding more pollution and noise, and having negative impacts to the users of the shared-use pathway.

Comments on the alternatives included a recommendation that an additional alternative be evaluated in the EIS that had a mixture of elements from more than one of the existing alternatives. In particular, to combine an R-2B treatment in the center roadway combined with an R-8A treatment for HOV in the outer roadway. Support was expressed for achieving full-time two-way HOV traffic flow, without extensive narrowing of the general purpose lanes. Because this combination of features would primarily address the potential congestion impacts of Alternative R-2B Modified, it has been treated in this EIS as a potential mitigation measure for Alternative R-2B Modified. This discussion is included in Chapter 5 - Comparison of Alternatives of this FEIS.

Comments on the pathway included concern over potential narrowing of the existing 10-foot path, traffic being brought closer to the pathway due to reductions in shoulder and travel lane width, and wind and debris effects. As described in Section 2.2, Alternatives R-5 Modified and R-8A would maintain the existing 10-foot pathway width by reducing the proposed westbound roadway width by 2 feet. Various design measures are being considered to address the wind and debris effects (see Section 3.4 Pedestrian/Bicycle Access in Chapter 3 - Transportation of this FEIS).

To address comments asking that the Project encourage alternatives to SOV use, an analysis of transportation system management (TSM) and transportation demand management (TDM) is included within Chapter 3 to identify whether additional funding of transit and park-and-ride alternatives would result in fewer SOVs in the I-90 corridor. The cumulative effects of improvements on SR 520 and I-405 have also been reviewed (see Section 4.16 Secondary and Cumulative Effects).

Noise levels from the various alternatives have been modeled along with an evaluation of the effectiveness of mitigation measures (see Section 4.5 Noise).

2.2 DEFINITION OF ALTERNATIVES EVALUATED IN THE EIS

Five alternatives are evaluated in this FEIS. For each alternative, modifications to I-90 roadway operations and the physical configuration of I-90 and associated facilities are described. All of the alternatives assume the same transit service levels. Refer to the summary for a summarized listing of impacts for each alternative and to Chapter 5 for a comparison of the impacts of the alternatives.

2.2.1 Alternative R-1: Existing/No Build

2.2.1.1 I-90 Roadway Operations

Between Seattle and Bellevue, I-90 currently operates with three general purpose lanes in each direction, and a two-lane reversible center roadway. The center roadway, also referred to as the I-90 express lanes, operates westbound from 1:30 AM to 12:30 PM weekdays, and eastbound from 2:00 PM to 12:15 AM on weekends, and eastbound on weekends. The center roadway is

restricted to high-occupancy vehicles (HOVs) with two or more occupants (HOV 2+) east of Island Crest Way and west of Rainier Avenue S. Between Rainier Avenue S in Seattle and Island Crest Way on Mercer Island, single-occupant or general purpose vehicles are permitted to use the center roadway.

Alternative R-1 would not involve any roadway modifications or construction apart from those required for preservation and maintenance of the corridor. The Puget Sound Regional Council Regional Travel Demand Forecasting Model was used to forecast future conditions for all the alternatives. The model included committed improvements by agencies within the region. No additional capacity expansion was assumed on I-90, SR 520, or I-405. It was assumed that Phase I of the SR 519 project would be completed by 2005, and Phase II by 2025. Transit improvements included Sound Transit Phase I plus committed service levels by Sound Transit, King County and other transit agencies.

Two operational scenarios have been evaluated for design analysis year (2025) conditions for Alternative R-1. These scenarios examine variations in operation of the center roadway and in regional HOV lane eligibility requirements. The requirement to consider operational changes to the I-90 center roadway was set out in the terms of the 1976 Memorandum Agreement between WSDOT and Mercer Island. The Memorandum Agreement states that operational changes should be considered when travel times for transit and HOV vehicles on the center roadway fall below the speed of the road and reliability criteria outlined in the agreement. Based on an assessment of traffic growth, operational changes triggered by these criteria could be required between 2005 and 2010.

The two operational scenarios considered for Alternative R-1 are as follows:

- *Option R-1A* – This operation scenario would continue the current reversible operations of the center roadway, allowing transit, high occupancy vehicles with two or more occupants (HOV 2+) and Mercer Island general purpose (GP) traffic in center roadway.

- *Option R-1D* – This operation scenario would allow transit, HOVs with three or more occupants (HOV 3+), and Mercer Island GP in the center roadway.

WSDOT would continue to manage the corridor as it does today, with a range of Intelligent Transportation Services (ITS) that include ramp metering, traffic surveillance and control, and driver information systems. Incident response teams are a priority and would continue to be dedicated to I-90 at current levels of staffing. Trucks carrying flammable loads would continue to be allowed through the Mount Baker Ridge tunnels and First Hill lid.

Two other operational scenarios were evaluated but not carried forward into the FEIS analyses. Both assume that a center roadway operational change would be implemented prior to the design analysis year of 2025, as described above. Both would retain the existing reversible operation.

- Option R-1B would continue HOV 2+ operations in the center roadway, but would eliminate use of the center roadway by Mercer Island single-occupant vehicles.

- Option R-1C would only allow HOV 3+ traffic in the center roadway, and would also eliminate use of the center roadway by Mercer Island single occupant vehicles. Outer roadway congestion would increase with either of these options.

Using forecasts of year 2020 traffic, person hours of travel were calculated for Options R-1B, R-1C, and R-1D. These values indicated that congestion levels would by lowest with Option R-1D. Relative to Option R-1D, which is evaluated in the FEIS, total person hours of travel would be approximately 20-25 percent higher with Option R-1B, and 25-30 percent higher with Option R-1C.

Flammable loads would continue to be allowed through the Mount Baker Ridge tunnels and First Hill lid. WSDOT would continue to use a range of Intelligent Transportation Systems (ITS) services in managing the corridor, including provisions for incident response teams dedicated to I-90. Currently (spring 2004), two incident response trucks respond to and assist in clearing accidents and vehicles which have broken down during the AM and PM peak periods. The second truck is funded through the end of the current biennium, e.g., June 2004. Maintaining funding for incident response is a priority for WSDOT. With additional funding beyond that currently provided by the state legislature, WSDOT would expand incident response team activities east to Issaquah on I-90, and as congestion levels increase, would evaluate expansion of service to mid-day periods.

2.2.1.2 Roadway Modifications

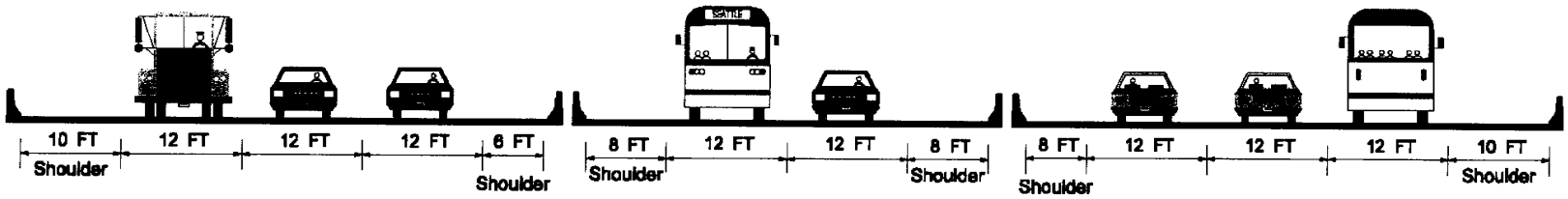
With the exception of the western terminus of the corridor, Alternative R-1 would not result in any physical modifications to the I-90 roadways or ramps between Seattle and Bellevue. WSDOT's SR 519 project, which broke ground for first phase construction in the spring of 2001, is now operational, provides a revised configuration of the 4th Avenue S ramps that feed the I-90 outer roadways west of I-5, and a grade-separated roadway for east- and westbound traffic on Atlantic Street to 1st Avenue S. Eastbound traffic passes through a new interchange on 4th Avenue S at Atlantic Street. When the SR 519 project is completed in its entirety, a grade-separated roadway for westbound traffic will be created over Royal Brougham Way.

Alternative R-1 would include activities required for preservation and maintenance of the corridor. These activities could include pavement and bridge deck rehabilitation, landscaping renovation, ITS upgrades, channelization and signing renewal, and heavy maintenance activities associated with the mechanical, electrical, and fire protection systems for the Mount Baker Ridge tunnels and lid, and the First Hill lid.

A typical cross section of the I-90 roadway for the Alternative R-1 is shown in Figure 2-1. On the floating bridges, shown in Figure 2-2, a similar cross section is provided except that a 10-foot wide shared-use pathway is carried on the HMH floating bridge, along with the westbound and center roadways.

As can be seen in Figure 2-1, I-90 typically provides three 12-foot wide traffic lanes, the standard lane width for interstate highways, throughout the corridor. The only exception is in the north bore of the original Mount Baker Ridge tunnels, where two existing eastbound travel lanes are 10.5 feet wide.

MORNING PEAK PERIOD

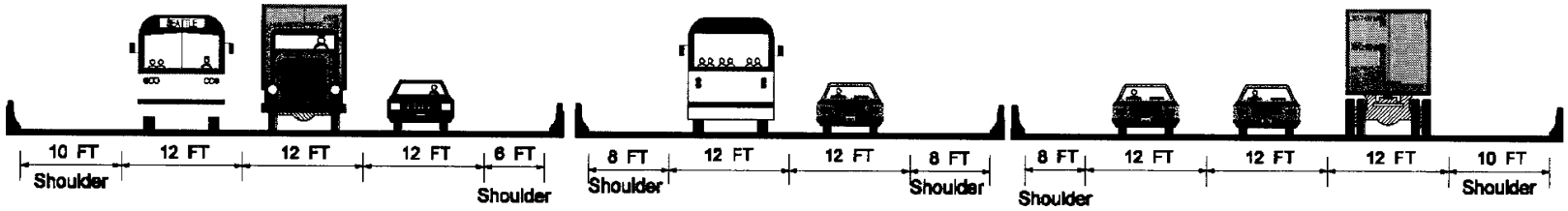


AM-Westbound to Seattle
Three Lane Outer Roadway

Reversible Center Roadway
AM-Inbound to Seattle
(Westbound)

AM-Eastbound to Eastside
Three Lane Outer Roadway

AFTERNOON PEAK PERIOD



PM-Westbound to Seattle
Three Lane Outer Roadway

Reversible Center Roadway
PM-Outbound From Seattle
(Eastbound)

PM-Eastbound to Eastside
Three Lane Outer Roadway

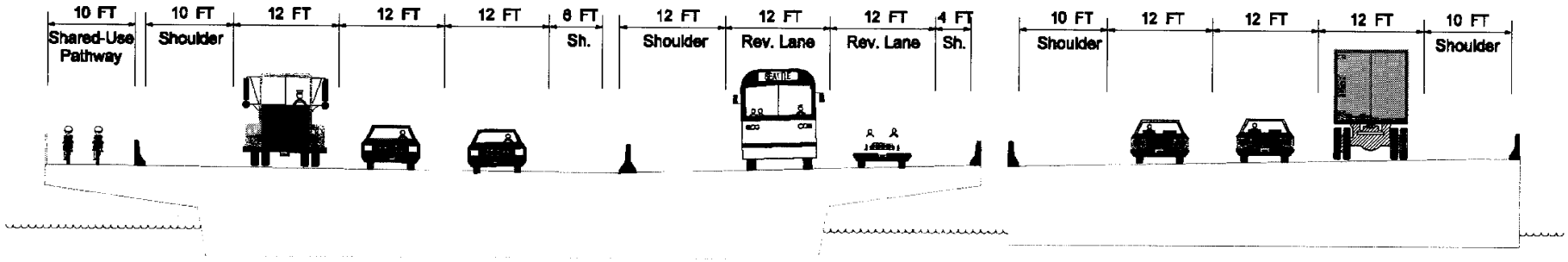
U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

Washington State
Department of Transportation

SOUNDTRANSIT

Figure 2-1
Alternative R-1
Existing/No Build on Roadway

MORNING PEAK PERIOD

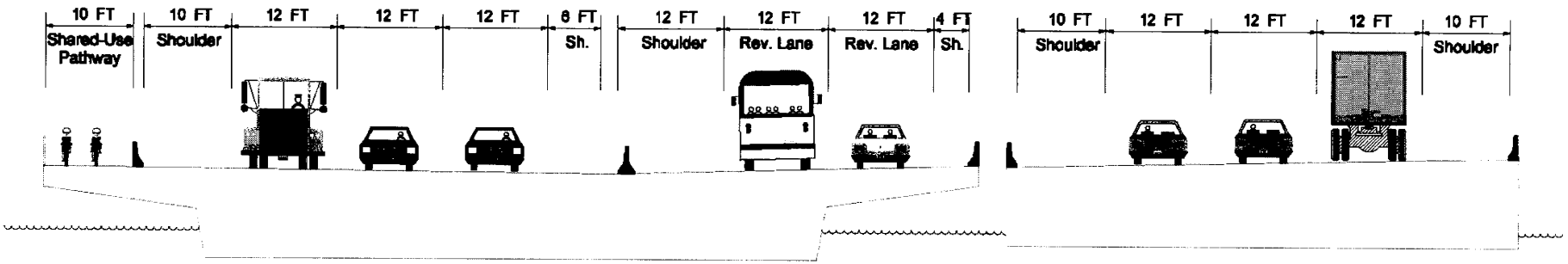


AM-Westbound to Seattle
Three Lane Outer Roadway

Reversible Center Roadway
AM-Inbound to Seattle
(Westbound)

AM-Eastbound to Eastside
Three Lane Outer Roadway

AFTERNOON PEAK PERIOD



PM-Westbound to Seattle
Three Lane Outer Roadway

Reversible Center Roadway
PM-Outbound From Seattle
(Eastbound)

PM-Eastbound to Eastside
Three Lane Outer Roadway

U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

Washington State Department of Transportation

SOUNDTRANSIT

Figure 2-2
Alternative R-1
Existing/No Build on Floating Bridges

The inside shoulder widths on the outer roadways would remain a minimum of 6 feet wide, with the exception of the twin bores of eastbound Mount Baker Ridge tunnel. Per the WSDOT *Design Manual*, on existing interstate highways of six or more lanes, existing 6-foot left shoulders may remain when no other widening is required (Figure 440-4, *Design Manual*, WSDOT, 2001).

The outside shoulders on the outer roadways would remain 10 feet wide, with the exception of the north bore of eastbound Mount Baker Ridge tunnels, where the shoulder width is between 1 and 1.5 feet wide. Shoulder widths on the center roadway would remain at the existing typical width of 8 feet.

Alternative R-1 would have stopping sight distances that would not meet current standards for a design speed of 60 mph according to the "Existing Stopping Sight Distance" values provided in the WSDOT *Design Manual* (Figure 650-3, *Design Manual*, WSDOT, 1999). The exceptions to a 60 mph design speed due to available stopping sight distance would be located at the Corwin curves and the First Hill lid.

2.2.2 Alternative R-2B Modified: Two-Way Center Roadway

2.2.2.1 I-90 Roadway Operations

With Alternative R-2B Modified, the center roadway would be changed to two-way operation 24 hours per day, seven days per week, and only transit and HOV traffic would be able to use the center roadway. The HOV eligibility requirements would likely be changed from 2+ occupants per vehicle in the year of opening to 3+ occupants per vehicle by the year 2025. Managed lane operation of the center roadway was also considered, which would increase utilization of the center roadway by allocating excess capacity that would exist with HOV 3+ operation to other users through use of tolling or other management techniques. Transit operators may elect to require transit buses to operate at reduced speeds in portions of the center roadway that would have reduced sight distances, as occurs today on the D2 Roadway west of the Mount Baker Ridge tunnels.

Alternative R-2B Modified would incorporate crash reduction measures, including the following:

- Speed management
- Enhanced delineation and signing, including
  - Delineation
  - Static signs
  - Variable message signs
- Enhanced incident management program

In the center roadway, posted speeds would be reduced to 50 mph. The outer roadways would continue to operate as they do currently, without restrictions for flammable loads in the tunnels and lids. Variable speed limits would be implemented throughout the corridor as a part of the speed management crash reduction measure noted above. During off-peak periods, the existing 60 mph posted speed would likely remain in effect.

2.2.2.2 Roadway Modifications

Modifications would need to be made to the I-90 roadway in order to facilitate the operational changes described above. The required modifications are described below by roadway section. Except as noted below, the center roadway would be 19 feet wide in each direction, typically striped with a 2-foot wide inside shoulder, a 12-foot wide travel lane, and a 5-foot wide outside shoulder (Figure 2-3). Modifications to roadway drainage systems would also occur throughout the corridor.

- *Seattle, I-5 to Mount Baker Ridge*: A median barrier would be added to the center roadway to allow for two-way operation. The new barrier would extend east from the end of the existing center roadway median barrier in the vicinity of Rainier Avenue S, providing a nominal roadway envelope 19 feet wide in each direction. Outside shoulder widths in the center roadway would be reduced from the existing 8 feet to 5 feet with Alternative R-2B Modified. No modifications would be made to the outer roadway.

- *Homer M Hadley (HMH) Floating Bridge (westbound lanes and center roadway):* A median barrier would be added to the center roadway to allow for two-way operation (Figure 2-3). No modifications would be made to the outer roadway, or to the shared-use pathway on the north side of the bridge.

  Design options are under consideration that would incorporate a narrower profile barrier in the center roadway. The narrower barrier would facilitate pontoon maintenance hatch access by increasing the roadway envelope width in the westbound direction by at least one foot, which would move the westbound travel lane off of the hatches. One option under discussion for this location would be to reduce the width of the eastbound center roadway to allow provisions for a maintenance shoulder in the westbound center roadway. The moveable capability of the narrow profile barrier could also be used to advantage at this and other corridor locations to facilitate incident response activities in the center roadway with Alternative R-2B Modified.

- *Lacey V Murrow (LVM) Floating Bridge (eastbound lanes):* No modifications would be made to the eastbound outer roadway, which currently provides three 12-foot wide travel lanes (Figure 2-3). The outside shoulder would remain 10 feet in width. The inside shoulder varies in width from 6 feet on the approaches, to 10 feet on the central portion of the bridge.

- *Mercer Island/First Hill Lid:* A median barrier would be added to the center roadway and the roadway would be restriped to allow for two-way operation. No roadway widening would occur within this corridor section. Within the First Hill lid, the eastbound center roadway would be 23 feet wide to provide increased sight distance on the inside of the an existing horizontal curve. No modifications would be made to the outer roadway.

- *Mercer Island CBD:* A median barrier would be added to the center roadway to allow for two-way operation. No roadway widening would occur within this corridor section. Two center roadway off-ramps would be constructed (east bound to 77th Avenue SE and westbound to 80th Avenue SE). No modifications would be made to the outer roadways.

- *Mercer Island/Shorewood*: A median barrier would be added to the center roadway. Within this section, the center roadway would be widened 4 to 6 feet on each side to provide a 10-foot wide shoulder in each direction, for a total roadway envelope of 24 feet in each direction. No modifications would be made to the outer roadways.

- *East Channel Bridge/Bellevue/Bellevue Way SE/I-405*: A median barrier would be added to the center roadway to allow for two-way operation. On the East Channel bridge, the existing median barrier between the center and eastbound roadways would be relocated 6 feet to the south, allowing for 22-foot wide roadway envelopes in each direction in the center roadway. The Bellevue Way SE ramp would be modified to allow for two-way operation, adding a concrete median barrier and widening the ramp by 4 to 20 feet. No modifications would be made to the outer roadways, or to the existing shared-use pathway on the north side of the East Channel bridge.

Typical cross sections of the I-90 roadway for Alternative R-2B Modified are shown in Figure 2-3.

2.2.3 Alternative R-5 Restripe: Transit-Only Shoulders on Outer Roadway

2.2.3.1 I-90 Roadway Operations

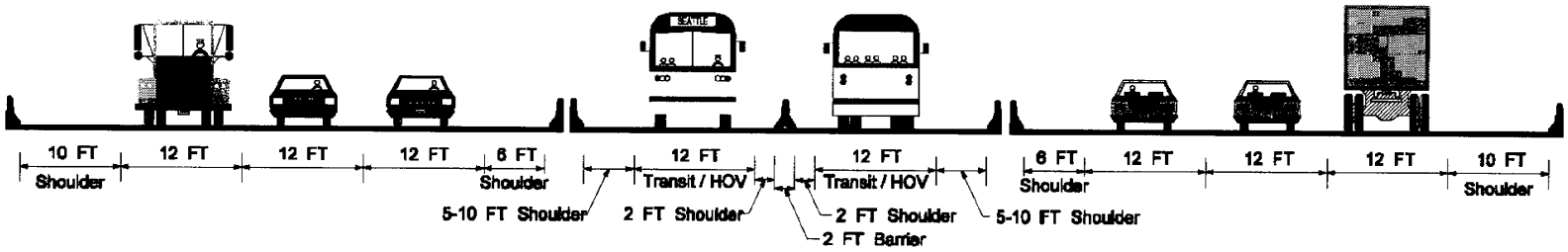
With Alternative R-5 Restripe, the existing reversible operations in the center roadway would be maintained, with both lanes operating in the same direction. The portions of the center roadway restricted to HOV traffic would likely operate with 2+ occupants per vehicle.

Transit-only shoulders would be created in both I-90 outer roadways for use by transit buses. Transit buses would use the shoulders when traffic in the outer roadways is moving at speeds of less than 35 to 45 mph. Bus drivers would not be required to use the shoulder but would be allowed to use the shoulder at their discretion. Transit operators may opt not to use the transit-only lanes due to the difficult weaving movements required to access the lanes.

33750973_21.cdr

Roadway

MORNING AND AFTERNOON PEAK PERIOD



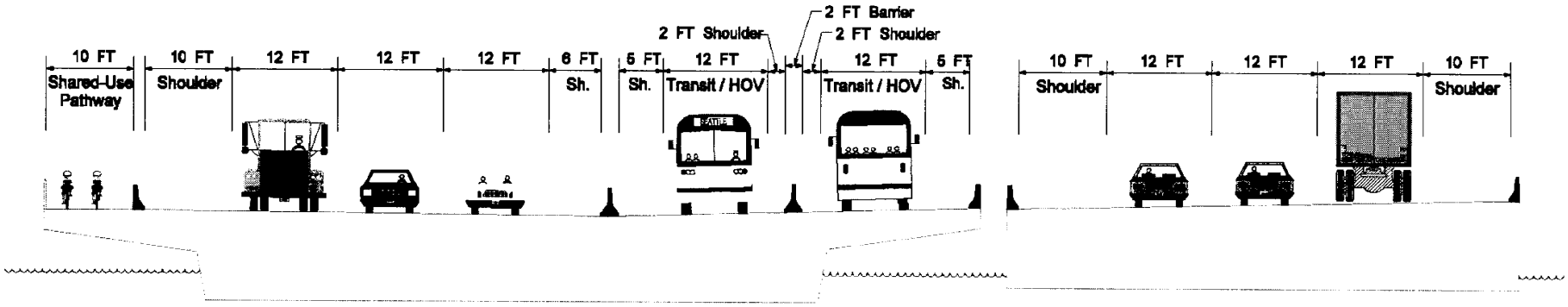
Westbound to Seattle
Three Lane Outer Roadway

Two-Way Center Roadway
(Widen 2 - 4 Feet)

Eastbound to Eastside
Three Lane Outer Roadway

Floating Bridges

MORNING AND AFTERNOON PEAK PERIOD



Westbound to Seattle
Three Lane Outer Roadway

Two-Way Center Roadway

Eastbound to Eastside
Three Lane Outer Roadway

U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

Washington State Department of Transportation

SoundTransit

Figure 2-3
Alternative R-2B Modified
Two-Way Center Roadway and Floating Bridges

Based on predicted operating speeds for traffic in the outer roadways, and on maximum speeds for transit buses (based on available sight distance in portions of the corridor), the transit shoulder would operate during the following hours:

- Eastbound–AM Peak Period

  Year of Opening: ..... 6:30 AM to 9:00 AM
  Design Year (2025): ..... 6:30 AM to 10:30 AM

- Westbound–PM Peak Period

  Year of Opening: ..... 2:00 PM to 7:00 PM
  Design Year (2025): ..... 2:00 PM to 8:00 PM

Alternative R-5 Restripe would incorporate the following crash reduction measures:

- Speed management
- Enhanced delineation and signing, including
  - Delineation
  - Static signs
  - Variable message signs
- Enhanced illumination
- Enhanced incident management program

The outer roadways would continue to operate as they do currently, without restrictions for flammable loads in the tunnels and lids. Variable speed limits would be implemented throughout the corridor as a part of the speed management crash reduction measure noted above. During off-peak periods, the existing 60 mph posted speed would likely remain in effect.

2.2.3.2 Roadway Modifications

With this design option for Alternative R-5 Restripe, the outer roadways would be restriped, and the traffic lanes and inside shoulder would be narrowed to create 14-foot wide transit-only shoulder lanes on the outside shoulders. With the restriping, two of the three existing travel lanes in both of the outer roadways would be reduced in width from 12 feet to 11 feet. The inside shoulder would be reduced in width from 6 feet to 4 feet. Exceptions to these lane and shoulder widths are noted below.

The 14-foot wide transit shoulder has been identified as the preferred width with Alternative R-5 Restripe, but options could be considered that would reduce the transit shoulder width to 12 or 13 feet. With these options, additional travel lanes would remain at the standard 12-foot width. This, and other options involving trade-offs between transit shoulder and travel lane width, would be further evaluated in subsequent detailed design phases of the project.

The required modifications are described below by roadway section:

- *Seattle, I-5 to Mount Baker Ridge:* No modifications would be made to the I-90 outer or center roadways in this corridor section.

- *HMH Floating Bridge (westbound lanes and center roadway):* Restriping would occur in the westbound outer roadway across the bridge. The outside shoulder would be widened while reducing lane widths and the inside shoulder width to allow for a transit shoulder. No modifications would be made to the center roadway or the shared-use pathway.

- *LVM Floating Bridge (eastbound lanes):* Restriping would occur in the eastbound outer roadway across the bridge. The outside shoulder would be widened while reducing lane widths and the inside shoulder width to allow for a transit shoulder. The inside shoulder on the central portion of the bridge would be reduced in width from 10 feet to 8 feet; elsewhere, the inside shoulder would be reduced in width from 6 feet to 4 feet.

- *Mercer Island/First Hill Lid:* Restriping would occur in the eastbound and westbound outer roadways. The outside shoulder would be widened from 10 feet to 14 feet westbound and 15.5 feet eastbound, while reducing lane widths and the inside shoulder width to allow for a transit shoulder. The wider transit shoulder would be provided eastbound to increase stopping sight distance for transit buses. Westbound, the inside shoulder would be reduced in width from the existing 11.8 feet to 9.8 feet, which would reduce stopping sight distance for westbound traffic in Lane 3. No modifications would be made to the center roadway.

- *Mercer Island CBD and Mercer Island/Shorewood:* Restriping would occur in the eastbound and westbound outer roadways. The outside shoulder would be widened from 10 feet to 14 feet while reducing lane widths and the inside shoulder width to allow for a transit shoulder. No modifications would be made to the center roadway.

- *East Channel Bridge/Bellevue/Bellevue Way SE/I-405:* No modifications would occur in the eastbound and westbound outer roadways. Bus movements to and from Bellevue Way SE would occur on the existing outer roadway ramps and travel lanes. No modifications would be made to the center roadway, or to the existing shared-use pathway on the north side of the East Channel bridge.

In addition to the section-specific design options described above, trade-offs between proposed lane and shoulder widths, and for placement of the 12-foot wide travel lanes, would be further evaluated in subsequent detailed design phases if Alternative R-5 Restripe were selected for implementation. These evaluations would consider optimization of roadway drainage considerations, sight distances, and observed use of individual lanes by heavy trucks.

Typical cross sections of the I-90 roadway for Alternative R-5 Restripe are shown in Figures 2-4 and 2-5.

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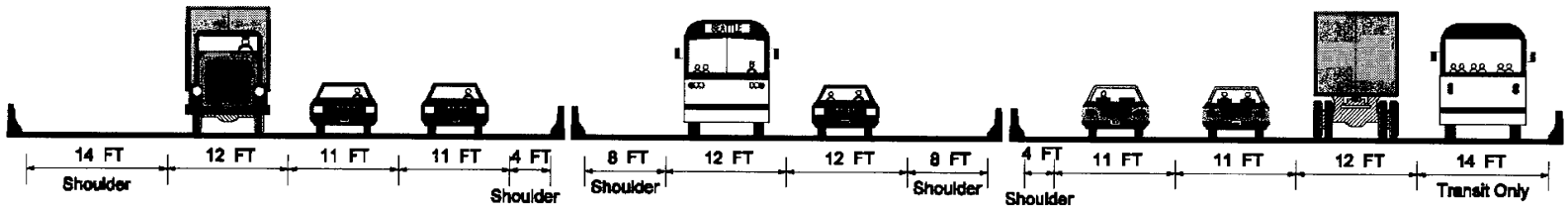
MORNING PEAK PERIOD

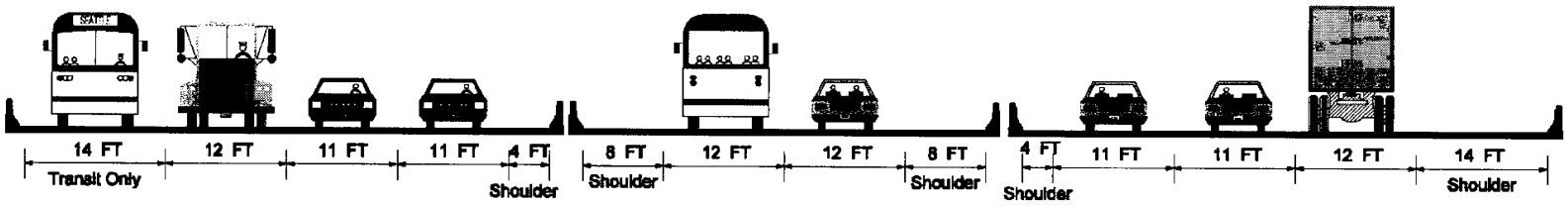


AM-Westbound to Seattle
Three Lane Outer Roadway

Reversible Center Roadway
AM-Inbound to Seattle
(Westbound)

AM-Eastbound to Eastside
Four Lane Outer Roadway

AFTERNOON PEAK PERIOD



PM-Westbound to Seattle
Four Lane Outer Roadway

Reversible Center Roadway
PM-Outbound From Seattle
(Eastbound)

PM-Eastbound to Eastside
Three Lane Outer Roadway

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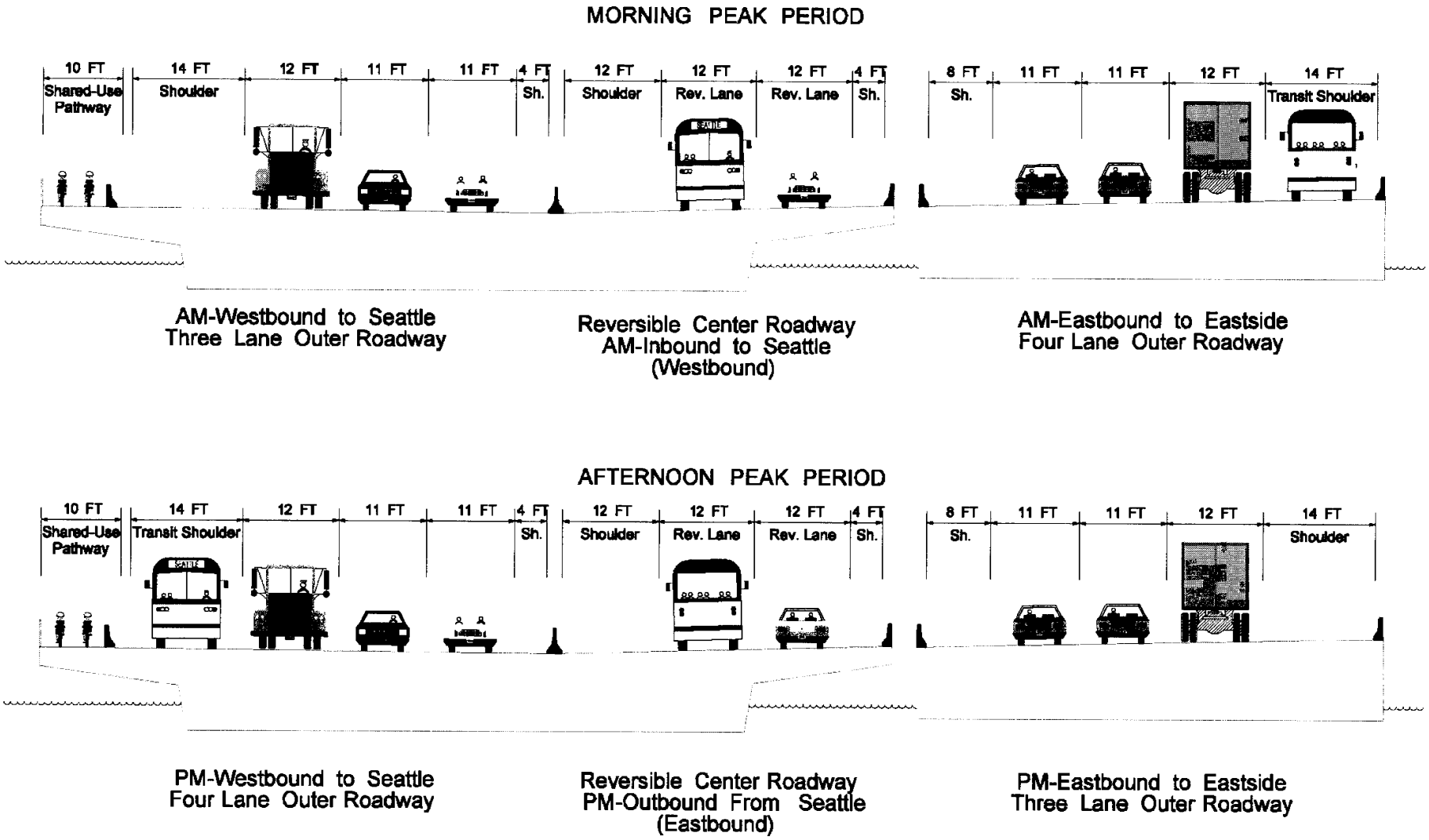
SOUNDTRANSIT

Figure 2-4
Alternative R-5 Restripe
Transit-Only Shoulders on Outer Roadway



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SOUNDTRANSIT

Figure 2-5
Alternative R-5 Restripe on Floating Bridges

2.2.4 Alternative R-5 Modified: Transit-Only Shoulders on Outer Roadway

2.2.4.1 I-90 Roadway Operations

With Alternative R-5 Modified, the existing reversible operations in the center roadway would be maintained, with both lanes operating in the same direction. The portions of the center roadway restricted to HOV traffic would likely operate with 2+ occupants per vehicle. Transit-only shoulders would be created in both I-90 outer roadways for use by transit buses. Westbound buses would operate on the inside shoulder, and eastbound buses on the outside shoulder. Hours of operation would be as described for Alternative R-5 Restripe (see Section 2.2.3.1).

Alternative R-5 Modified would incorporate similar crash reduction measures as proposed for Alternative R-5 Restripe and include:

- Speed management
- Enhanced delineation and signing, including
  - Delineation
  - Static signs
  - Variable message signs
- Enhanced illumination
- Enhanced incident management program

The outer roadways would continue to operate as they do currently, without restrictions for flammable loads in the tunnels and lids. Variable speed limits would be implemented throughout the corridor as a part of the speed management crash reduction measure noted above. During off-peak periods, the existing 60 mph posted speed would likely remain in effect.

2.2.4.2 Roadway Modifications

Portions of the outer roadways would be reconfigured to allow for a 14-foot wide inside shoulder for westbound buses, providing continuity with the existing westbound HOV lane and transit connections to downtown Seattle. Ramps at Bellevue Way SE and on Mercer Island would be modified to provide connections to the westbound transit shoulder. The eastbound outer roadway would be widened to allow for standard inside shoulder and traffic lane widths in much of the corridor, while providing a 14-foot wide outside shoulder for use by transit buses.

The 14-foot wide transit shoulder has been identified as the preferred width with Alternative R-5 Modified, but options could be considered that would reduce the transit shoulder width to 12 or 13 feet. With these options, additional travel lanes would remain at the standard 12-foot width, or the amount of additional widening could be reduced as noted below for some sections. This, and other options involving trade-offs between transit shoulder and travel lane width, would be further evaluated in subsequent detailed design phases of the project.

The required modifications are described below by roadway section:

- *Seattle, I-5 to Mount Baker Ridge:* No modifications of I-90 west of Rainier Avenue S would be required. Restriping would occur in the westbound outer roadway through the Mount Baker Ridge tunnel and lid. The outside shoulder width in the westbound tunnel would be reduced from 10 feet to 4 feet. No modifications would be made to the center roadway.

- *HMH Floating Bridge (westbound lanes and center roadway):* The inside shoulder would be widened to facilitate use of the shoulders during peak periods. On the east and west approach spans of the bridge, the median barrier would remain in place, and the existing width of the westbound outer roadway would be restriped to provide a 4-foot-wide outside shoulder, one 12-foot-wide and two 11-foot-wide travel lanes, and a 14-foot-wide inside shoulder.

  The central portion of the bridge, which is supported by pontoons, represents approximately 5,500 feet out of the total bridge length of approximately 8,500 feet. The westbound outer roadway would be restriped to provide three 11-foot-wide travel lanes, a 4-foot-wide outside shoulder, and a 15-foot-wide inside shoulder.

  A value engineering study was conducted in March 2003 that resulted in recommendations to preserve the width of the shared-use pathway by reconfiguring the westbound lanes on the HMH floating bridge rather than widening the bridge. This recommendation resulted in removing the bridge widening from further consideration since the DEIS.

- *LVM Floating Bridge (eastbound lanes):* Restriping would occur in the eastbound outer roadway across the bridge. The outside shoulder would be widened while reducing lane widths and the inside shoulder width to allow for a transit shoulder. The inside shoulder on the central portion of the bridge would be reduced in width from 10 feet to 8 feet; elsewhere, the inside shoulder would be reduced in width from 6 feet to 4 feet.

- *Mercer Island/First Hill Lid:* Restriping would occur in the eastbound and westbound outer roadways. The westbound outer roadways would be widened at the west portal of the First Hill lid. Within the First Hill lid, the eastbound outside shoulder would be widened to 15.5 feet, while reducing lane widths and the inside shoulder width. The wider transit shoulder would be provided eastbound to increase stopping sight distance for transit buses. Westbound, the inside shoulder would be widened from 11.8 feet to 14 feet for use by transit buses. No modifications would be made to the center roadway.

- *Mercer Island CBD:* The outer roadways would be widened by up to 2 feet eastbound and 4 feet westbound to allow for a 14-foot wide transit shoulder. This widening would allow the existing eastbound inside shoulder (6 feet wide) to remain in place, and would provide for an 8-foot wide outside shoulder westbound. Westbound, a new transit-only ramp would be added at 80th Avenue SE. No modifications would be made to the center roadway.

- *Mercer Island/Shorewood:* The outer roadways would be widened by up to 6 feet in each direction to allow for a transit shoulder. This widening would generally occur to the north for both outer roadways, allowing a 10-foot wide inside shoulder eastbound, which would meet current interstate design standards, and maintaining the existing 10-foot wide outside shoulder westbound. No modifications would be made to the center westbound roadway.

- *East Channel Bridge/Bellevue/Bellevue Way SE/I-405:* Modifications would be made to the Bellevue Way SE ramp to provide connection to the westbound HOV lane that would feed the inside transit shoulder west of the center roadway slip ramps at East Mercer Way. These modifications would include adding a concrete median barrier and widening the ramp by 4 to 20 feet. No modifications would be made to the center roadway, or to the existing shared-use pathway on the north side of the East Channel Bridge.

Typical cross sections of the I-90 roadway for Alternative R-5 Modified are shown in Figures 2-6 and 2-7.

2.2.5 Alternative R-8A: Add HOV Lanes on Outer Roadways – *Preferred Alternative*

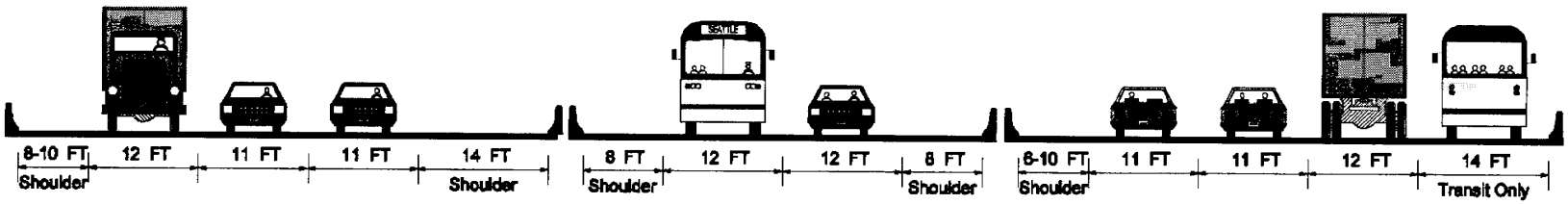
2.2.5.1 I-90 Roadway Operations

Alternative R-8A would retain the current reversible operations in the center roadway, with both lanes operating in the same direction. Single-occupant vehicles could use the center roadway only between Seattle and Mercer Island.

Alternative R-8A would incorporate crash reduction measures similar to those being proposed for the other Build Alternatives with the addition of shoulder rumble strips. The measures include the following:

- Speed management
- Shoulder rumble strips
- Enhanced delineation and signing, including
  - Delineation
  - Static signs
  - Variable message signs
  - Lane control signals
- Enhanced illumination
- Enhanced incident management program

MORNING PEAK PERIOD

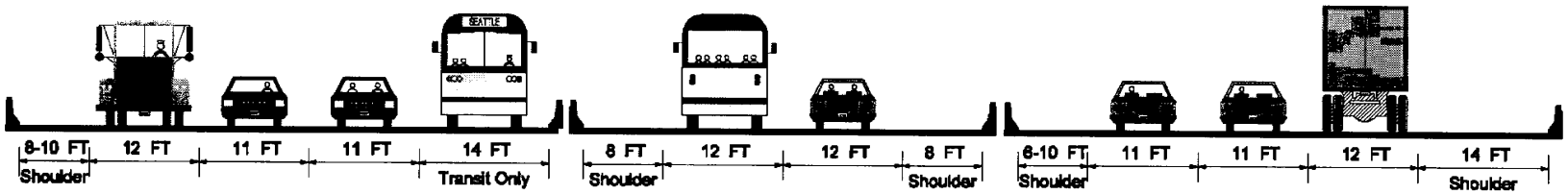


AM-Westbound to Seattle
Three Lane Outer Roadway

Reversible Center Roadway
AM-Inbound to Seattle
(Westbound)

AM-Eastbound to Eastside
Four Lane Outer Roadway

AFTERNOON PEAK PERIOD



PM-Westbound to Seattle
Four Lane Outer Roadway

Reversible Center Roadway
PM-Outbound From Seattle
(Eastbound)

PM-Eastbound to Eastside
Three Lane Outer Roadway

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Figure 2-6
Alternative R-5 Modified
Transit-Only Shoulders on Outer Roadway

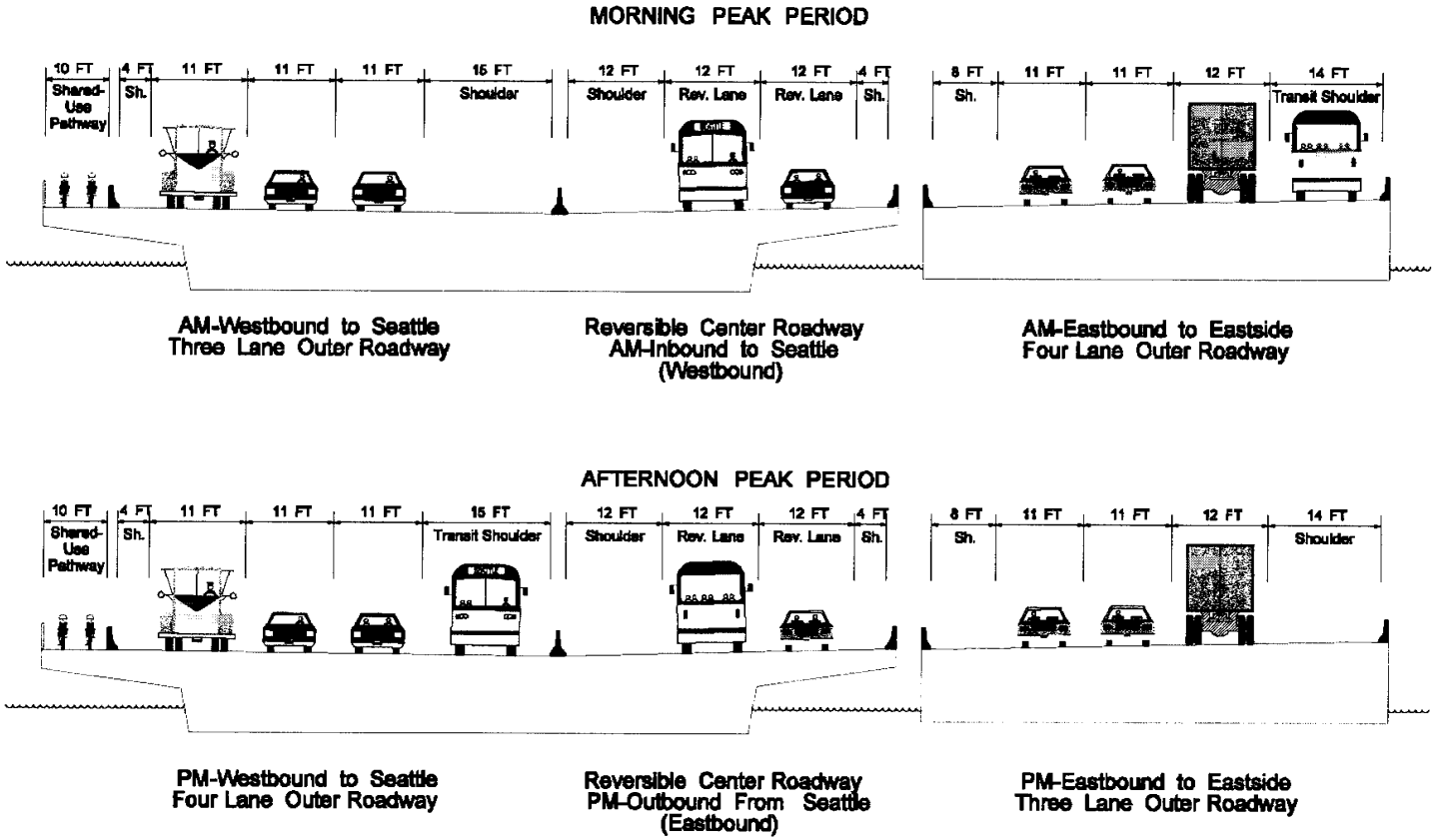

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Figure 2-7
Alternative R-5 Modified on Floating Bridges

Because of sight distance restrictions, and reductions in shoulder widths, the posted speed on I-90 may be reduced from 60 mph to 50 mph between I-5 and Island Crest Way. Variable speed limits would also be implemented throughout the corridor as a part of the speed management crash reduction measure noted above. Flammable cargoes may be prohibited on I-90 between I-5 and Island Crest Way due to reductions in lane and shoulder widths on the outer roadways through the Mount Baker Ridge tunnels and lid, and through the First Hill lid. The center and outer roadway HOV lanes would likely operate with 2+ occupants per vehicle.

Operational options analyzed but no longer under consideration for Alternative R-8A include:

Time-of-Day Operation of Outer Roadway HOV Lanes – Closure of one of the four proposed outer roadway lanes during reverse-peak periods.

Managed Lane Operations of the Center Roadway – Expanded use of time-of-day restrictions, and consideration of tolling or other management techniques to increase utilization of the center roadway.

2.2.5.2 Roadway Modifications

Modifications would need to be made to the I-90 roadway in order to facilitate the operational changes described above. Except as noted below, the typical section for the outer roadways would provide an 8 to 10 foot wide outside shoulder, one 12-foot wide general purpose lane and two 11-foot wide general purpose lanes, a 12-foot wide HOV lane, and a 2-foot wide inside shoulder.

The required modifications are described below by roadway section:

- *Seattle, I-5 to Mount Baker Ridge*: Both the eastbound and westbound outer roadways would be widened by up to 11 feet to provide a fifth travel lane between I-5 and Rainier Avenue S. This widening, in addition to providing for outside shoulders at least 8 feet in width, would improve existing sight distances for eastbound traffic to approximately 60 mph. All outer roadway travel lanes in both directions through the CorwincCurves would be reduced in width from 12 feet to 11 feet. Westbound, the existing lane drop into the Rainier Avenue S southbound loop ramp would be modified to a through lane.

- Through the eastbound bores of the Mount Baker Ridge tunnel, one of the existing lanes on the outer roadway would be reduced from 12 feet wide to 10.5 feet in order to provide an additional travel lane through the south bore. The additional travel lane would also be 10.5 feet wide; the resulting lane and shoulder widths in the south bore of the eastbound tunnel would match existing lane and shoulder widths in the north bore of the eastbound tunnel. Westbound through the Mount Baker Ridge tunnel, the outside shoulder width would be reduced from 10 feet to 4 feet. No modifications would be made to the center roadway.

- *HMH Floating Bridge (westbound lanes and center roadway):* One additional lane for transit and HOV use would be added for a total of four lanes. On the east and west approach spans of the bridge, the median barrier would remain in place, and the existing

width of the westbound outer roadway would be restriped to provide a 4-foot-wide outside shoulder, two 12-foot-wide and two 11-foot-wide travel lanes, and a 2-foot-wide inside shoulder.

- The central portion of the bridge, which is supported by pontoons, represents approximately 5,500 feet out of the total bridge length of approximately 8,500 feet. On this portion of the bridge, the westbound outer roadway would be restriped to provide four 11-foot-wide travel lanes, relocating the existing median barrier by two feet to the south to increase the width of the westbound outer roadway from 52 feet to 54 feet, to provide a 2-foot-wide outside shoulder and an 8-foot-wide inside shoulder. The width of the inside shoulder on the westbound roadway would be increased from 6 feet to 8 feet to facilitate incident response activities.

  For the entire length of the bridge with all design options, the adjacent shared-use pathway would remain 10 feet wide in its existing location. Screening would be added on top of the existing concrete traffic barrier between the shared-use pathway and the westbound outer roadway.

  Table 2-5 compares the lane configurations of Alternatives R-1 and R8A:

Table 2-5
Comparisons of Lane Configurations, Alternatives R-1 and R-8A

	# and width of GP Lanes	# and width of HOV/Transit Lanes	Width of Inside Shoulder	Width of Outside Shoulder	Shared-Use Pathway Width	Total Westbound Roadway Width
Alternative R-1 Existing						
Bridge Approaches	three 12-foot lanes	0	6'	10'	10'	52'
Central Portion	three 12-foot lanes	0	6'	10'	10'	52'
Preferred Alternative R-8A						
Bridge Approaches	two 11-foot lanes one 12-foot lane	one 12-foot lane	2'	4'	10'	52'
Central Portion (relocate median barrier)	three 11-foot lanes	one 11-foot lane	8'	2'	10'	54'

Source: HNTB 2003

- *LVM Floating Bridge (eastbound lanes):* The eastbound outer roadway would be restriped to provide a fourth lane (for HOV use) on the outer roadway. The outside shoulder width would be reduced from 10 feet to 8 feet on the central portion of the bridge; elsewhere, the outside shoulder width would be reduced from 10 feet to 4 feet. Additional scuppers would be cut into the north barrier on the bridge to facilitate stormwater drainage with the proposed 2 foot wide inside shoulder.

- *Mercer Island/First Hill Lid:* The westbound outer roadway would be widened at the western portal of the First Hill lid to provide a wider outside shoulder and to improve stopping sight distance. The eastbound and westbound outer roadways would be restriped within the First Hill lid to provide for a fourth lane (for HOV use) on the outer roadways. Eastbound, the inside shoulder width would be reduced from 13.5 feet to 8.5 feet, which would accommodate disabled vehicles but would compromise

stopping sight distance on a horizontal curve. All three general purpose lanes would be reduced in width from 12 feet to 11 feet.

Westbound, the inside shoulder width would be reduced from 11.8 feet to 10.8 feet, and the outside shoulder width reduced from 10 feet to 2 feet. One option under consideration for this portion of the westbound outer roadway would provide an 8-foot wide outside shoulder, which would result in a 4.8 foot wide inside shoulder. The resulting stopping sight distance would require an advisory speed, or reduced posted speed, of 50 mph for westbound traffic inside the lid. No modifications would be made to the center roadway.

- *Mercer Island CBD:* The outer roadways would be widened by up to 2 feet eastbound and 4 feet westbound to provide for a fourth lane (for HOV use). In this section, outside shoulder widths would be up to 6 feet eastbound and 8 feet westbound. Additional widening along the outside shoulder would also occur to provide wider refuges for disabled vehicles, or for use by law enforcement and maintenance vehicles. New transit/HOV-only direct access ramps would be added at 77th and 80th Avenue SE to connect to the eastbound and westbound HOV lanes, respectively, on the outer roadway. No modifications would be made to the center roadway.

- *Mercer Island/Shorewood*: The outer roadways would be widened by up to 6 feet in each direction to add a fourth lane (for HOV use). This widening would generally occur to the north for both outer roadways, allowing 10-foot wide outside shoulders eastbound and westbound. Up to 12 feet of additional widening would occur in some areas to provide for 12 to 14 foot wide HOV enforcement areas along the inside shoulder of the outer roadways, and to provide increased stopping sight distance. No modifications would be made to the center roadway.

- *East Channel Bridge/Bellevue/Bellevue Way SE/I-405*: Restriping would occur on both the eastbound and westbound outer roadways, and the eastbound/center roadway barrier relocated 12 feet north, to facilitate westbound HOV access to/from the Bellevue Way SE and I-405 HOV ramps. Eastbound, this would allow for 10-foot wide shoulders on both sides of the outer roadway, and for five 12-foot wide travel lanes. The center roadway would be reduced in width from 40 feet with two lanes, to 28 feet with one lane, configured as two 8-foot wide shoulders and a 12-foot wide reversible lane.

  Westbound, the East Channel bridge would be restriped to provide a new HOV auxiliary lane that would connect the proposed Bellevue Way SE westbound HOV direct access ramp to the center roadway slip ramp at East Mercer Way. With restriping, the westbound outer roadway would have a 10-foot wide outside shoulder, two 12-foot wide and four 11-foot wide travel lanes, and a two-foot wide inside shoulder. No modifications would occur to the existing shared-use pathway on the north side of the East Channel bridge.

  Modifications would be made to the Bellevue Way SE ramp to provide connection to the existing westbound HOV lane. These modifications would include adding a concrete median barrier and widening the ramp by 4 to 20 feet.

In addition to the section-specific design options described above, trade-offs between proposed lane and shoulder widths, and for placement of the 12-foot wide travel lanes, would be further evaluated in subsequent detailed design phases if Alternative R-8A were selected for implementation. These evaluations would consider optimization of roadway drainage considerations, sight distances, and observed use of individual lanes by heavy trucks.

Typical cross sections for the I-90 roadway with Alternative R-8A are shown in Figures 2-8 and 2-9a.

2.2.6 Identification of a Preferred Alternative

The I-90 Steering Committee identified its preferred alternative for the I-90 project on July 15, 2003. They identified Alternative R-8A, HOV lanes on the outer roadway, as an essential first step towards achieving a long-term transit vision for the Eastside; providing a strong transit connection between east and west King County; and improving the region's economy, mobility and quality of life; with the ultimate configuration of the I-90 to include high capacity transit in the center roadway.

The recommendation was supported by all I-90 Steering Committee members: the cities of Bellevue, Mercer Island and Seattle; King County; Sound Transit; and the state Department of Transportation. In addition, King County Executive Ron Sims, Seattle Mayor Greg Nickels, Bellevue Mayor Connie Marshall and Mercer Island Mayor Alan Merkle all wrote letters in support of the preferred alternative, which are included as Appendix F to this FEIS. The letters also highlight the parties' interest in developing and implementing high-capacity transit (HCT) in the I-90 corridor. They defined HCT as "a transit system operating in dedicated right-of-way such as light rail, monorail, or a substantially equivalent system". They recommended the development and executing of a future agreement based on the following principles:

- R-8A with HCT deployed in the center lanes is the ultimate configuration for I-90
- Construction of R-8A should occur as soon as possible as a first step to the ultimate configuration
- Upon adoption of R-8A, move as quickly as possible to implement HCT in the center lanes
- Commit to the earliest possible conversion of center roadway to two-way HCT operation based on outcome of studies and funding approvals
- Committee identified their commitment towards development and execution of a future agreement outlining their collective interest in developing and implementing HCT in the I-90 corridor

Alternative R-8A was identified by the Sound Transit Board as its Preferred Alternative on November 13, 2003.

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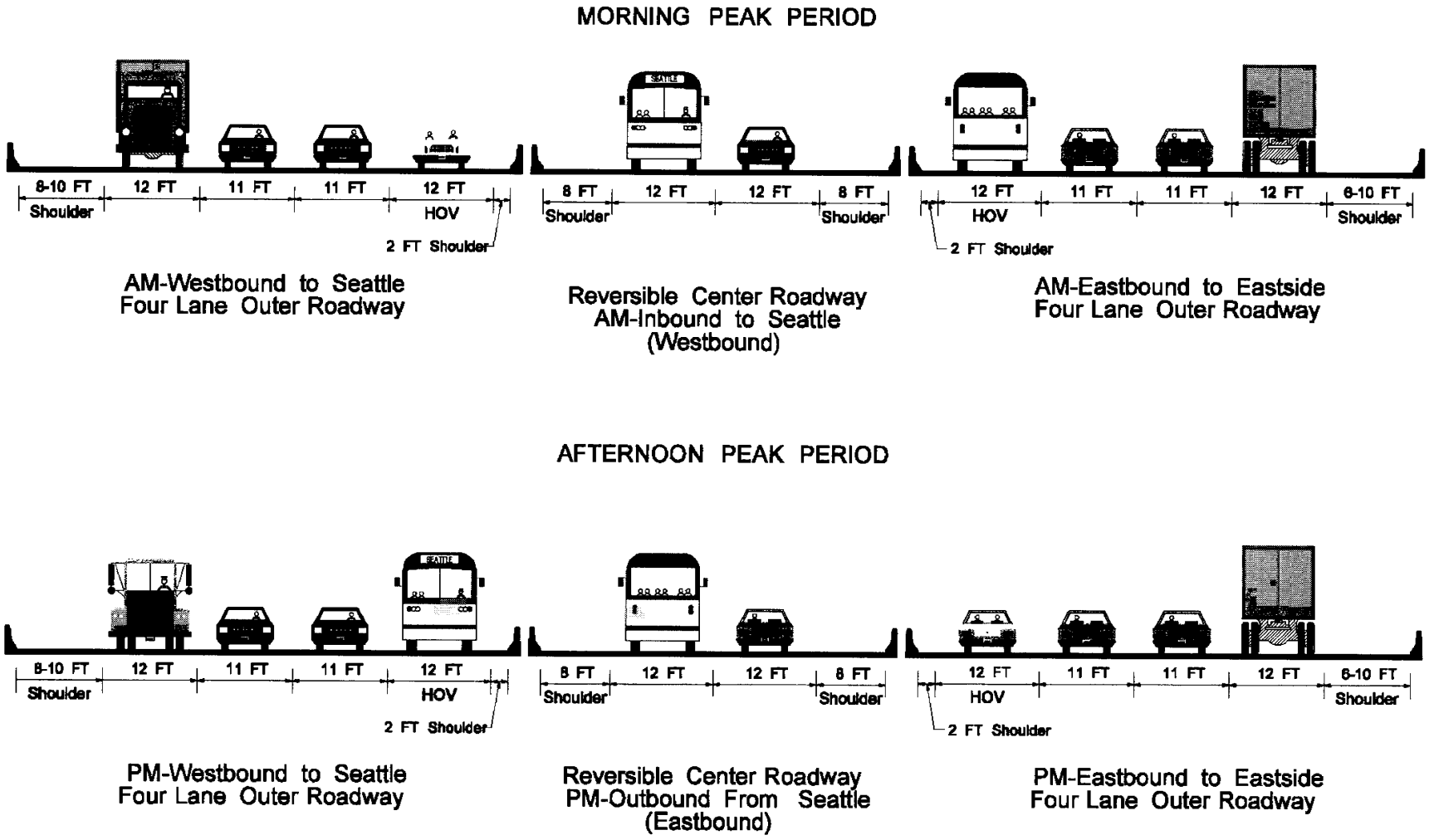

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Figure 2-8
Alternative R-8A
Add HOV Lanes on Outer Roadway

Figure 2-9 Alternative R-8A – Bridges with Widening (Deleted from FEIS)

(Deleted because there is no longer a proposal to widen the HMH floating bridge structure.)

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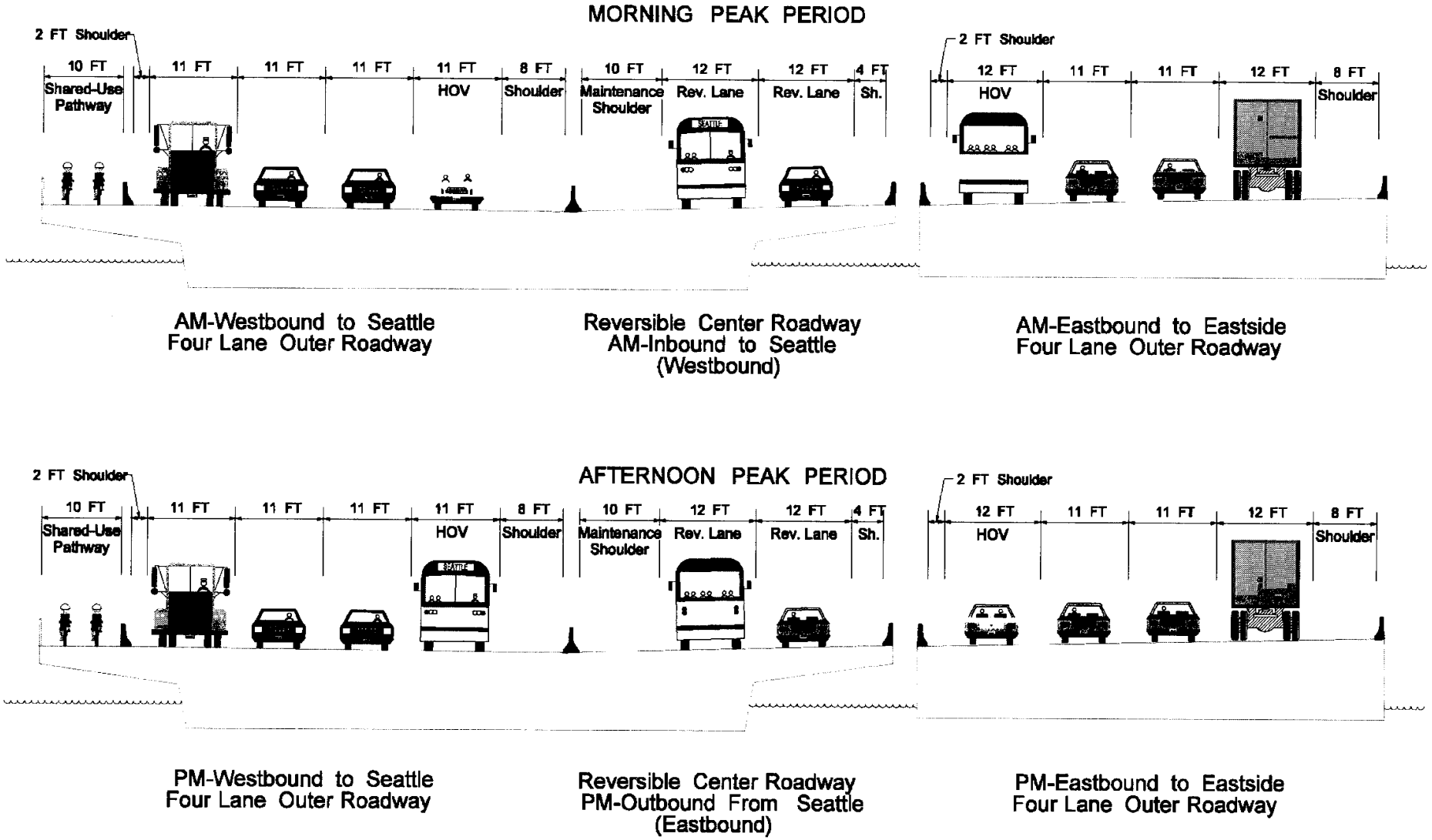

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Figure 2-9a
Alternative R-8A on Floating Bridges
Without Bridge Widening

Following completion of the FEIS, a decision on the project proposed to be implemented will be made by both the Sound Transit Board and the Washington State Transportation Commission. As the lead federal agency, FHWA will make a final decision as a part of the NEPA process to be included in its Record of Decision (ROD).

2.2.7 Consistency of Alternative R-8A with Sound Move

Sound Move provides for two-way transit operations in the center roadway on the I-90 bridge between Bellevue and Seattle, similar to the alternative described as Alternative R2-B. The preferred alternative, Alternative R8-A, differs from the design proposed in Sound Move in that it would place the transit lanes on the outer roadway instead of in the center roadway. Sound Move permits necessary design modifications such as this under certain circumstances, including infeasibility and/or impracticality. The reasons supporting the proposed design include the unacceptability of Alternative R2-B to certain signatories to the 1976 Memorandum Agreement and the center roadway design which would degrade, rather than improve transit operations. If Alternative R8-A is selected as the proposal to be constructed after issuance of the Final EIS for this project, then Sound Transit staff will prepare and submit the necessary documentation to support the design modification to the Sound Transit Board for consideration.

2.2.8 Estimated Cost

The cost information included in the DEIS identified preliminary estimates of probable construction costs for each of the alternatives in 2002 dollars. This information was included for comparison purposes. Design costs were not included nor were expenditures to date. The DEIS estimates of probable construction costs were as follows:

Alternative R-2B Modified:	$28 to $ 30 million
Alternative R-5 Restripe:	$10 to $ 12 million
Alternative R-5 Modified:	$68 to $ 76 million
Alternative R-8A:	$90 to $100 million

Since the DEIS was issued, WSDOT has completed a value engineering (VE) study in March 2003, and a cost estimating validation process (CEVP) in July 2003 for the project. The VE team included representatives from Sound Transit, WSDOT, and FHWA, and their consultants. The VE team included experts in structural, civil, transportation, and construction engineering. The VE analysis resulted in recommendations to preserve the width of the shared-use path by reconfiguring the westbound lanes on the HMH floating bridge rather than widening the bridge. As a result, the construction costs of Alternatives R-5 Modified and R-8A were reduced relative to the alternatives evaluated in the DEIS.

The CEVP process was completed in order to validate the construction costs and to identify and quantify potential risks that could impact the project's budget and schedule. The cost of the final design phase and any costs incurred by the project to date were included in the CEVP numbers, for an estimate of total cost to complete the project.

The cost of final design was estimated at approximately 11 percent of the construction costs, for budgeting purposes. Probability ranges for project costs were developed based on the current

level of project design. The project schedule for design, permits, right-of-way, and construction was evaluated, and annual inflation factors of 3 percent were applied based on the years that expenditures are planned to occur. The estimates of total project costs and anticipated years of completion shown below include all of the above factors to a 90 percent certainty.

Alternative R-2B Modified:	$ 49 million – construction complete 2008
Alternative R-5 Restripe:	$ 21 million – construction complete 2006
Alternative R-5 Modified:	$ 93 million – construction complete 2008
Alternative R-8A – Preferred Alt.	$128 million – construction complete 2008

Sound Transit is working with representatives from other partner jurisdictions to identify and request project construction funds from several funding sources. Sound Transit and WSDOT have made a joint request for $30 million in the reauthorization of the federal transportation program (Transportation Equity Investment Act for the 21st Century (TEA-21)). In addition, funds may be included in the Regional Transportation Investment District (RTID) proposal which is under development and may be presented to the public for a vote in 2004.

2.2.9 Benefits and Disadvantages of Delaying Implementation of the Project

2.2.9.1 Benefits of Delaying Implementation of the Project

The benefits of delaying implementation of the Project would include:

- Environmental impacts (e.g., to air quality, water quality, biological resources, visual quality, and utilities) during construction of the Project would be delayed, or eliminated if the Project was never constructed.

2.2.9.2 Disadvantages of Delaying Implementation of the Project

The disadvantages of delaying implementation of the Project would include:

- As congestion on I-90 worsens, all travel on the Lake Washington crossing is anticipated to become increasingly slow and less reliable. This is a special concern for regional express and local bus service, as well as carpools/vanpools operating in the reverse-peak direction that would continue to be delayed by the lack of HOV express lanes.

- Bus delays and failure to meet schedules would continue to reduce the confidence of bus riders in the reliability of transit service, reduce riders' abilities to make transfer connections, make it difficult for riders to reach their destinations when expected, and reduce the attractiveness of transit service in the I-90 corridor.

- Projected transit demand in the corridor would not be met due to limited transit capacity.

- Safe and reliable two-way transit and HOV lanes on I-90, critical to the success of encouraging people to use transit or HOVs instead of their SOVs, would not be provided. Mobility in the corridor would continue to be degraded and would negatively impact economic development and the movement of freight.

- Volumes in the general-purpose lanes would be expected to exceed 100 percent of available capacity during both peak periods and in both directions of travel. Traffic estimates anticipate over 10 hours of daily congestion on the corridor by the year 2025.

- WSDOT would not be consistent with their Freeway HOV System Policy including provisions for consideration of two-directional separated HOV roadways on I-90 "when directional splits are relatively even for the number of lanes present, there is a demand for ridesharing in both directions during peak hours, or there is a large volume of buses adversely affected by congestion in the off-peak or reverse-peak direction." (Refer to Section 1.2.1 of this FEIS).

- Jobs resulting from construction of the Project would not be created.